January 1965
60 Cents

QST

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amateur radio

PUBLISHED BY THE AMERICAN RADIO RELAY LEAGUE

LINEAR STANDARD

AUDIO TRANSFORMERS

PIONEERS IN MINIATURIZATION

BROADCAST
HI-FIDELITY
HAM
COMMERCIAL

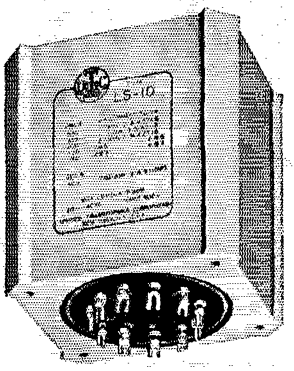
For over 30 years UTC has been the leader in advancing the art and technology of iron core inductance devices . . . The Linear Standard (LS type) units are the highest quality, non-hermetic, high fidelity transformers of their type. This series includes transformers designed for tube, transistor, hybrid, modulation and matching applications.

With the ever increasing use of wide range equipment, the point has been reached where the major limiting factor is the frequency range of the transformers employed. These LS components represent the closest approach to the ideal transformer from the standpoint of uniform frequency response, low wave form distortion, high efficiency, thorough shielding, and dependability.

LS SERIES

TRANSFORMER TYPES	Pri. Range Ω	Sec. Range Ω	Freq. Range ± 1 db	Max. Level Range
Low Imped. to Grid and Mixing and Matching	2.5 to 5,000	50 to 120,000	7 ∿ to 50 KC	+ 15 dbm to + 23 dbm
Interstage and Driver	5,000 to 30,000	50,000 to 135,000	10 ∿ to 20 KC	100 mw to 40 W
Hybrid and Repeat Coils	150 to 600	150 to 600	20 ∿ to 40 KC	+ 15 dbm to + 18 dbm
Plate, Crystal, Photocell, and Bridging to Line	4,000 to 30,000	50 to 600	7 ∿ to 50 KC	200 mw to 400 mw
High Level Matching	50 to 600	1.2 to 600	10 ∿ to 40 KC	20 W to 40 W
Output to Line and Voice Coil	8 to 10K	500 to 1.2	7 ∿ to 50 KC	20 W to 60 W
Modulation	3K to 10.4K	6000 to 1.2	10 ∿ to 50 KC	20 W to 2500 W

IMMEDIATE DELIVERY
From Stock



LINEAR STANDARD
HIGH SHIELDING
DIE CAST CASES
TOP & BOTTOM MTG.

LS-1 CASE

Length	3¼"
Width	2⅝"
Height	3¼"
Mounting	1⅝ x 2⅛"
Screws	6-32
Cutout	1⅞" dia.
Unit Weight	3 lbs.

Write for latest catalog of over 1,200 STOCK ITEMS with UTC high reliability

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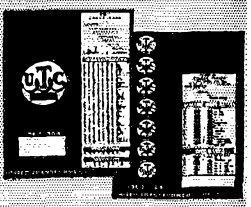

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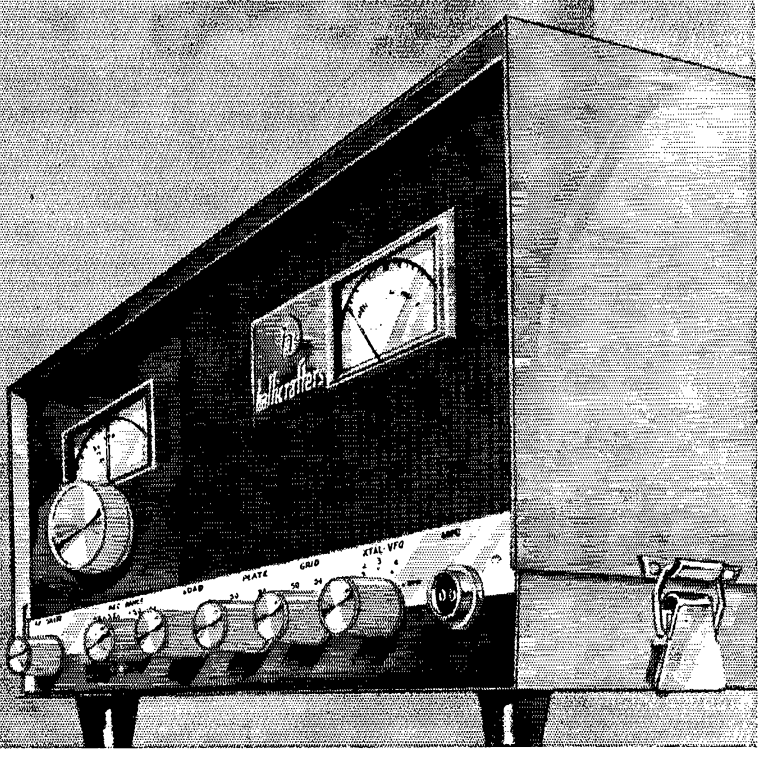

Efficient filters and selected injection frequencies make the NEW SR-46 and SR-42 VHF transceivers virtually immune to FM and TV interference.

Interference-free reception is only one of many advantages in the new SR-46. Complete six meter band coverage is another. Or full two meter coverage, if you prefer, in the companion SR-42 unit. Both give you double the usual bandspread, through use of dual tuning ranges. A neutralized nuvistor front end boosts sensitivity, and eleven tuned circuits increase selectivity while suppressing interference. Push to talk, of course.

Thorough field testing, before production, by hundreds of operators, assures you of years of trouble-free performance. It all adds up to your top VHF value. See the SR-46, or the SR-42, at your distributor today.

FEATURES

Frequency Coverage: 50 to 52 Mc and 52 to 54 Mc (144 to 146 Mc and 146 to 148 Mc in the SR-42). **Power Input:** 10-12 watts. **Power Supply:** 115 VAC and 12 VDC (vibrator and line cord optional extra). **Transmitter Crystals:** high frequency type; provision for four (one furnished), plus external VFO, switch-selected from front panel. **Tubes:** 10, plus zener diode oscillator control and four diodes (11 tubes, 2 zeners and four diodes in the SR-42). **"S" Meter** automatically switches to RFO. **Cabinet:** "snap-off" type for easy access. **Size:** 5½" high, 12⅛" wide, 8¼" deep. **Shipping Weight:** 17 lbs. **Amateur Net Price:** $189.95.

New **SR-46**

SIX METER VHF TRANSCEIVER and SR-42 for two meters

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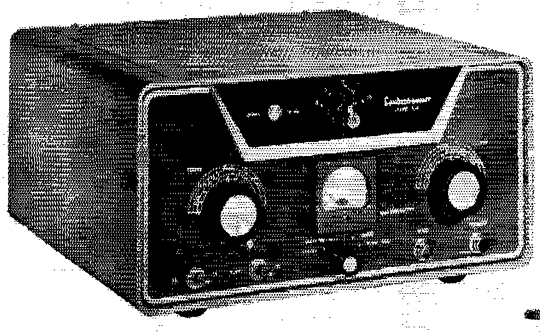
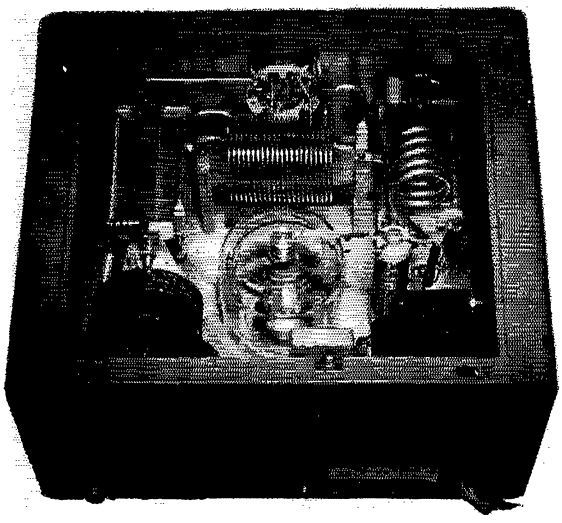
—CONTENTS—

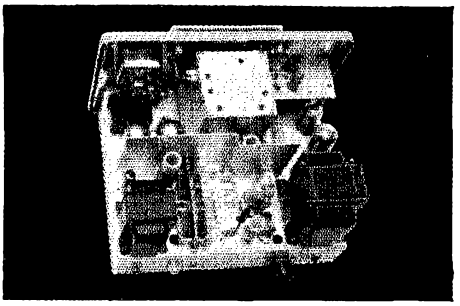
EIMAC

3-400Z triode is featured in Hallicrafters desk-top HT-45 Linear Amplifier

Below you see the Hallicrafters HT-45 Linear Amplifier designed for one kilowatt service: continuous, key-down rating! This popular amplifier provides commercial service reliability and improved linearity, thanks to Eimac's 3-400Z zero bias triode. The original-design 3-400Z eliminates costly and bulky screen and bias power supplies. Power—Dependability—Quality! That's what you expect and get in the HT-45. And that's what you can get when you design your linear amplifier with Eimac's 3-400Z. For additional information on this tube—and its big brother, the 3-1000Z—please write: Amateur Service Department, Eitel-McCullough, Inc., San Carlos, California.







Some may call it "ancient modulation", some simply call it AM phone—but whatever you call it, AM still represents a major portion of today's amateur activity—and the "Ranger II" is one of today's most popular AM rigs! For AM or CW operation, for 160 through 6 meters—the "Ranger II" offers the "biggest-little" 75 watts you'll find on the air! Rated at 75 watts CW and 65 watts high-level AM, the "Ranger II" delivers communications quality audio with the necessary punch to break through today's QRM! An excellent "first" transmitter for the Novice or the new General, the "Ranger II" will drive any of the popular kilowatt level tubes and will provide a high quality speech driver system for high powered modulators without modification! What else? The "Ranger II" offers attractive styling in a compact cabinet and is available at a reasonable price.

Cat. No. 240-162-1..."Ranger II" Kit ... **Net $249.50**
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FEATURES

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Basic tuning controls are located on the VFO dial escutcheon—QSY within the phone or CW portion of a band is usually possible by merely changing the VFO frequency setting.

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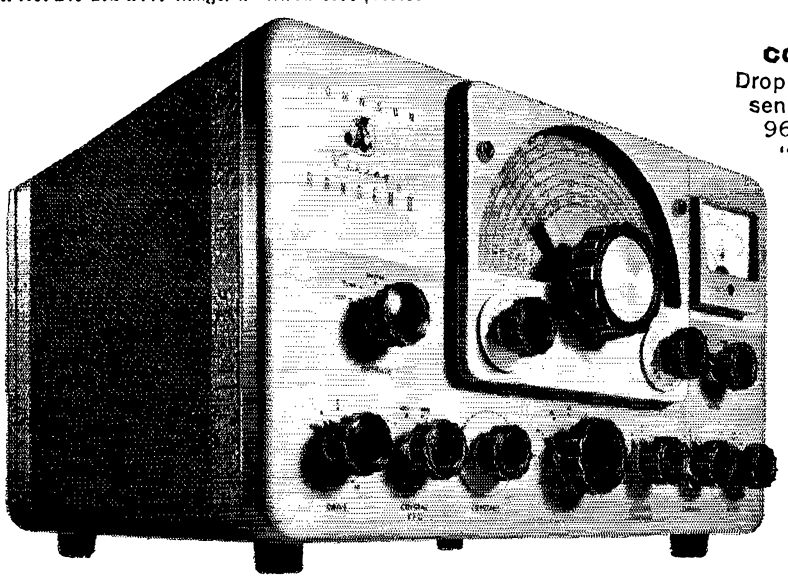

COMPLETE CATALOG

Drop us a card and we will send you Amateur Catalog 962 which gives the full "Ranger II" story, as well as detailed information on our complete line of amateur transmitters and accessories.

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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, OES, OPS, OO and OBS. Technicians may be appointed OES, OBS or V.H.F. PAM. Novices may be appointed OES. SCMs desire application leadership posts of SEC, EC, RM and PAM where vacancies exist.

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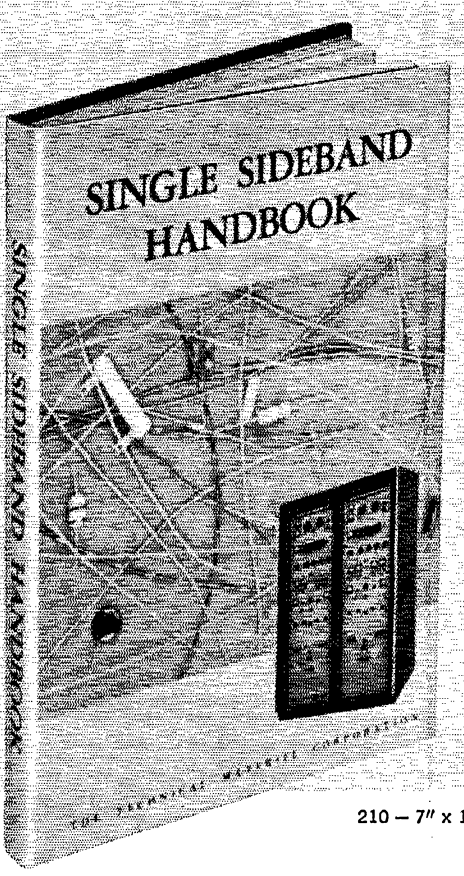

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It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors.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

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

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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GILBERT L. CROSSLEY W3YA
734 West Foster Avenue, State College, Pa. 16801

Vice-Director: Edwin S. Van Deusen W3ECP
3711 McKinley St., N.W., Washington, D.C. 20015

Central Division

PHILIP E. HALLER W9HPG
6000 S. Tripp Ave., Chicago, Ill. 60629

Vice-Director: Edmond A. Metzger W9PRN
1520 South Fourth St., Springfield, Illinois 62703

Dakota Division

CHARLES G. COMPTON W0BUO
1011 Fairmount Ave., St. Paul, Minn. 55105

Vice-Director: Charles M. Bove W0MXC
1611½ East Lake St., Minneapolis, Minn. 55407

Delta Division

PHILIP P. SPENCER W5LDH/W5LXX
29 Snipe St., Lake Vista, New Orleans, La. 70124

Vice-Director: Franklin Cassen W4WBK
925 North Trezevant St., Memphis, Tenn. 38108

Great Lakes Division

DANA E. CARTWRIGHT W8UPB
2979 Observatory Ave., Cincinnati, Ohio 45208

Vice-Director: Charles C. Miller W8JSU
4872 Calvin Drive, Columbus, Ohio 43227

Hudson Division

MORTON B. KAHN W2KR
1150 S.W. Cypress Way, Boca Raton, Florida 33432

Vice-Director: Stan Zak K2SJO
13 Jennifer Lane, Port Chester, New York 10573

Midwest Division

ROBERT W. DENNISTON W0NWX
Box 631, Newton, Iowa 50208

Vice-Director: Sumner H. Foster W0GQ
2315 Linden Dr., S.E., Cedar Rapids, Iowa 52403

New England Division

ROBERT YORK CHAPMAN W1QV
28 South Road, Groton, Conn. 06340

Vice-Director: Bigelow Green W1EAE
236 Marlboro St., Boston, Mass. 02116

Northwestern Division

ROBERT B. THURSTON W7PGY
7700 31st Ave., N.E., Seattle, Wash. 98115

Vice-Director: R. Rex Roberts W7CPY
837 Park Hill Drive, Billings, Mont. 59102

Pacific Division

HARRY M. ENGWICHT W6HC
770 Chapman, San Jose, Calif. 95126

Vice-Director: Ronald G. Martin W6ZF
1573 Baywood Lane, Napa, Calif. 94558

Roanoke Division

P. LANIER ANDERSON, JR. W4MWH
428 Maple Lane, Danville, Va. 24541

Vice-Director: Joseph F. Abernethy W4AKC
764 Colonial Drive, Rock Hill, S.C. 29730

Rocky Mountain Division

CARL L. SMITH W0BWJ
1070 Locust St., Denver, Colo. 80220

Vice-Director: John H. Sampson, Jr. W7OCX
3618 Mount Ogden Drive, Ogden, Utah 84403

Southeastern Division

THOMAS M. MOSS W4HYW
P.O. Box 20644, Municipal Airport Branch, Atlanta, Ga. 30320

Vice-Director: Charles J. Bolvin W4LVV
2210 S.W. 27th Lane, Miami, Fla. 33133

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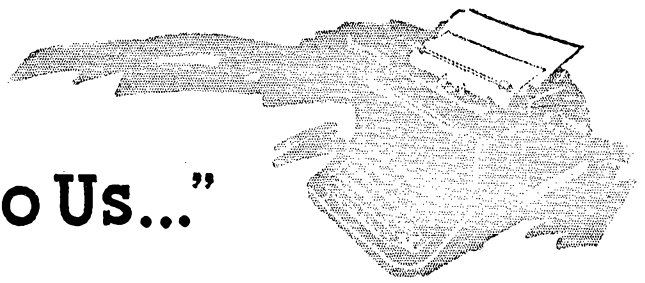
HOWARD F. SHEPHERD, JR. W6QJW
127 South Citrus Avenue, Los Angeles, Calif. 90036

Vice-Director: John F. Martin W6ECP
1135 Crest Drive, Encinitas, Calif. 92024

West Gulf Division

ROEMER O. BEST W5QKF
P.O. Box 1656, Corpus Christi, Texas 78403

Vice-Director: Ray K. Bryan W5UYQ
2117 S.W. 61st Terrace, Oklahoma City, Okla. 7315



"It Seems to Us..."

The Year in Review

RADIO PROPAGATION experts spoke of 1964 as the year of the quiet sun, and predicted that amateur activity would be correspondingly quiet. Well, 1964 proved that the experts were wrong, and wrong in a big way!

During its 50th anniversary year, three major ARRL long-term objectives were finally accomplished: amendment of the Communications Act to permit reciprocal operating priviliges for U. S. amateurs and those of other countries: the issuance of a commemorative stamp honoring amateur radio; and the formation of a western hemisphere alliance of national ham associations to constitute the Region II division of IARU.

In commemoration of the League's 50th birthday, *QST* carried a special year-long series highlighting memorable events and personalities in the growth and development of amateur radio. It recorded our progress — from a few thousand amateurs in 1914 to more than 250,000 today, from a handful of League members at the start, to more than 100,000 in 1964; from primitive spark transmitters and decoherer receiving apparatus to today's sideband, RTTY, 100-cycle selectivity, and even ham satellites in space; from an uncoordinated group of individual experimenters to an organized body fulfilling the functions of an amateur radio *service*.

QST article and essay writing contests brought new ideas and views appraising the present position of amateur radio and its future. Affiliated clubs and convention groups held anniversary banquets marking the 50-year League tenure, and this was also the theme of the 1964 National Convention in New York City. More states and communities than ever before proclaimed an Amateur Radio Week in commemoration. Also appropriate to its 50th year, ARRL established the Maxim Gold Medal award for outstanding contributions to amateur radio, and made the first presentation to John L. Reinartz, K6BJ, in recognition of his pioneering development of the short waves — an event soon saddened by his passing. Perhaps the *piece de resistance* was the issuance of a commemorative postage stamp honoring the accomplishments of the nation's amateurs, scheduled in 1964 to coincide with the League's 50th anniversary year. The stamp was initially released at Anchorage, Alaska, to recognize the outstanding performance of amateur radio in providing emergency communications during the earthquake. Appropriate dedication ceremonies were held there as well as in Washington, D.C. The stature of amateur radio with the general public is certain to be enhanced as the 120,000,000 stamps are sold through postoffices around the nation during the coming year.

On the international front, the year was marked with a substantially growing recognition by amateurs and their national societies around the world of the need for mutual cooperation and coordination, and great strides were made toward this end. Three societies — in Barbados, Ceylon and Greece — newly became members of the International Amateur Radio Union. Official and semi-officical visits of various society officers and staff members served to promote interchange of information and coordination of aims. After much preliminary planning, amateur societies in this hemisphere joined to form the Region II division of the IARU, patterned after the Region I organization which has been so successful for more than a dozen years in the Europe-Africa area. The International Amateur Radio Club continued its activity at the seat of telecommunications regulatory government in Geneva, spreading the gospel of the importance and usefulness of the amateur radio service; articles in the ITU's *Telecommunications Journal* further served to provide national communications authorities with the background and performance of amateurs around the world. ARRL showed its determination to fulfill its proportionate function as representative of amateurs in international matters by a Board appropriation of $100,000 for the defense of amateur frequency assignments, and undertook long-term studies to prepare for an eventual allocations conference.

Domestically, there was considerable discussion of the amateur's current status and future course, with a main topic the 1963 League proposal to raise our technical standards through restricting use of major voice bands to those holding the higher grades of license. While at its 1964 meeting the Board of Directors by no means found overwhelming endorsement by the membership, it had de-

(*Continued on page 10*)

(Continued from page 9)

termined there was more than adequate support to re-affirm its position. The petition awaited action by FCC, although the Commission did indicate its own concern with a proposal to tighten eligibility rules for the Conditional Class license.

We lost the battle to avoid license application fees (at least in the initial stages; the matter is presently before the Supreme Court) and for the first time in history such fees were imposed beginning in March. FCC went to automatic data processing in its licensing procedures, aimed at eventual increased efficiency, but not without some changeover problems which caused lengthy delays in some areas of license issuances. Citizens Band groups continued to make passes at amateur frequencies, either by proposing outright reallocation for CB use, or the establishment of a CB-type license in the amateur structure. These attempts were strongly opposed by the League and for numerous reasons stood little chance of adoption, but indicated probable future conflicts between the two services. Amateur regulatory changes were minor — FCC acted favorably upon a petition by the League to simplify signing requirements for RTTY, and reorganized and renumbered our regulations from the 12 series to the 97 series.

Dedication to public service was the 1964 theme of the operating and field organization of the League. The marriage of AREC and NTS into the over-all umbrella of the Amateur Radio Public Service Corps successfully passed the honeymoon stage, and extensive articles on background on specific objectives appeared in *QST* during the year. A new handbook on operating, to parallel the League's various technical publications, was in process and expected to appear in 1965, with accent on organization and emergency preparedness. The American National Red Cross and ARRL revised and updated their agreement for mutual cooperation in disasters. Fortunately the latter were few in 1964, but amateurs rose to perform particularly meritorious service in the Alaskan earthquake.

Sunspots and expert predictions notwithstanding, from an operating standpoint the year was far from quiet. If DXCC is any indication of the conditions on our bands, it was a fine year with more than 700 new members of the club. A number of DXpeditions added interest. The Worked All Continent award remained popular with almost 1200 issuances, while WAS applications were close to the previous year at the 800 mark.

On v.h.f., astounding results were obtained with the 1000-foot natural reflector at Arecibo, Puerto Rico, where KP4BPZ operated on 144 and 430 Mc. to shatter moonbounce records on both frequencies with several two-way contacts in Europe and the U. S. In the Field Day, better than 15,000 individuals took to the hills to equal the mark set in last year's test.

So if 1964 was supposed to be a poor year, the "better" years to come should be something to see! QST

NATIONAL'S FIFTIETH

An interesting department of ARRL's new Headquarters building is the museum where amateur gear from the crystal detector-spark coil days is on display. Many of the instruments were home-built, partly because individual amateurs' designs were often ahead of what manufacturers had to offer.

An exception, however, is receivers built by the National Company, a manufacturer that celebrated its fiftieth anniversary last year. The National SW3 of 1931, for example, was an important part of the station of many a ham. One of these sits beside an SW5, an even older model. The first AGS, the receiver used by Byrd at the south pole for the three years 1933–35, is there and so is an FB-7, one of the first manufactured superhets.

Later models do not belong in a museum devoted to old gear, but the National name immediately brings to mind the NC-101X and

the HRO, receivers that came out in the thirties and are still in use in many ham stations.

After fifty years, National, with the NCX-5, the HRO-500 and other equipments, is as well known as ever. The company can be proud of its half century of contribution to amateur radio.

OUR COVER

Merrill Swan, W6AEE put his teletype machine to work and came up with warm Season's Greetings from all of us at Headquarters to all of you.

IMPORTANT NOTICE

Changes of Address

Important postal changes in handling second-class mail matter are now in effect. Please advise us *direct* of any change of address. Four weeks notice is required to effect change of address. When notifying, please give old as well as new address. Your promptness will help you, the postal service and us. Thanks.

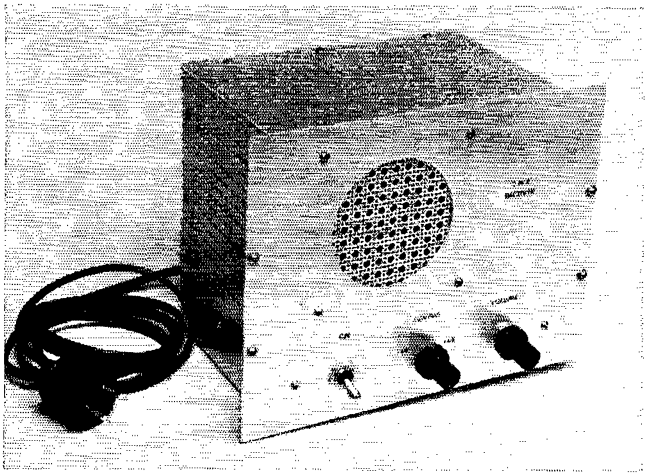


Fig. 1—The 2N2 receiver. Controls from left to right are for power, tuning, and volume.

The 2N2 Receiver

A Simple 144-Mc. Superregenerative Design

BY DOUGLAS A. BLAKESLEE,* W1KLK

THE 2N2 — two Nuvistors for 2 meters — is a complete receiver using two Nuvistors and one conventional tube. It covers 144 to 148 Mc., plus some overlap for the MARS and CAP frequencies. The young Novice with a limited budget will find the 2N2 receiver offers an inexpensive introduction to a popular v.h.f. band. The General can complete this easy-to-build project in a couple of evenings and, with a low-power transmitter, enjoy many QRM-free contacts. If there is little v.h.f. activity in your area, your club group can build simple equipment such as the 2N2 to start a switch to v.h.f. for local contacts.

In any receiving configuration, sensitivity and selectivity are important considerations. The receiver described is very sensitive, and you will be able to hear all you can work with low power. But to achieve simplicity — only two stages at 144 Mc. — a superregenerative detector circuit has been chosen. The selectivity will depend on the amount of superregeneration and the Q of the detector tuned circuit. A tuned circuit of medium Q has been used — again for simplicity — so the receiver has only moderate selectivity. Those used to the razor-sharp selectivity of s.s.b. receivers will find the 2N2 a bit different. You can work a group of stations and never have to touch the tuning. High-Q tuned lines can be used in v.h.f. superregens for greater selectivity,[1] but the construction becomes more difficult.

How It Works

A 6CW4, V_1, is used as an r.f. amplifier to provide some amplification of the incoming signal and to isolate the antenna from the superregenerative detector. The plate circuit is untuned. This results in low gain from the stage, but no neutralizing is required. Those who have sweated over oscillating v.h.f. stages will agree that the ease of adjustment is worth the small loss in sensitivity.

The regenerative detector has not enjoyed any popularity for many years in ham receivers. There was a time when it was *the* receiver, but for newcomers (like the author) this was in the dim past. However, for applications where circuit simplicity, light weight, or low power consumption are important factors, the regenerative detector deserves consideration.

The regenerative detector functions by feeding back some of the output to add to the incoming signal, making it much more useful for weak signals than other detectors. Increasing the feedback or regeneration too far will result in self-oscillation. It is possible, especially at v.h.f., to increase the regeneration beyond the point of oscillation and then interrupt the oscillations at a regular rate by means of a "quenching" voltage. This quality increases the sensitivity of the detector, to the point where the superregen often will rival much more elaborate receiving systems. The quenching voltage may come from a separate oscillator, or be generated within the superregenerative detector itself.

The second 6CW4, V_2, functions as a superregenerative detector which furnishes its own quenching voltage. The amount of superregeneration is controlled by varying the plate voltage on V_2 by means of R_1. C_1, L_2, and associated capacitors in the grid circuit of V_2 determine the frequency of the detector. With the values

* Technical Assistant, *QST*.

[1] Tilton, "A V.H.F. Receiver for the Novice or Technician," *QST*, November, 1951.

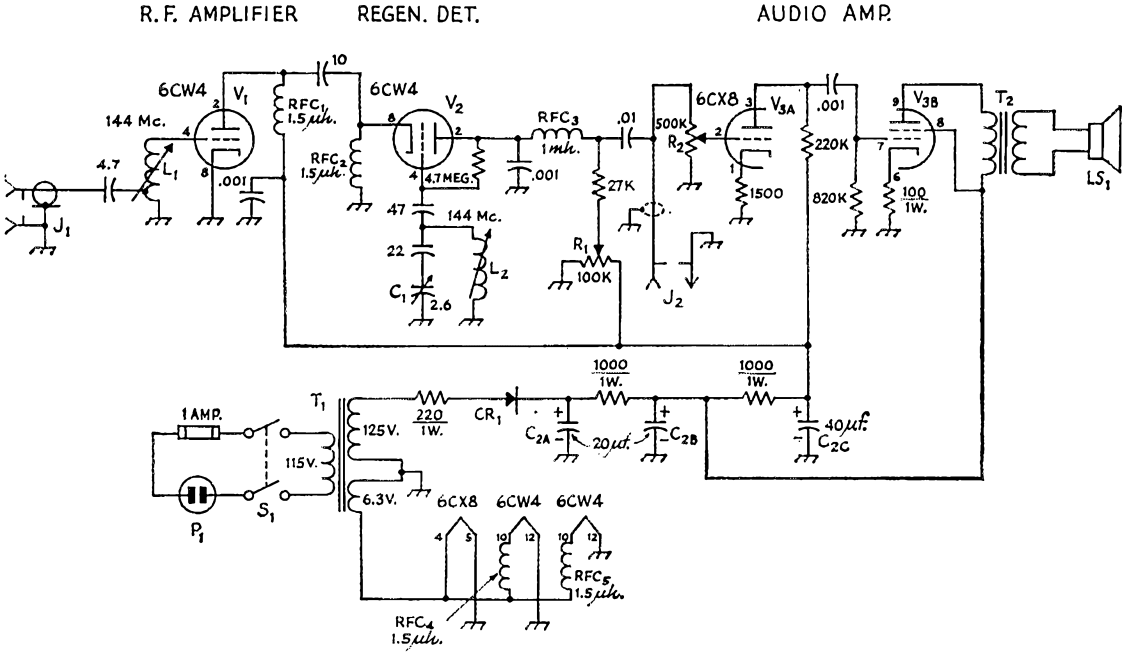


Fig. 2—Circuit diagram of the 144-Mc. receiver. Fixed capacitors are ceramic unless otherwise indicated. Resistors are ½-watt composition unless otherwise specified.

C_1—1.8-2.6-pf. midget variable (Johnson 160-104 with 4 rotor plates removed).

C_2—20-20-40-μf. electrolytic, 250-volt or higher rating (Mallory FP-320 shown).

CR_1—Silicon diode, 400 volts p.i.v., 750 ma. (1N540, GE504, etc.).

J_1—Chassis-mounting coaxial receptacle (SO-239).

J_2—Phono jack.

L_1, L_2—4 turns No. 18 tinned wire, ⅜-inch long, on ¼-inch slug-tuned form (Miller 4500). L_1 is tapped 1 turn from the ground end.

LS_1—4-inch loudspeaker, 3.2 ohms.

P_1—Line plug.

R_1—2-watt control, linear taper (Ohmite CU-1041).

R_2—½-megohm control, audio taper (Mallory Midgetrol U-53).

RFC_1, RFC_2, RFC_4, RFC_5—Approx. 1.5 μh.; 33 turns No. 24 enam., close-wound on 3/16-inch-diam. form (Miller 4604).

RFC_3—1 mh. (Miller 4652).

T_1—Power transformer: 125 volts, 50 ma.; 6.3 volts, 2 amp. (Knight 61G411, Stancor PA-8421).

T_2—Audio output transformer: Pri. 5000 ohms, sec. 3.2 ohms, 3 watts (Knight 62G064).

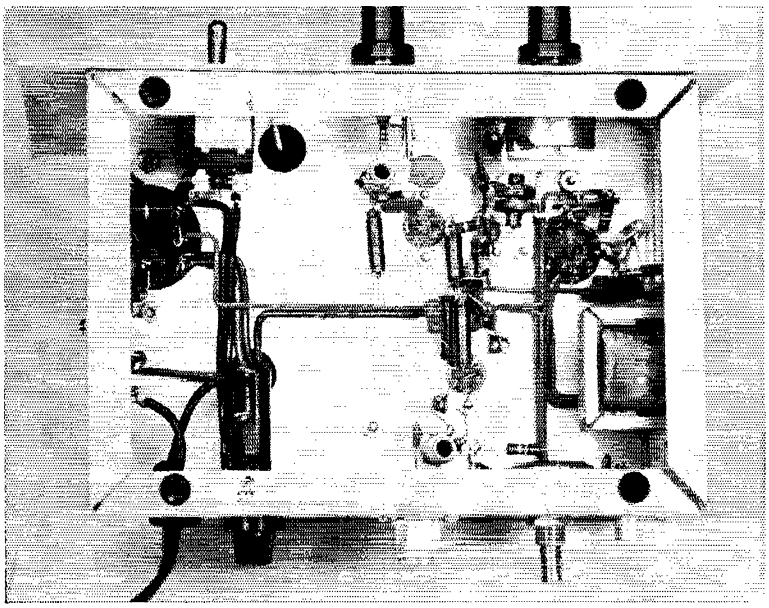


Fig. 3—Bottom view of the 2-meter receiver. The power supply is on the left, the r.f. amplifier and detector in the center, and the audio section at the right.

given, the tuning range is about 5 Mc. The regeneration (feedback) path is through the 4.7-megohm resistor from plate to grid.

The triode section of the 6CX8 is a voltage amplifier for the audio signal from the detector. The pentode section provides sufficient audio output for the 4-inch speaker. The 6CX8 was chosen because it is a popular tube in v.h.f. transmitters, increasing the chances that builders already will have one in the junk box.

Nuts and Bolts

A 5 × 7 × 2-inch chassis provides ample room for construction with no crowding of components. The front panel is 6½ × 8¼-inch aluminum, with a lip on either side to secure the receiver in a box, or to mount a cover, as shown in Fig. 1. The cover and speaker grille are cut from Reynolds perforated aluminum. The general parts placement can be seen in Fig. 3. The left chassis wall holds a terminal strip for the rectifier diode, CR_1, and power-supply resistors. Use a heat sink, such as pliers, to hold the wire lead when soldering this diode, as excessive heat will damage the internal junction.

The right wall has the audio output transformer mounted horizontally. L_1, L_2, and the two Nuvistor sockets are mounted roughly in a line between the tuning control, C_1, on the front panel, and the antenna jack, J_1 on the rear of the chassis. A five-terminal strip is placed next to the Nuvistor sockets for mounting components. A phono jack is mounted on the rear of the chassis for muting the receiver. Shielded wire should be used for the lead from this jack to the first audio grid, to prevent hum pickup.

The coils are wound on ¼-inch slug-tuned forms with No. 18 wire. The turns may be cemented in place for stability.

Alignment and Use

Check your wiring to see that it is all correct, and make sure the polarity of the rectifier diode is right. Turn on the power and measure the voltage with a voltmeter at the junction of CR_1 and C_{2A}. It should be about 105 volts. Rotate the regeneration control until a hiss is heard in the speaker. This is the point of superregeneration.

To adjust the frequency of the detector, you will need a signal source. If you have a signal generator, connect it to the antenna jack on the 2N2. If you wish to use your 144-Mc. transmitter or grid-dip meter, make up a pickup loop and connect it to the antenna jack. A local station may also be used for alignment by connecting an antenna to the receiver and having the other station transmit to you. Set your signal source to 146 Mc. and tune C_1 to one-half capacitance. Then adjust L_2 until you hear the 146-Mc. signal. C_1 should then tune to 143.5 Mc. at maximum capacitance and to 148.5 Mc. at minimum. Tune back to the 146-Mc. signal and adjust L_1 (this is a very broad adjustment) for maximum signal strength. The receiver is then ready to use.

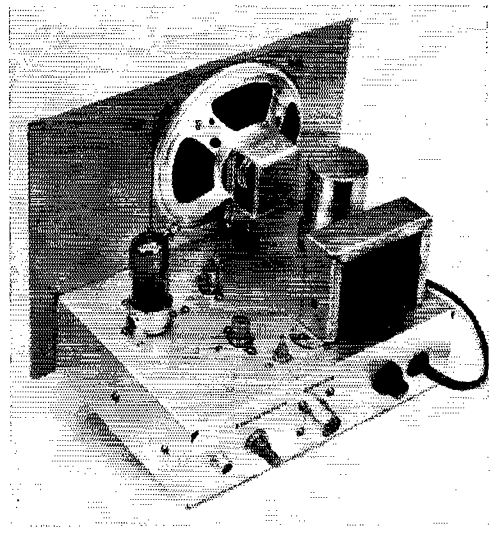


Fig. 4—Rear view of the 2N2 receiver. From left to right on the rear chassis wall are the muting jack, regeneration control, antenna jack, and the fuse holder.

A quarter-wave whip may be placed directly in the antenna jack of the 2N2 for local reception, but for top performance you will need a beam — and the bigger the better.[2] To use the receiver with the shack transmitter, the muting terminals must be short-circuited while transmitting. This can be done with an auxiliary set of contacts on the antenna relay, or by means of extra contacts on the transmitter standby switch. Use shielded wire for the muting, again to prevent hum pickup. Then you are ready to learn what a package of performance the 2N2 receiver is. QST

[2] McCoy, "A Five-Element Two-Meter Beam for $1.49," *QST*, October, 1962, describes an inexpensive one.

Strays

Ham weddings. K3VOO married W3VGF. They met at W8PME (Bethany College, W. Va.), having been introduced to each other by W8UNS, one of the profs. In a similar vein, K2RDP married K1QNV, whose father is WA6FSY. Best man was K2LFR. The couple now operates from W6BB (University of California).

K7SGX wonders whether there is anyone else who would like to keep skeds on 3.5 Mc. using American Morse. Write *him*.

—•••—

Send an s.a.s.e. (No. 8 size) to W4RLS, Box 26, Russellville, Ala., and receive a listing of hams who belong to the church of Christ.

Most amateur radio operators are fascinated with any form of communication. Teletype machines as used by radio and news services have long held a special interest to many amateurs. An increasing number of these have obtained machines and have been using them on radio frequencies. This method of communication offers great opportunity to experiment with techniques that are quite a bit out of the ordinary.

This article initiates a series which, in later issues, will go into details on building the latest thing in receiving and transmitting accessories as well as provide a firm foundation in basic radioteletype concepts. The author is a well-known member of this highly enthusiastic group of amateurs.

The Teletype Machine

What the Models Available to Amateurs Will Do

BY IRVIN M. HOFF,* K8DKC

SINCE the earliest days, communications has been an important aspect of everyday life. Early communications involved smoke signals and signaling drums. Later came the written word, with message runners and eventually the famed "Pony Express." Then the telegraph was invented, and the first major breakthrough in high-speed long-distance communication had been achieved.

In 1906 the first American teletypewriter was invented, and a company to market it was formed by the inventer, Charles Krum, and financier Joy Morton (of the Chicago Morton Salt Company fame). Called the "Morkrum Co.," the young firm had pretty rough sledding until 1915, when the Associated Press decided to use the Morkrum equipment.

A German immigrant, Edward Kleinschmidt, independently was manufacturing a machine bearing his name about the same time. In 1925 these two companies were merged, and the combined company was purchased in 1930 by Western Electric, the manufacturing branch of Bell Telephone Company. At this time the company was known as the Teletype Corporation.

At this point it seems appropriate to describe a teleprinter, in the event that you don't know what we are talking about! A teleprinter is a typewriter that has additional parts which change the mechanical motion of the typist's fingers into electrical pulses for transmission on radio or wire circuits. At the receiving end these pulses are again changed back into mechanical motion and the message is printed automatically on the special typewriter. You have probably seen such a device at the local newspaper office, on television news shows, or in modified form at the stockbroker's office. All teleprinters are commonly called "Teletype machines," since the Teletype Corporation was so well known in the teleprinter field. However, the word "Teletype" is a registered trade-mark of the Teletype Corporation, and when using the word it should always be capitalized — otherwise, to be technically correct, one should refer to such a machine as a "teleprinter."

* 1733 West Huron River Drive, Ann Arbor, Michigan 48103

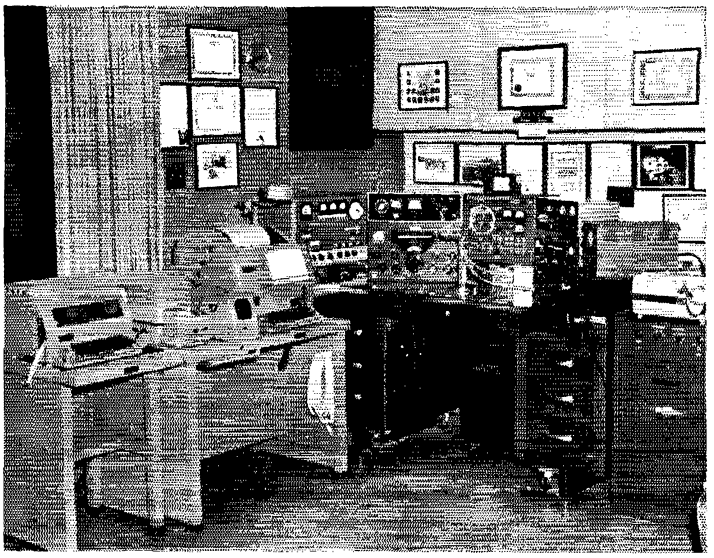
It is a little-known fact that any individual or firm can purchase directly from the Teletype Corporation. However, the high cost of the equipment has kept amateurs in general from doing so. At the present time, though, a low-cost line of equipment is being manufactured which can be purchased at prices the amateur can consider. This is the "32" line; more on it later.

During World War II, the government built a large manufacturing plant for Kleinschmidt, and again we have two major sources of teleprinter equipment in this country. The Kleinschmidt equipment is used mainly by the military services, and turns up occasionally in amateur hands via MARS (Military Affiliate Radio System) stations.

Amateur RTTY

In this country, amateur RTTY started about 1946. Both on the East Coast and on the West Coast, groups commenced using the equipment on both 2 meters and 80 meters. On the lower frequencies, m.a.b. (make-and-break) keying, which resembles normal c.w., was used. The pulse length on a teletype machine is quite short, and it was soon found that ordinary m.a.b. was not nearly as satisfactory as leaving the transmitter run continuously and shifting the carrier in frequency to correspond to key up or key down. This was allowed on 11 meters, and as a result, some of the important contributions were first made on that band. On v.h.f., the amateur regulations allowed (and continue to) use of a carrier with audio tones. This made very simple equipment possible and offered great immunity to large amounts of frequency drift in the receiver or transmitter. The method is called a.f.s.k. (audio frequency shift keying) and gives excellent results where it is permitted.

In 1953, the FCC modified its rules to permit f.s.k. (frequency shift keying) on lower frequencies, using shifts of 850 c.p.s. ± 50 c.p.s. However, many commercial stations using RTTY



An advanced amateur RTTY station (K4PJJ). The tables at the left hold a Model 14 typing reperforator (extreme left) and a Model 19 composite unit.

had found that certain problems could be minimized by use of shifts more narrow than 850 c.p.s. In fact, if you were to listen to commercial frequencies, you would find shifts ranging from 70 c.p.s. on up to 850. Certain "standards" such as 70, 85, 170, 240, and 425 are common. Amateurs also wanted the opportunity to experiment with these narrower shifts, and in March 1956 it became possible to use "any shift up to 900." This has been an aid to experimentation and has relieved the need for accurately calibrated systems.

The only other recent change in the rules became effective in August 1964. Until that time "dual identification" had been necessary — that is, regular identification by c.w. plus identification on the teleprinter itself. The FCC has maintained that c.w. identification is necessary to assist in their monitoring work with trucks and other installations not equipped with teleprinters. However, at present the transmitting station need only identify his own station on c.w., naming all stations with whom he is in contact in a normal manner on the teleprinter. This allows use of automatic c.w. identification systems. Of course, we all hope that eventually the c.w. requirement will be eliminated entirely.

It is interesting to note that the majority of those who get on RTTY stay enthused about the hobby. Very few seem to spend much time on voice communications once they acquire a taste for the "green keys," as the keyboard is often called.

Obtaining the Machines

The best guess that can be made would place about 5,000 machines in the hands of amateurs today, although of course we know that only a fraction of these are in active use. However, the amateur really interested in getting on the air has ample opportunity to buy a machine.

The Bell Telephone Company normally destroys antiquated equipment when it is replaced with new and more costly units. Several societies have been formed in various states by interested personnel, and Bell often allows these societies to have the discarded equipment for junk-weight prices — often as low as $25 for a teleprinter.[1] These machines are normally in "as is" condition, but since they are taken out of active service, usually have been well cared for and need little or no maintenance.

Many machines have been made available to MARS members, and this is a source not to be overlooked. Again, advertisements frequently appear in the various amateur publications, particularly in the *RTTY Bulletins*.[2]

Very few machines have been made available through Western Union. This may not always be the case, however. There are two minor differences in the Western Union machines that might be interesting to mention. First, the bell rings (to attract attention) when the Figures "J" key is struck rather than when the Figures "S" key is struck (the latter is normal). Also, the stop pulse is 22 milliseconds instead of 31 milliseconds (more on that in a subsequent article) and thus they operate at about 65 words per minute instead of 60. However, these machines use the same 420-r.p.m. motor-driven shaft speed and are perfect copy on any normal machine. (The European speed, which is 66.6 w.p.m., is not to be confused with the Western Union machines.) So do not hesitate to get a 65-w.p.m. Western Union machine should one be available at a cost you consider reasonable.

Types of Machines

There are four basic types of machines the amateur normally will be interested in obtaining:

[1] For latest information on sources of supply for used teleprinters, write ARRL, 225 Main St., Newington, Conn. 06111.

[2] *RTTY*, published by RTTY, Inc., 372 Warren Way, Arcadia, Cal. 91007.

Florida RTTY Bulletin, published by Fred W. De Motte, W4RWN, 306 S. Beach St., Daytona Beach, Fla.

1) Page printers, such as the Models 15, 26, 28 and 32, which print the message on a continuous roll of paper fed over the platen in much the same way that a sheet of paper goes through a regular typewriter.

2) Tape readers, called "TDs" (for *T*ransmitting *D*istributor). These machines generate the transmitting pulses by scanning a punched tape, which is perforated in advance of transmission.

3) Reperforators and typing-reperforators, such as the Model 14, for making punched tape either from a local keyboard or the incoming signal. The typing-reperforator also prints the message on the tape, using the regular characters of the alphabet.

4) Composite machines that include the page printer, a tape reader, and a perforator to cut tape from the keyboard for later playback. Examples include the Models 19, 28ASR, and 32ASR.

Model 15 Page Printer

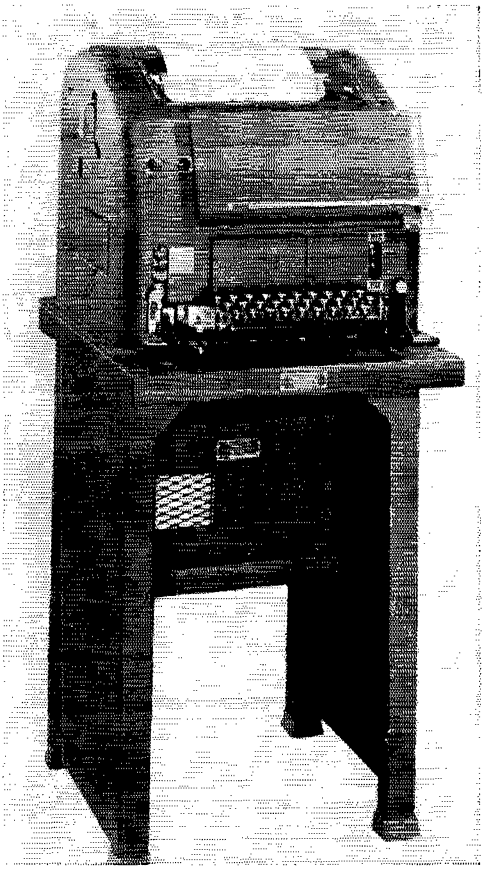
About 250,000 Model 15s were made before production was stopped some two years ago. This machine is one of the most easy to obtain and was intended for continuous 24-hour duty. The Model 15 is so rugged that with a little care and routine lubrication it could well outlast the average amateur. It is heavy, fairly large, and somewhat noisy, but does an excellent job. Typical resale price is $75–$100.

Model 26 Page Printer

The Model 26 was built during the war and critical metals were held to a minimum in its construction. It was intended for light or occasional duty of 3–4 hours per day, maximum. A great number of these showed up around military installations, and today they are very popular in amateur circles. The keyboard is the easiest to use of any of the modest-cost older machines. The 26s are quiet and make a good teleprinter for amateur use; however, parts are difficult to obtain and they were never intended for heavy duty. A major disadvantage might be the necessity for the table that accompanies the unit, since the roll of paper is stored inside the table rather than inside the printer, as in the Model 15. These machines go used for $40–$75, according to advertisements.

Model 28KSR Page Printer

The Model 28 equipment is an entire series within a series. These items are currently in use and very difficult to obtain used. The 28KSR (*K*eyboard *S*end-*R*eceive) is a modern version of the Model 15, and has certain automatic equipment available which makes it quite versatile. These units have a marvelous keyboard with very light touch, resembling that of an electric typewriter. They are capable of speeds up to 100 words per minute with the correct gears. Only a small number of well-heeled enthusiastic amateurs have these expensive printers. Average used resale price is $450.



The Model 15 page printer with table. This type of machine is in use in a great many amateur RTTY stations.

Model 32 Page Printer

The Model 32 comes as a page printer called the 32KSR, or as the 32ASR composite set. The KSR has a light touch but the key travel is fairly long, and as the keys are plastic for low cost they sound a little like the keyboard on a toy piano. Only a few of these brand-new machines are being used by amateurs today, but they are most attractive; new cost is quite reasonable. they are very lightweight, and rather quiet. Although not intended for heavy duty, a new machine should provide years of excellent service. Parts are very easily obtained and very low in cost. The Model 32 sells for under $450 new from the Teletype Corporation.

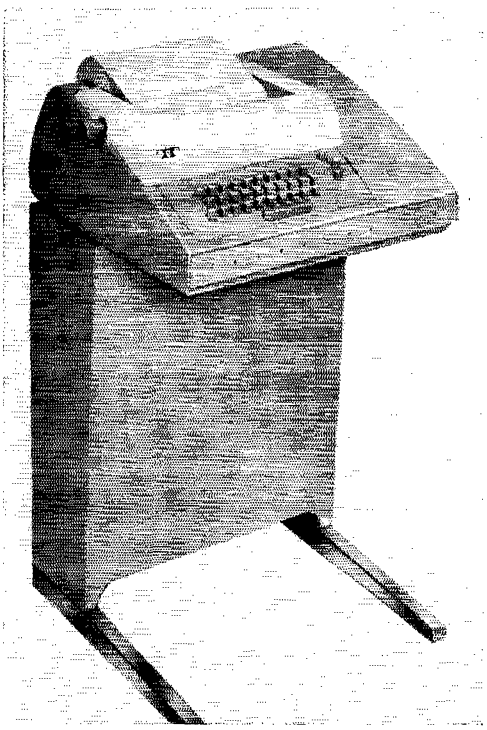
Tape Readers

The "TD" that the amateur will most often find will be the Model 14. These units have their own independent motor and clutch for advancing the tape from a remote position. Some of the units intended for the military had nonsynchronous motors that were governor controlled. If you have a choice, avoid the governor-controlled motor. It needs to be set against a special 87.6-c.p.s. tuning fork that may be hard

to get, and arcing at the brushes often causes r.f. interference with weak signals. Most of these machines have been converted to 60-c.p.s. synchronous motors. Typical cost is from $50 to $100.

Model 19

This is a composite set that includes a Model 15 page printer, a tape perforator that punches holes in the tape from the keyboard (but not from an incoming station, and it does not print on the tape), a counter showing how many characters have been punched in the tape so the operator knows when to start a new line, a large power supply to operate the punch magnet, a tape reader to play the tape, and a metal desk



The Model 32 page printer is the newest type that can be obtained directly from the manufacturer at a price that is reasonably attractive to the amateur.

for all these things to be placed upon (see photo of K4PJJ). These units are quite sought after, since they represent rather a complete station in themselves. Prices range from $35 through some societies, when they are occasionally released, to $300 from an individual. The keyboard is quite stiff, even when not pulling tape, since it continues to operate the mechanical levers that would otherwise operate the tape punch.

Model 28ASR

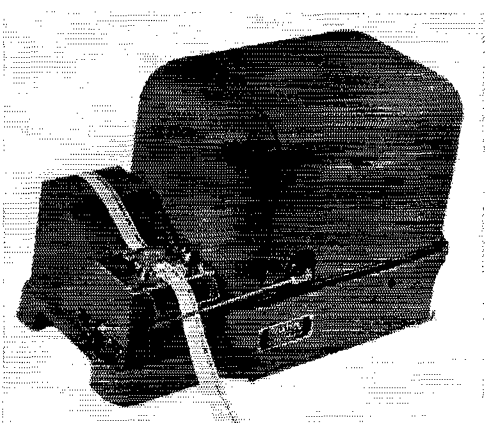
The 28ASR is a modern Model 19 with many additional features. With the integral "stunt box," nearly unlimited functions can be inserted at the operator's desire — for example, automatic "non-overline" control (prevents printing over a line already typed), automatic carriage return (prevents "pile-ups" at the end of the line should a carriage return signal be missed), ringing a bell if somebody types your call letters, or suppressing all printing until somebody calls you specifically. A great variety of accessories is available, including a tape reader having a pivoted sensing unit that can "walk up" to the last letter on the tape, making the usual 4- or 5-inch tape loop unnecessary. Prices range, used, from $750 for the more simple standard unit on up. Some MARS stations occasionally have access to these marvelous units.

Model 32ASR

This is a new line of equipment which can be purchased directly from the Teletype Corporation. The 32ASR is not as versatile as the 19 or the 28ASR, since the keyboard cannot be used to punch tape while receiving an incoming signal. However, it does include a tape punch and a tape reader, and has all the usual advantages that go with the ability to make and play tape. These machines are similar to the 32KSR in appearance, are lightweight, and are modestly priced at $580, including stand and a box to catch the chads that are knocked out of the tape by the punch. Many options are available, so one should request the communications type (rather than Bell Telephone or Western Union type), with automatic carriage return and automatic non-overline. With these features, you can walk away from the machine and regardless of the quality of the signal received, you will not pile up letters at the end of a line nor print over a previous line accidentally.

Model 14 Reperforators

There are numerous Model 14 types, including a strip printer that prints on a narrow $\frac{3}{5}$-inch tape. As even a short conversation uses a lot of tape the page printer is much more economical, so the Model 14 strip printers for the most part sell for very little — $15 often being typical. They have little use in the normal installation and are often used for parts.



Tape reader (TD) showing tape from a typing reperforator.

Many of these machines use standard Bell Telephone characters and the operator would wish to change over to "communications" type. This can be done if the owner is skilled with a soldering iron. The necessary conversion kits are easily obtained. Many 15s and 19s need this conversion also. If not converted, there will be fractions above certain letters, such as the C, V, B, and F.

There are 14RO (*R*eceive *O*nly) reperforators that punch holes in tape directly from an incoming signal. Don't turn one of these down merely because it has no keyboard. It can be remotely used from an extra keyboard or directly from the page-printer keyboard. The 14RO often sells for $50.

The more usual type is the Model 14 typing-reperforator. These may or may not have a keyboard, but while punching holes they also print on the tape, so you can read what will be sent when the tape is played.

The most advanced version of the 14 "reperfs" would include a cover with tape reel, an end-of-line indicator which turns on a small light to tell the operator to commence a new line, a back-up so the tape may be moved to eliminate an error (part of the back-up system is a second lever that allows the ribbon to be raised to view the tape), a keyboard, and sometimes a solenoid-controlled tape feed-out (which is seldom used by amateurs). These most advanced forms of the "reperfs" often sell for $100–$150. When buying, one would do well to inquire whether the motor is synchronous or governor-controlled. The changeover to synchronous is not difficult, and involves obtaining an 1800-r.p.m. synchronous motor (around $10) and a set of gears (around $6) to match. Also inquire about the other features mentioned, to know what you're getting.

Other Equipment

Of course, a lot of other machines have been built by the Teletype Corporation, but those mentioned are best suited for amateur use. These are all capable of running the prescribed speed and all have the necessary "5-unit" code to be discussed in the next article. The Model 33, for instance, is similar in appearance to the Model 32 but uses the newer "8-unit" code and has a four-row keyboard instead of the typical three-row keyboard. The Model 35 uses the "8-unit" code and is the heavy-duty version intended for continuous operation.

Very few Kleinschmidt units have appeared on the amateur scene, and when they do it is normally through a MARS station. If one is advertised, write the owner for descriptive material.

Versatility of RTTY

So far we have not mentioned much about what can be done with RTTY. When an operator types on the keyboard of a teleprinter, electrical pulses are generated in a circuit that can be connected to a land-line circuit or to a radio transmitter. One of the advantages of RTTY over other forms of communication is that the printer can automatically respond to these electrical pulses even if nobody is present. It is fascinating to watch an unattended printer typing a message (or printed "conversation") from another amateur. With some advanced receiving demodulators (which change the output of the receiver into these electrical pulses to operate the printer) you can walk away from the printer, and when the message is completed the printer stops and turns itself off moments later.

With the modern printer, you can do so many different interesting things that one can only name a few. It is possible, for instance, to hit the "bell" and have it automatically turn your station off the air and at the same time turn on the other fellow's station; this is called "bell-break." "Autostart" has been used with fascinating results on the higher frequencies where drift in the receiver and interference from other stations is not encountered. Whether you are at home, at the office, or out of town, another station that comes on the frequency can start your machine via short-wave radio and leave a message, then shut your station down once more. W6NRM and W8SDZ, among others, helped pioneer this on 80 meters, using crystal-controlled receivers and transmitters and special 60-c.p.s. vibrating reeds to control the motors of the printers. In the past few months, K3NIO has developed a very advanced autostart unit using digital computer techniques to recognize RTTY characters and reject c.w. and other types of interference that might appear on the same frequency. No special equipment or coding need be used by the transmitting station — if he merely hits the frequency accurately and commences sending RTTY characters, the computer recognizes this as authentic RTTY and turns on the motor of the receiving printer after 32 characters have been received. Such a link on 80 meters between K3NIO and K8DKC, who now has similar equipment, has been in successful operation for several months.

"Retransmit" — from 80 to 2 meters, for example — is easily possible and greatly enhances the fun that can be obtained. So, whenever K3NIO sends an autostart message to K8DKC, it automatically turns on the 6-meter link to W8SDZ and prints the same thing. It has the disadvantage of requiring a special receiver to be left permanently on that one frequency.

Automatic remote control can also be conveniently set up. W6NRM is contemplating such a move at present to allow use of a better transmitting location. W8SDZ used to operate K8DKC from Toledo while living in an apartment house. K3NIO at present pipes in his autostart received signal from 5 miles away via a leased line. W2BFD used to operate his station at the store from his house some distance away.

Endless possibilities present themselves. At present, Jon on the *SS Hope* can talk directly to his parents in Ann Arbor via a leased line connecting to K8DKC's equipment, and his parents can control the entire operation from their home — of course, K8DKC carefully monitors the whole operation in connection with FCC requirements.

Many other interesting things have been done.

W9GRW and four others rented a "burglar alarm" circuit between several cities in Illinois and have several land-line stations on that circuit. Any one of them can be patched into any of a number of short-wave transmitters on amateur frequencies.

It is simple on some advanced machines, such as the Model 28, to "program" them so they will not respond to any RTTY characters until that particular station's call letters are mentioned, thus giving a permanent "selective call-up" method. W6AEE has such a system. When busy, he often places his receiver on a specific frequency and then if somebody comes on that frequency calling him, it fires up the printer. This is not "auto-start" in the normal sense, but actually "selective call-up." The two could readily be combined for interesting results.

Some of the machines have added special equipment, usually not difficult to obtain, which prevents a machine from "piling up" at the end of a line if a carriage return is missed due to an error. Others have added an interesting system to keep from accidentally reprinting over the same line if a line-feed (turn-up) is missed. Then you can truly walk away from the machine and not miss a thing.

Only a few of the more-complex situations have been described. If these things appeal to your sense of imagination, then you yourself might very likely be one of the next to think of even more exotic purposes to which RTTY could be put. We hope we have now given you some background on this fascinating hobby and an interest in getting enough information to put a teleprinter into actual RTTY operation.

The next article will describe how a Teletype machine works and how to fire up one locally to get experience prior to receiving or transmitting on the air. — *Editor.* QST

Strays

The Country Cousins Net specializes in helping the underprivileged, the handicapped, and the afflicted. One recent project was getting hold of a steel guitar for a young orphan. W7VFR put out the message about the need for the musical instrument, and WA6GQJ produced one. This is only one of many successful missions of the Country Cousins.

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Aw, who says conditions are lousy? W4ORB recently made WAC from his car, running 9½ watts input and using an 8-foot whip.

—•••—

What was not known when we reported VE7APG as a Silent Key in the November issue was that the funeral services were conducted by VE6QL.

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W6HG wonders how many hams hold all three top radio tickets — Amateur Extra, First Class Telephone, and First Class Telegraph. Tell him.

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Through the efforts of W9HBK, a research assistant in the low-temperature physics group at the University of Illinois, seven doctoral candidates at the Institute of Physics in Bariloche, Argentina, keep in close touch with their faculty advisor, Prof. J. C. Wheatley, at the University of Illinois. One of the Argentine physics students is LU9VD, who handles that end of the regular schedule on 10 meters. Despite the uncooperative state of the sunspot cycle, the weekly schedule has been 80% successful.

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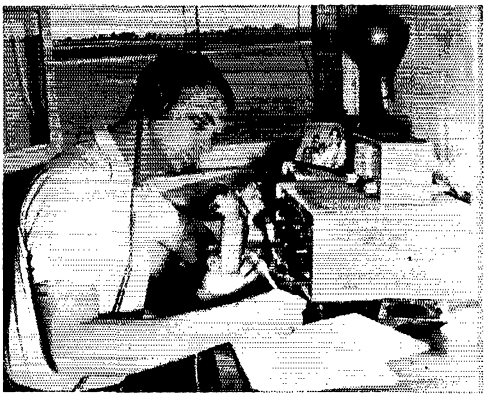
It's a small world. K4WMB was QSO 9Q5KC, where 9Q5AE was a visitor. During the conversation it developed that 9Q5AE was the pilot who crashed near K4WMB's QTH in 1962 and came to his home in order to use the phone and summon help.

—•••—

KØIOG and WAØAYA relax after providing communications for an Oral Polio Clinic in Warrenton, Missouri. The Zero Beaters ARC of Washington, Mo. was the club sponsoring the communications for the nine-town area.



F7CL (W4WDR) has no trouble keeping in touch with his wife Teenie, in Chatanooga, Tennessee, when he's off somewhere with the Air Force—she's WA4REL, and they QSO regularly.

Noise-Figure Indicator

Quick Checking on V.H.F. Receiver Performance

BY THOMAS SLY,* K2QCX

QUITE often it is desirable to make a quick check on a receiver or converter to be sure that the input circuits are still in top-notch adjustment. Where there may be 8 or 10 adjustments to be peaked up, some of which may be interacting, switching on and off of a noise generator and taking comparative output readings can be very time-consuming.

The circuits of a simple device that solves this problem are shown in Fig. 1. In brief, the noise generator is pulsed electronically at a 60-cycle rate. The receiver output is electronically switched in synchronism between two output meters, one giving a reading with the inserted noise off, the other with the inserted noise on.

The circuit of the noise head is shown in Fig. 1A. Noise diode CR_1 is powered by an unfiltered half-wave rectifier so that it produces chopped noise output at a 60-cycle rate.

The detector Fig. 1B, plugs into a receiver headphone jack. It consists of an all-diode audio switch, directing the audio signal into two separate channels (this also at a 60-cycle rate and synchronized with the noise source), after which it is rectified and the resulting d.c. levels stored on separate capacitors.

In detail, the audio output from the receiver is rectified by CR_2, and the positive-going pulses are fed through blocking capacitors C_2 and C_3 to both diodes CR_4 and CR_5. CR_3 insures against any reverse current through CR_2. When end A of the secondary of T_2 is positive, CR_6 conducts. Only the small drop (about 0.4 volt) across CR_6 appears between point A and ground, and this voltage is applied as forward bias to CR_4. Practically all of the rectified output from T_2 appears across R_2, and this voltage is applied as reverse bias to CR_5, so CR_5 does not conduct. Similarly, on the other half of the a.c. cycle from T_2, CR_7 conducts, placing forward bias on CR_5, and reverse bias on CR_4.

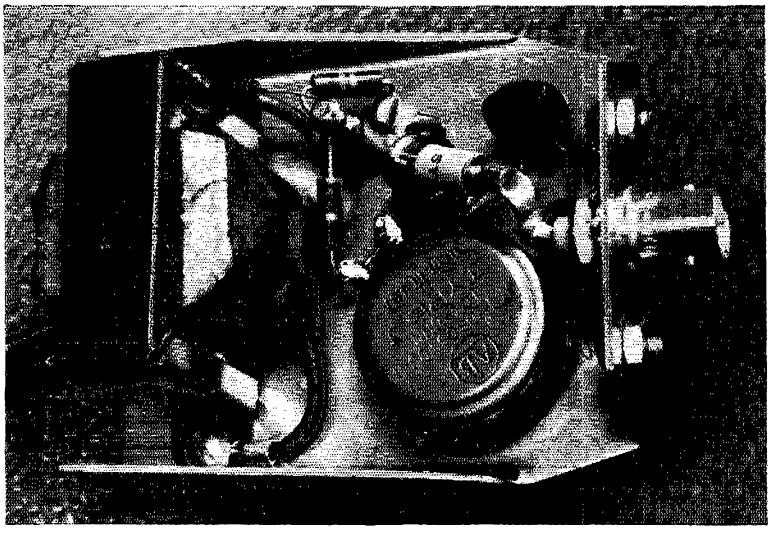
Since it is unlikely that any two a.c.-reading meters (v.o.m. or v.t.v.m.) will agree, except on sinusoidal waveforms, internal rectifiers are provided so that d.c. meters may be used for the two output indicators.

Operation Is Simple

Just insert the detector-unit input plug into the headphone jack on the receiver, and the power plug into the 115-volt a.c. line. If your receiver uses a product detector, then switch it on and adjust the pitch control for a noise spectrum which fills the audio spectrum smoothly. Turn off the a.v.c. and adjust the r.f. gain, if necessary, to keep the receiver from overloading. Now adjust the audio gain for some convenient reading on the two output meters. Both meters should read about the same value if the input resistances are the same. Otherwise, they may be somewhat different.

Now connect the noise head to the converter input, using the shortest possible connection, and plug the noise head into the a.c. line. Advance the current control to maximum. If the converter is tuned to any degree, the deflection of one meter

*Shellman Drive, R.D. 1, Clay, New York.



Bottom view of the noise pulser.

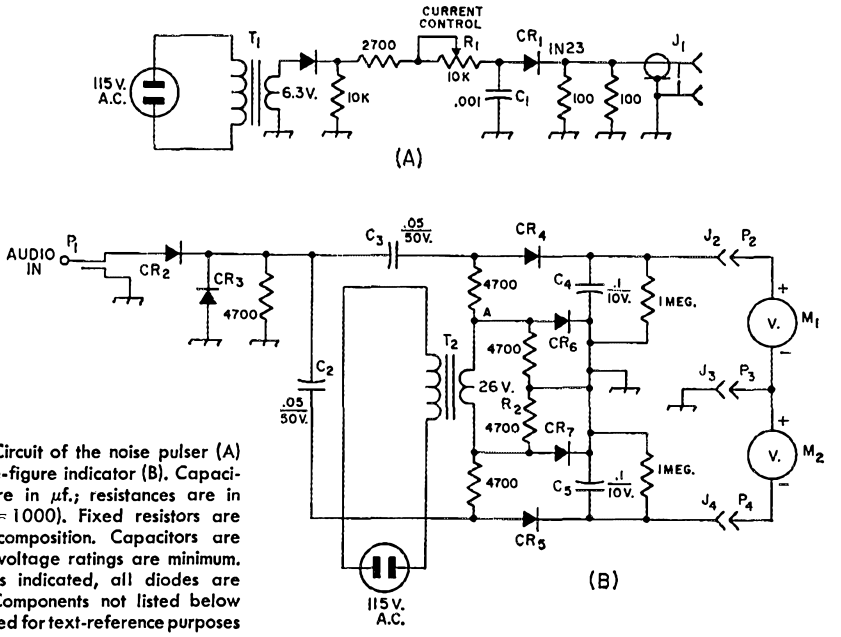


Fig. 1—Circuit of the noise pulser (A) and noise-figure indicator (B). Capacitances are in μf.; resistances are in ohms (K = 1000). Fixed resistors are ½-watt composition. Capacitors are ceramic; voltage ratings are minimum. Except as indicated, all diodes are IN645. Components not listed below are labeled for text-reference purposes

J_1—Chassis-mounting coaxial receptacle.
J_2, J_3, J_4—Tip-jack binding post.
M_1, M_2—Any high-resistance d.c. voltmeter or v.t.v.m. (output approx. 1 volt with 3.2-ohm audio input to switching unit).
P_1—Headphone plug.
P_2, P_3, P_4—Tip plug.
R_1—Linear-taper control.
T_1—Filament transformer, 6.3 volts.
T_2—Filament transformer, 26.4 volts.

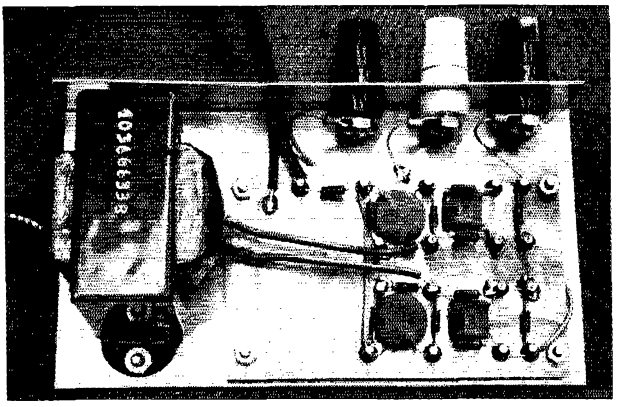
should advance, while the other remains stationary. If the power plug is reversed, the comparative meter deflections will reverse.

All adjustments should be made keeping the stationary meter at a reference point by adjusting the audio gain, then trimming the converter circuits for a maximum reading on the other meter. As the readings on the second meter become much higher than the reference, reduce the diode current so as to keep the injected noise at a minimum necessary for alignment. The receiver should be adjusted to the point on the dial where the best noise figure is desired. If broad-banding is desired, then periodic checks should be made during alignment at several points on the dial to see how the alignment is coming out. If the tuning is too sharp, then stagger-tune a few of the adjustments to broaden the curve.

The nice part of this gadget is that converters may be tailored quickly for serious DX work or contests in a matter of minutes, and this can be done in the field or any place where a.c. power is available.

Incidentally, for anyone thinking that a converter can be accurately aligned "by ear," I haven't found one yet that couldn't be given a substantial improvement by proper adjustment with this device (some factory-built-and-aligned units included).

One soon gets a rough idea of what readings constitute a good noise figure, even though there is no actual calibration. I couldn't care less what the actual noise figure is as long as the external noise can be heard with the beam in any direction. QST



Bottom view of the noise-figure-indicator switching unit.

The Mox-Box

A Simple Monitoring and Control Unit

BY LEWIS G. McCOY,* W1ICP

The Mox-Box (manual operating control box) consolidates your operating controls to a single switch. In addition, a built-in code monitor enables you to monitor your own sending.

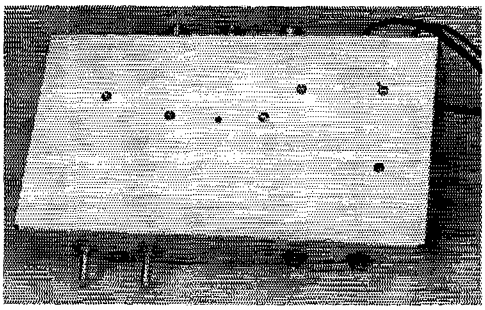
A PROBLEM that bothers the ham just getting started on the air is that of connecting all his equipment together so that he doesn't have to throw a dozen switches to go from receive to transmit. If a single antenna is used it usually involves switching the antenna from the receiver to the transmitter, plus muting or switching the receiver to standby. In case of the Novice, he has the additional problem of monitoring his sending. Because he is crystal-controlled, the ham he is working will probably be on a different frequency, so the receiver cannot be used to monitor his fist.

This article describes a control unit, the Mox-Box, that integrates all the switching controls to a single switch, plus a monitor which permits the user to monitor his sending regardless of where the receiver is tuned.

Fig. 2 is the circuit diagram of the unit. The Mox-Box has a built-in transistor tone oscillator plus a relay, K_1, which is used to transfer the antenna from the receiver to the transmitter and vice versa. One arm of a double-pole relay is used for this function. The other arm is used to transfer the headphones from the receiver to the tone-oscillator monitor. The relay is controlled by S_1. In the receive position, the antenna is connected to the receiver and the headphones to the receiver audio. When S_1 is thrown to the position that energizes the relay, the antenna is switched to the transmitter and the headphones to the monitor output.

We've talked about the control box but actually this article describes the construction of two units. The other one is a code-practice oscillator. The reason for describing two units is quite simple. Nearly all the parts from the practice oscillator can be used in the control box. Many readers will be working toward a license, and a code-practice oscillator can be incorporated into the control box. Both units are excellent items for radio-club projects for beginners. The practice oscillator is something the student can build and make good use of, and none of his investment will be wasted because the parts can be used when he is ready to go on the air.

* Technical Assistant, *QST*.



The switch at the left is the operate-standby switch. Next to it is the switch used to turn off the oscillator when the unit is not in use. At the far right is the key jack. Although it isn't mentioned in the text, you can reduce the cost of the unit by using phono type jacks for your coax leads instead of the more expensive coax type fittings.

Circuit Details

The code-practice oscillator, shown in the photograph on page 24 and Fig. 1, is a simple audio oscillator using a single transistor. Power for the unit is obtained from a 9-volt transistor radio battery. Current drain from the battery is small and it should last for a long time in this type of use. The oscillator is designed to be used with

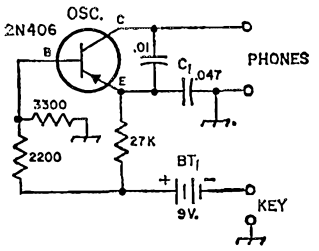


Fig. 1—Circuit diagram of code-practice oscillator. Component values are the same as Fig. 1.

magnetic-type headphones in the 2000- to 3000-ohm impedance range. There are some surplus headphones around that run about 200 ohms impedance, and if this type is used C_1 must be changed to a lower value (see Fig. 2).

Using high-impedance phones and a value of 0.047 μf. for C_1, the audio pitch or tone is about 1000 cycles. The pitch can be lowered by adding capacitance in parallel with C_1. A 0.047 μf. added in parallel to C_1 will lower the pitch appreciably.

The standard-type telegraph key has only one set of contacts. This presents a problem if any equipment in addition to the transmitter is

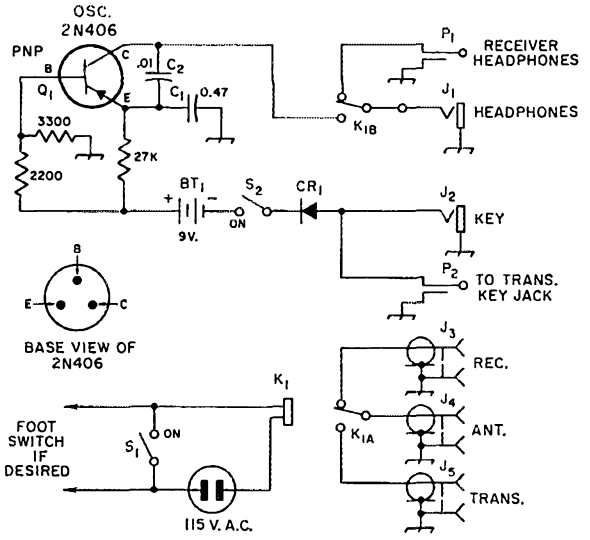
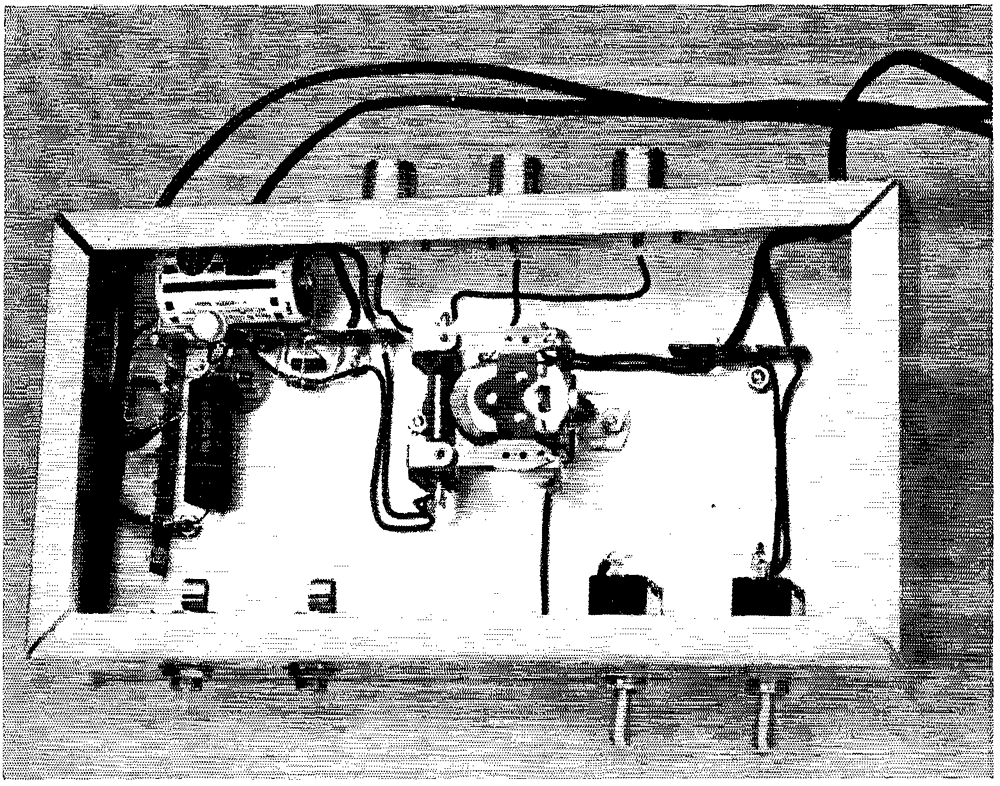


Fig. 2—Circuit diagram of the Mox-Box. The letters C, B, and E on Q1 indicate the base (B), collector (C), and emitter (E). For transmitters having negative voltage at the key, use a p.n.p.-type transistor; for positive voltage, n.p.n. Also, for transmitters with positive voltage at the key the battery and diode polarities should be reversed, compared with what is shown here. Resistances are in ohms, resistors are ½ watt.

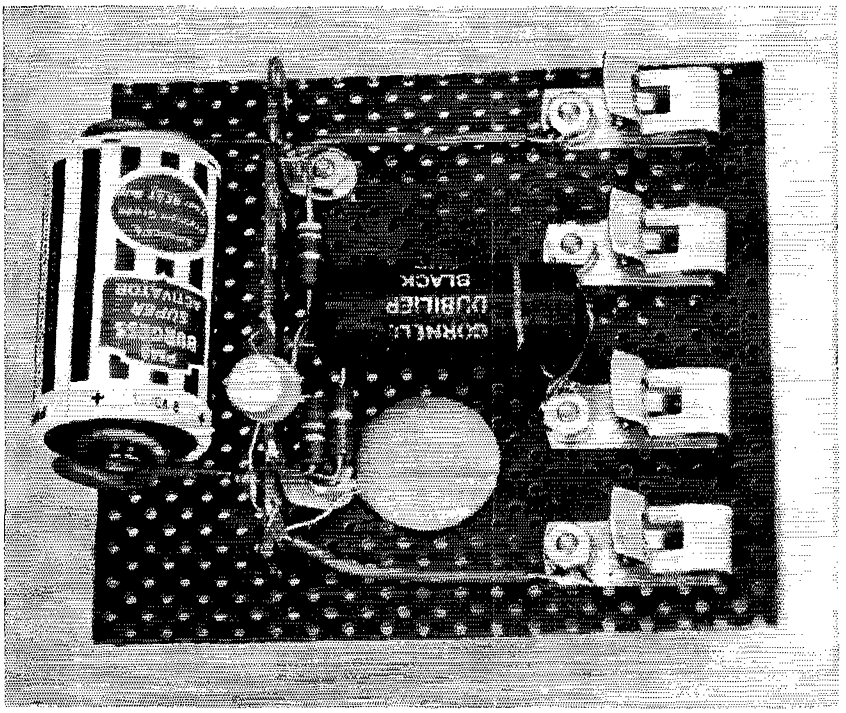
BT1—9-volt transistor battery.
C_1—0.047-μf. paper for high impedance phones (2000 ohms), 0.15 μf. for low-impedance phones (200 ohms). Any working voltage rating over 10 volts is suitable.
C_2—0.01-μf. disk ceramic.
CR_1—Silicon rectifier, any p.i.v. rating over 250 volts (Barry Electronics 600/750).
J_1, J_2—Phone jack, open circuit.
J_3, J_4, J_5—Coax chassis receptacle type (SO-239).
K_1—Double-pole double-throw relay, 115 v. a.c. (Advance GHA/2C/115 VA, Guardian 900-2C-115 VAC, Potter & Brumfield MR 11A 115-volt coil.)
P_1, P_2—Phone plug.
Q_1—P.n.p. type 2N406, n.p.n. type 2N647.
S_1, S_2—Single-pole single-throw toggle switch.

keyed, as it is in our case with keying a monitor and transmitter, using the one set of contacts on a key. If you compare the oscillator circuits of Figs. 1 and 2 you'll notice there is only one difference — the addition of CR_1, a silicon rectifier. The rectifier makes it possible to key both the monitor and a transmitter with a single set of key contacts. A silicon rectifier has a very high resistance in one direction, while very low resistance in the other direction.

In any transmitter, there is a voltage, either positive or negative with respect to chassis, across



All of the monitor components are grouped at the upper left in this bottom view. The relay is mounted near the rear center in order to keep the leads between the relay and the three coax inputs on the chassis rear as short as possible.



Here is a photo of the code practice oscillator. The two clips at the bottom are for the headphones and the two at the top for the key.

the key terminals. In a cathode-keyed transmitter, a common type, the cathodes of the keyed stages are opened between cathodes and chassis by the key. When the key is open, a positive voltage appears on the ungrounded key terminal. If this voltage were allowed to get into the code-monitor circuit it could mess things up. However, this is prevented because of the high resistance of CR_1 when the key is open. In other words, with the key up, CR_1 blocks any voltage from reaching the monitor. When the key is closed, the cathodes of the keyed stages are brought to chassis ground via the key, and at the same time the low-resistance path through CR_1 is closed, permitting the code monitor to come on.

When the transmitter has a negative voltage at the key, with respect to chassis, a p.n.p.-type transistor must be used for Q_1 and the battery and diode polarities are as shown in Fig. 2. If the transmitter key voltage is positive with respect to chassis, then an n.p.n.-type transistor must be used and the battery and diode polarities connected just opposite to what is shown in Fig. 2.

In order to determine which polarity your transmitter has, connect the negative lead (black or $-$) from a voltmeter to chassis ground and touch the positive lead (red or $+$) to the ungrounded key terminal. The voltmeter should be set on the 250-volt range for this test. If the pointer reads up, then the transmitter has a positive voltage on the key. If the pointer swings to the left past zero, then the transmitter has a negative voltage on the key. If you are good at reading circuit diagrams you can check the circuit diagram of your rig to determine the voltage polarity on the key. However, some manufacturers seem to delight in making confusing circuit diagrams, so if you are not sure, use the voltmeter check.

As mentioned earlier, one arm of K_1 is used to transfer the antenna from receive to transmit. For some obscure reason, amateurs who use coaxial feed line think they must have a coaxial-type relay for switching their antennas. This isn't true. Coaxial relays are expensive, and while it is a good type for the purpose if you can afford one, any ordinary relay will do the job, particularly at Novice power levels. As long as the leads from the coax fittings, J_3, J_4, and J_5 in our case, are kept reasonably short, there won't be any appreciable mismatch in the feed line.

Getting the Parts

If you are just getting started in ham radio you probably haven't had a chance to collect a junk box of parts. One way to get a good supply of resistors and capacitors is from an old TV set. Many TV repairmen or dealers are happy to sell old sets for just a few dollars, or even give them away. All of the capacitors and resistors shown in the units described here can usually be found in an old TV set.

Write to the various parts distributors and obtain their current catalogues and at the same

(Continued on page 144)

Basics for Beginners

The Whys of Transmission Lines

Part I

BY GEORGE GRAMMER,* WIDF

To radiate effectively, an antenna ought to be up in the air as high as it can be put. Also, it should not be close to houses, power lines and the like. You may not have an ideal spot, but even so you probably won't have to bring the antenna right into your operating room. So in most cases the situation is this: The antenna is "out there" and the transmitter is "in here"; how is the r.f. power to get from the transmitter to the antenna?

The answer, of course, is a transmission line. Your 60-cycle power comes to you through a transmission line, too. However, there is a difference in the way r.f. lines and 60-cycle lines operate. The reason is the difference in wavelengths. One wavelength at 60 cycles is over 3000 miles. If we wanted to build a half-wave antenna for that frequency it would have to extend more than half way across the United States. So even though you may be 20 miles from a power station, you're only a very small fraction of a wavelength away. The time it takes for power to reach you is so short, compared with $^1/_{60}$ second (one cycle), that the standing-wave effects discussed earlier[1] are negligible.

But in transmitting power at a frequency of, say, 7 Mc., the time taken for the power to travel 50 feet isn't at all negligible compared with the duration of one cycle. This means that we can't look upon a transmission line as a simple electrical circuit, which we *can* do at 60 cycles. What is happening at the "far" or "output" end of the line may be quite different from what is happening at the "near" or "input" end at the same instant.

The "Infinite" Line

A useful concept in explaining transmission-line operation is the **infinite line.** This is an imaginary line consisting of two conductors, side by side and close together, extending so far that we can never reach the end.

If an r.f. voltage is applied to the input end of such a line, one terminal will be negative whenever the other is positive, and vice versa. This causes the current to flow in one direction in one wire and in the other direction in the second, as in Fig. 1. Because the currents flow in opposite directions, the electromagnetic fields set up by them are also opposite. The fields therefore cancel each other's effects, or nearly do so (there is always a *little* uncancelled field, because the two wires can't actually occupy the same spot). Since the fields cancel, there is no radiation from the line.

Thus all the energy put into the line travels away from the generator, following the line at almost the speed of light. And since the line is infinitely long, none of the energy ever comes back.

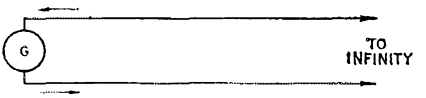


Fig. 1—An imaginary two-conductor line extending to infinity. Arrows show that the current in one wire flows in the opposite direction to current in the other; this relationship is true throughout the entire length of the line, although the actual currents periodically reverse direction as the polarity of the generator's voltage reverses each half cycle.

Characteristic Resistance

Probably the first question you'd ask at this point is this: If the generator voltage is known, how much current will flow in the line? From the discussion of the meaning of resistance in Part II[2] you would be right to infer that such a line must act like a resistance, since energy is being taken continuously from the generator. But how many ohms?

This resistance, called the **characteristic resistance** of the line, has nothing to do with the actual resistance of the conductors. While it may seem odd, the fact is that it is a function of the inductance and capacitance per unit length of line. The resistance actually is determined by the line's L C ratio. This ratio depends on the diameters of the conductors and the spacing between them. The smaller the conductor diameter and the wider the spacing, the higher the characteristic resistance. Practical values of resistance lie between about 150 and 800 ohms for a

*Technical Director, ARRL.

[1] "Antennas and Feeders," Part I, *QST*, October, 1963.

[2] "Antennas and Feeders," Part II, *QST*, November 1963.

"two-wire" or **parallel-conductor** line as shown in Fig. 1.

It is important to realize that this characteristic resistance does not itself consume any power. The power is merely *following* the line on its way to infinity. The characteristic resistance is simply the ratio of voltage to current all along the line. Since the line is imaginary anyway, we can imagine further that the conductors have no actual resistance and there is no other energy loss along the line. Thus all the power put into the line is delivered to infinity, wherever that may be. This means that the characteristic resistance is "pure" resistance — no reactive effects at all.

Characteristic Impedance

But what if the conductors do have resistance of their own? Practically, of course, they must have. Also, the practical insulation between the two conductors is not perfect; there is some leakage between the two wires. This leakage is equivalent to a resistance (a high value) shunted across the two conductors. In the topsy-turvy world of transmission lines the presence of these two components of resistance gives rise to *reactance*. So if the line is a practical one having losses, the generator doesn't see a pure resistance but sees an impedance containing both resistance and reactance. This is called the **characteristic impedance** of the line.

Because things get complicated at this stage we like to ignore the reactive part of the characteristic impedance, and do so by assuming that the line has no losses. As long as the losses per unit length are small we can get away with it. Fortunately, this is the case with lines used by amateurs at frequencies below 30 Mc. It is even a good-enough assumption in the lower v.h.f. range. When the losses are small the characteristic impedance is *very nearly* a pure resistance equal to the characteristic resistance. The term characteristic impedance is widely used to mean the characteristic resistance of a lossless line. We'll use it that way here, too.

The Terminated Line

An infinite line, even if we could have one, wouldn't be of any practical use. It happens, though, that a line can be tricked into *thinking* that it's infinitely long.

In Fig. 2A, suppose that the line is cut at XX. If the generator is moved up to this point it will still see the same characteristic impedance (which is commonly designated Z_0), since what remains of the line to the right of XX is still infinitely long. In the same way, the section of line to the left of XX "sees" the section to the right of XX as a resistance equal to the characteristic impedance. This is true anywhere along the line. It suggests the idea that the line section to the left of XX wouldn't know the difference if a resistor having the same value as the characteristic impedance were substituted for all the line to the right of XX.

This is actually so. If a line of any length is **terminated** in a resistance equal to its characteristic impedance the voltages and currents are just the same in that section as they would be if the line were infinitely long. If the line has no losses, all the power put into it at the generator end is delivered to the terminating resistance.

Matching

The terminating resistance doesn't have to be a resistor. It can be any device, such as an antenna, that uses up power and thus has an equivalent resistance. If the power-consuming device doesn't inherently have the right value of resistance to match the line, its resistance can be transformed by means of circuits (such as those described earlier[3]) that will make it "look like" the proper value. Matching of this sort is done more often than not; only occasionally does the load have the right value of resistance, in itself, to match a practical line impedance.

One final point about a **matched line:** If the line has negligible losses, an ammeter inserted anywhere along its length will give the same reading. Also, a voltmeter connected across it at any point will give the same reading. There are no standing waves of current or voltage such as we find along an antenna, even though the line may be many times longer than the antenna. But this is true *only* when the line is terminated in its characteristic impedance.

Standing Waves on Lines

Now let's look at a line that *doesn't* simulate one that is infinitely long. The length of a matched line didn't matter, because all the power kept going in the same direction — to the load. If the line is not matched, its length becomes quite important.

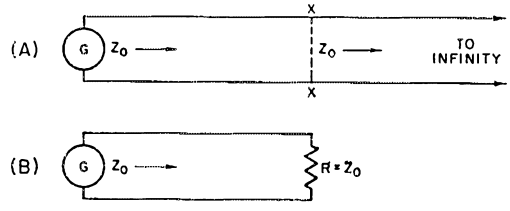


Fig. 2—An infinitely-long line can be simulated by terminating an actual line in its characteristic impedance.

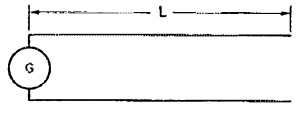


Fig. 3—A line with no termination—simply an open circuit.

To take an extreme case, suppose the line just stops, as in Fig. 3. The power goes out from the generator to the open end, at which point it has no path left to follow except to turn back and head toward the generator. This it does, just

[8] "A.C. in Radio Circuits," Part III, *QST*, May 1963.

as in the case of the antenna discussed in Part I. In coming back it sets up standing waves of voltage and current, just as it did along the antenna.

Here, too, the current and voltage distribute themselves along the line according to the wavelength. If the line length L is just one-quarter wavelength, the current and voltage distribution are as shown in Fig. 4A. If you will imagine the line to be unfolded so that the wires extend in opposite directions from the generator, you can see that this is the same voltage and current distribution that we found along a half-wave antenna (Fig. 3, Part I). The line, too, is resonant to the generator's frequency. The total length for both wires is still a half wavelength, although the line as a whole is only a quarter wave long.

Odd Lengths

If the line is less than a quarter wave, as in Fig. 4B, there is room only for the outer sections of the standing waves. The line is not resonant in this case. The generator sees it as a reactance, and in order to put maximum current into the line the reactance must be tuned out by adding reactance of the opposite kind. Inductive reactance is needed here for **loading** the line.

In Fig. 4C the line is more than a quarter wave long. Here we have not only the standing waves we had along the quarter-wave line but the beginning of another set, too. This line is not resonant, either, and again it looks like a reactance to the generator. However, in this case its reactance must be tuned out by using capacitance for loading.

Finally, Fig. 4D shows a line a half wavelength long. Each wire is like a half-wave antenna. Since one terminal of the generator is always positive when the other is negative, and vice versa, the voltages and currents are always opposite in polarity along the wires, just as in the other cases. The half-wave line is also resonant at the applied frequency, since each wire will accommodate exactly a complete standing wave, no more and no less.

This could be continued on for still longer lines. In doing so we should find that the line is always resonant when its length is exactly a multiple of one-quarter wavelength. It is *not* resonant at any other lengths.

Quarter- and Half-Wave Resonance

Comparing A and D in Fig. 4, you can see that there is a difference even though both can be considered to be resonant. In A the voltage is zero at the generator, but the current has its highest value. In D the current is zero and the voltage has its highest value. Since the impedance seen by the generator is equal to voltage divided by current, the impedance at the input end of the line must be extremely low in A and extremely high in D. If there were no power lost in the line the impedance values would be zero and infinity, respectively. However, no line can be completely free from loss, so we don't have to worry about what might be meant by zero and infinity. Practically, the impedance is a very

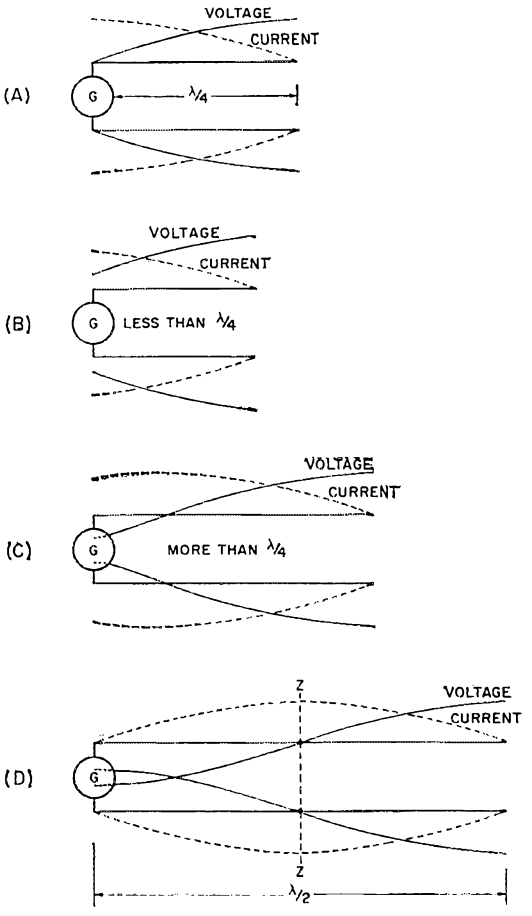


Fig. 4—Standing waves along open-circuited lines.

low resistance in A and a very high resistance in D.

A quarter-wave line open-circuited at the far end acts like a series-resonant circuit. A half-wave line open at the far end acts like a parallel-resonant circuit.

The Short-Circuited Line

Instead of being left open at the far end as in Fig. 3 the line could be short-circuited as in Fig. 5. Once again, energy traveling out from the generator must turn back when it reaches the short circuit. However, in this case there can be no voltage across the short circuit, although the current can be large. This is just the reverse of the open-circuited case of Fig. 3.

If you will look at Fig. 4D, you will see that just the same condition exists at the point ZZ,

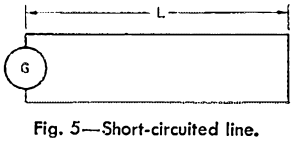


Fig. 5—Short-circuited line.

one quarter wavelength from the end of the open line. The voltage between conductors is zero (if there are no losses) at this point. This means that a short-circuit could be placed across the line at ZZ without disturbing the currents or voltages. Since it is a quarter wavelength from ZZ back to the input end of the line, this section of line also is resonant.

It is apparent from this that what the generator sees when looking into a quarter-wave short-circuited line is the same as what it sees when looking into a half-wave open-circuited line. That is, a quarter-wave short-circuited line is equivalent to a parallel-resonant circuit. The voltage and current distribution are as shown in Fig. 6A.

By carrying on this line of thought it is easy to demonstrate that a half-wave short-circuited line is equivalent to a series-resonant circuit. The current and voltage distribution are given in Fig. 6B. Lines of other lengths are not resonant, and will act like almost pure reactances. Table I summarizes this.

Table I
Transmission-Line Behavior

Length	Open-Circuited Line	Short-Circuited Line
Less than ¼ wavelength	Capacitive Reactance	Inductive Reactance
¼ wavelength	Series-resonant circuit	Parallel-resonant circuit
Between ¼ and ½ wavelength	Inductive Reactance	Capacitive Reactance
½ wavelength	Parallel-resonant circuit	Series-resonant circuit

The line behavior goes through the same series of changes with each added quarter wavelength.

Why Open- and Short-Circuited Lines?

Offhand, you might think that open- and short-circuited lines are about as useless, practically speaking, as an infinitely-long line. However, the fact is that they are quite useful.

In the first place, a resonant line can be substituted for a resonant circuit, and often is. The resonant line is especially useful at v.h.f. and

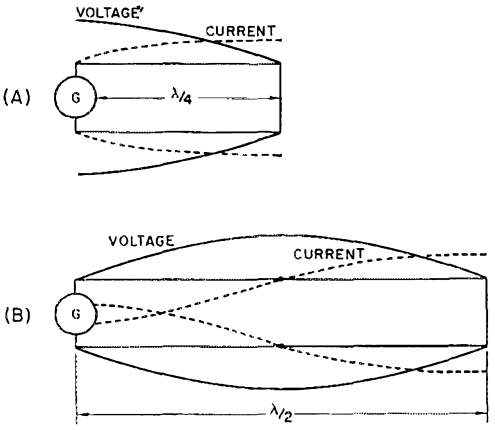


Fig. 6—Voltage and current distribution along resonant short-circuited lines.

u.h.f., where it may offer the only resonant-circuit structure that it is physically possible to use. Here is where the multiple resonance that goes with a series of quarter-wave sections often saves the day. A conventional *LC* circuit does not have this feature, and there is a limit to how large, physically, such a circuit can be made for a given frequency.

Second, nonresonant sections of line can be used in place of coils and capacitors, simply by adjusting the length to give a desired value of inductive or capacitive reactance. This is frequently done in antenna matching systems.

Finally, there are applications where multiple resonance in a line lets us do things like short-circuiting a harmonic of the transmitter while the fundamental frequency goes through unaffected. For example, a short-circuited line having a length of one-quarter wavelength at the fundamental frequency has a very high impedance — nearly an open circuit — and can be connected across another transmission line with little effect on the power flowing through it. But at the second harmonic it is a half wavelength long, and it will act as a short circuit across the other line at that harmonic (and all other even harmonics). QST

Strays

WA9FMQ operates the Twoer and K9YBC and WA9AVZ look on during a recent v.h.f.pedition to Bunker Hill, Wisconsin. Bovine s.w.l.s. in the background are unnamed.

The Oscar III Telemetry System

A Preliminary Description

OSCAR III is a 2-meter radio amateur repeater and its primary purpose is to provide two-way random communication among radio amateurs. It is a free-access device: that is, "any number may play."

An auxiliary telemetry channel is incorporated in the satellite to enable ground observers to monitor operation of the equipment. If anything goes wrong with Oscar III during orbit, the only clue to the malfunction will lie in the information telemetered to the ground observers. Radio amateurs, therefore, are urged to monitor the telemetry channel of Oscar III and to log the information received therefrom.

Plans call for Oscar III to transmit telemetry signals relative to temperature measurements made at various critical points in the satellite. The telemetry signal will be transmitted on 144.85 Mc. and will resemble Fig. 1. One complete telemetry sequence will last from 6 to 12 seconds and will consist of two III's in Morse code (.... ..) as an identifier, followed by two "bursts" of telemetering. Each "burst" consists of a series of pulses at 64 pulses per second, and each burst indicates a temperature measurement made at a specific point in the satellite. The repetition rate of the complete telemetry sequence (two III's plus two bursts) is related to the battery voltage. As the battery voltage drops, the III and burst rate will decrease. A calibration curve for this relationship will be distributed at a later date.

In addition, the duty cycle of the pulses in each portion of the telemetry sequence conveys the desired temperature information (Fig. 2). An inexpensive oscilloscope may be used to measure the duty cycle as expressed as the ratio of pulse width (A) to repetition rate (B). The pulse width conveys the information which is measured against the reference repetition rate. When observed on an oscilloscope, the telemetry burst may be traced on the screen with a grease pencil and the ratio of A/B or C/D determined after the pass is completed.

— *Don Norgaard, W6VMH*
Bill Orr, W6SAI

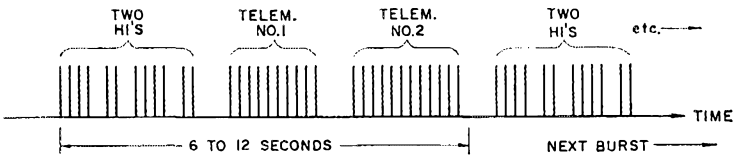


Fig. 1

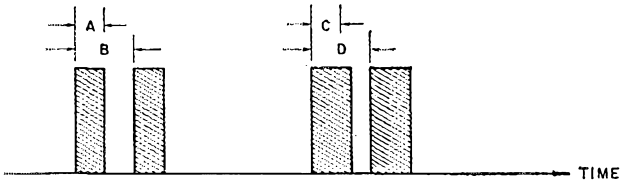
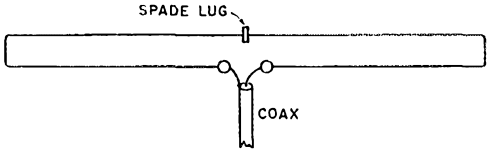


Fig. 2

Strays

Feedback

In the drawing of the supporting mast for the Antalo, Fig. 6, page 25, December QST, the two 1-inch-spaced holes should be drilled and tapped for 8-32 screws, rather than the two indicated. To help to clarify the nature of the driven element, this is, in effect, a conventional folded dipole bent into circular shape. The element is shown in flat form below.



The new president of Young Harris College in Georgia is Dr. Raymond A. Cook, W4JOH. He taught in Iran for a while, and used his ham gear there to provide assistance during the devastating earthquakes suffered by Iran in 1962.

— • • • —

When VE2YA left Pointe Claire, he vowed that he would choose a neighborhood where there were no other hams, as he had long suffered from the proximity of VE2DR. After buying a house in Halifax, first being sure there were no beams in the vicinity, he discovered that a neighbor was VE1DR.

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K8JLK would like to hear from American overseas missions having ham gear and wanting to participate in the "Religion In American Life" program.

Hurricane Hilda

Amateurs to the Fore to Perform the Usual

BY PETER CHAMALIAN,* W1BGD

Hurricanes are nasty creatures. They are the worst storms all rolled up into one, with the high winds of a tornado and the heavy rains that cause widespread flooding. The worst part is that they don't follow any type of predictable course. Hurricane Hilda was no exception.

HURRICANE Hilda was born on Sept. 24, the eighth tropical storm of the season. After passing over Cuba, already ravaged by two other storms this year, she turned toward the Gulf of Mexico. For a while it looked as if she would hit Mexico, then Texas and finally Louisiana. On Oct. 2, while most of the amateurs in the U.S. and Canada were preparing for the annual Simulated Emergency Test, amateurs in the Gulf Coast states were also preparing, but this would be no test. Hilda was on the way and it was only a matter of hours before she slammed her full 150-m.p.h. winds and heavy rains into the Louisiana coast.

Most of the Louisiana nets were preparing for the emergency operations to come. Local AREC and c.d. groups were coordinating plans with local officials and alerting members. The Fifth Region Net (RN5) was preparing for 24-hour operation for both the SET and Hilda.

In the early morning hours of Oct. 3, Hilda struck the Louisiana coast between Morgan City and New Orleans. She continued her northerly course during the day, moving at about 6-m.p.h. and passed Baton Rouge at approximately midnight. She then turned eastward through Southern Louisiana, Mississippi, Alabama and Western Florida. As she progressed, Hilda caused tornadoes to form, one near Larosa and three near New Orleans.

Net Operation

The Louisiana Section Net (LAN) held its regular session on Friday and decided that plans for the SET should be scrapped in view of the pending emergency. They would use the same system of liaison and Net Controlling that would have been used during the SET. Manager W5CEZ requested that stations prepare for continuous operation from 2200Z Oct. 3 since there was no reason for keeping the net active until an emergency situation arose. The net operated on 80 at night and 40 during the day and maintained continuous liaison with RN5 even though several stations were off because of loss of power or antennas. *W5s* CEZ GHP and HRD carried most of the load when it became necessary to switch to 40-meters. In addition to the contact with RN5, liaison was maintained with the Gulf Coast Hurricane Net, Southwest Louisiana Emergency Net and Delta SSB Net.

The Delta SSB Net operated for 64-hours during Hilda with some 1252 stations checking in. Liaison with local nets and NTS was maintained by various stations throughout the state. K5ANK, NCS, reported that seven stations, *W5s* FJY IQH GZR RNH SWS, K5HUJ and WA5BVR, gave forth with superhuman efforts, staying active for 30 or more hours during the operation.

The New Orleans Area Net was busy handling traffic on 3910 kc. during Hilda. K5LGO set up operations from the St. Charles Hospital in Luling, and W5ONE helped keep the frequency clear of stations who happened to come accidently. When skip conditions got so bad that operation was almost impossible, stations in the eighth, ninth and tenth call areas assisted with relays between stations in the immediate disaster areas.

The Central Gulf Coast Hurricane Net went into operation at 1000Z Oct. 2. The net acted primarily as a clearing house for c.d. traffic between local c.d. nets that were operating near the frequency. When the tornado struck Larosa, killing 20 or more people, the call for doctors and nurses went out and was immediately relayed to proper officials. W5GAJ relayed a request from railroad officials to W5KSI that communication lines were down and contact was lost with a train northbound from New Orleans. The route the train was taking was given and amateurs contacted local railroad officials and relayed arrival and departure times back to W5GAJ for coordination at the railroad headquarters.

The Fifth Region Net was in operation for 32 hours handling both SET and Hilda traffic. Continuous liaison was maintained with the Central Area Net (CAN).

The Central Area Net took Hilda in stride with SET traffic and was prepared to continue the round-the-clock operation, maintained during the SET, if needed. It wasn't.

Local Operation

W5PM and W5LDH contacted c.d. officials and stations with emergency operation capabilities and requested them to move to the Thibodaux, Morgan City, Patterson and Franklin area to aid W5IQH, the only station in operation from the area. WA5CKN stopped at Morgan City and set up his mobile equipment. W5MCC went to Patterson and provided communications from that city. K5SGK and K5USU went to Franklin

* Communications Assistant, ARRL.

where contact was made with W5IQH. He requested K5USU to go to local c.d. headquarters and set up operation. W5IQH handled incoming while K5USU took care of all outgoing traffic.

Operation in Lafayette started on Oct. 1 and continued for five days. City-wide coverage was maintained on 2 meters while 6 meters was used to contact local cities. Statewide contacts utilized 75 meters. Many antennas came down and had to be re-installed in 100-m.p.h. winds. When not actually operating, amateurs aided rescue squads in clean-up operation and in helping stranded families to safety. Two-meter communication at headquarters was lost when the vertical element of the ground-plane was snapped off by a gust of wind. W5WZR set up operation at a television station where emergency power was available along with some supports for dipoles. He handled a heavy load of relief traffic. Padre, W5WZR, being a Cajun himself, talks the slow lazy language of the Bayou country and his refusal to get rattled no matter what happened helped settle other hams down to the business at hand.

W5FMO made the initial contact with the FCC in New Orleans to request a declaration of emergency frequencies. Two 10-kc. segments of the 75-meter phone band were to be used should skip conditions warrant and at 2300Z Oct. 3 the declaration went into effect. ARRL was notified of the emergency frequencies and W1AW transmitted a special bulletin several times that weekend.

A microwave tower in Livonia that carried 2 television channels was put out of commission by the high winds. W5LDH arranged for K5ZQZ to use W5FJY's mobile to go to Livonia and handle traffic, pertaining to the restoration of service, for some three hours until the system was put back into operation.

Members of the Iberia Radio Club went on alert Oct. 2. WSCXE, W5WEO, *K5s* DPG FMS MMV MZG VVN set up at c.d. headquarters on 6 meters and WA5GKT, K5PGU and K5RDL remained at their home stations. Emergency generators were loaned by military and other groups in the area W5AGS monitored weather reports from Fort Polk and relayed this information on the emergency nets.

Amateurs in Houma, *W5s* AZM BFU JKR IKB SWS and K5KQG, were able to stay on the air with emergency generators borrowed from local oil companies.

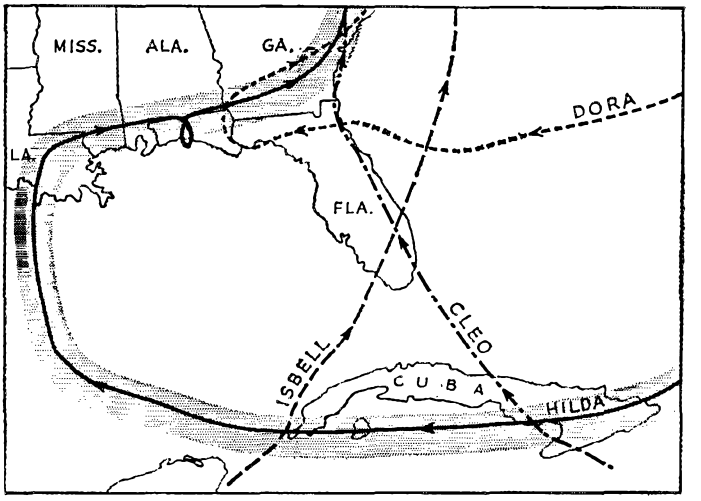
Assistance from Other Areas

Just in case, amateurs in Texas also prepared for Hilda. When she turned towards Louisiana, these groups remained active to aid Louisiana amateurs. AREC Groups in Texas Towns near the Louisiana border went to various towns at the request of W5WZR. Three mobile units arrived in the affected areas near Lafayette by Sunday afternoon and others arrived that night. Units going to Franklin checked with the local c.d. net and were assigned by them to go to areas where help was needed. With the big backlog of health and welfare traffic piling up by the minute, some plan had to be devised as to how to deliver and check each inquiry. W5IQH, with K5JKN operating, set up a mobile net comprised of the Texas amateurs and gave them the messages as they came through. The mobile units then delivered the messages in person and got replies if requested. By the time they headed home, they had handled approximately 350 messages.

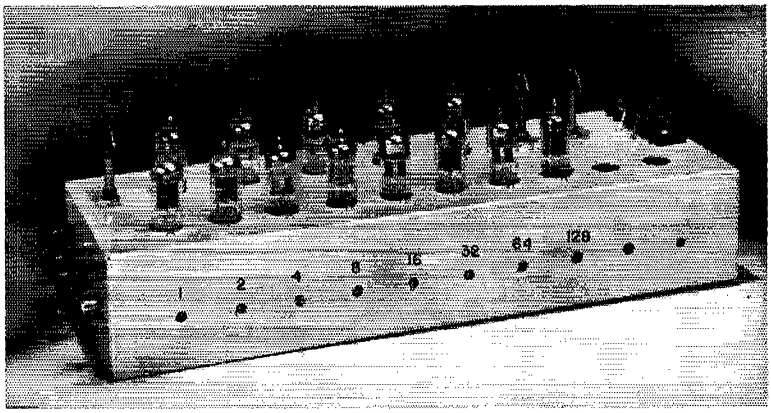
Conclusions

For the most part, the entire operation came off without a hitch. The fact that amateurs in the area struck by Hilda had time to prepare for her coming, that AREC groups in this part of the country were scheduling SET activities, and that the entire NTS structure was in full activation, made the difference between a possibly haphazard operation and a well-organized and smoothly-run one.

Another page in amateur public service operating goes into the history books, and an operation we can all be proud of. QST



This map of the Gulf Coast states and Cuba shows the paths of the major hurricanes this year. Hilda, shown by the broad line, took the most roundabout path of them all. Notice the little loop-de-loop? That is the actual path she took as she ripped through the four Southeastern states.



The binary counting unit. Across the rear of the chassis, from left to right, are the gated-amplifier gain control, tubes in the gated amplifier, gate flip-flop, first and second time dividers, and a 60-p.p.s. generator (not described). The two controls at the right are in the time-divider circuit. The eight tubes in the front row are in the counting flip-flops. The neon bulbs in these circuits protrude from holes along the side of the chassis, each lamp being labeled according to the count indicated by its lighting. The timing push-button and reset switches are at the left-hand end of the chassis.

Low-Cost Precision Frequency Measurement

Novel System Using an Electronic Frequency Counter

BY WILLIAM S. SKEEN,* K6YRQ, ex-W7EPM

The use of an audio oscillator as an interpolator between adjacent 10-kc. markers in frequency measurement is well known. The simple binary counter described here by K6YRQ is used to read out the frequency of the audio oscillator to a high degree of accuracy, making precise calibration of the oscillator unnecessary.

EQUIPMENT for measuring frequency to within 10 cycles or better might seem superfluous to the ham having a 100-kc. calibrator built into his receiver. However, Official Observers, and those grinding or measuring crystals for lattice filters, frequency synthesizers and other such purposes, may find use for the equipment described here.

Those interested in precise frequency measurement will very likely have already added a 10-kc. harmonic generator driven by the 100-kc. calibrator to provide 10-kc. markers. The addition of two more units makes it possible to measure frequency to within almost plus or minus one cycle, (assuming zero error in the marker frequency, which cannot be taken for granted.) This equipment consists of a frequency counter, and an audio oscillator having a range of 0 to 5000 cycles.

The equipment is used in the following manner. An incoming signal will beat with the nearest 10-kc. marker in a receiver to produce an audible beat note of a frequency between 0 and 5 kc. Inspection of the receiver dial is generally sufficient to indicate which side of the nearest 10-kc. point the signal is, and we also know the frequency of the marker signal. It remains, then, only to measure the frequency of the beat note and add it to or subtract it from the frequency of the nearest 10-kc. marker, as the case may be, to come up with the final answer.

The frequency of the beat note may be measured by adjusting an audio oscillator to zero beat with the audio signal from the receiver, and reading the frequency from the calibrated dial of the oscillator. However, inexpensive audio oscillators (the author uses a $20 kit unit) seldom have a calibration accuracy better than ± 100 cycles. The electronic counter described in this article will read out the frequency of the oscillator to an accuracy of approximately ± 1 cycle.

Harmonic Generator

Although harmonic generators have been discused previously in the pages of *QST*, the one used here is described because the identical circuit is used as a divider in the frequency counter. This circuit, which provides the 10-kc. markers when driven by a 100-kc. oscillator, is shown in Fig. 1. A 6AS6 is much preferred in this circuit, although a 6CB6, or similar pentode, may be used with a larger value at C_2. An interesting advantage of this circuit is that it is necessary to change

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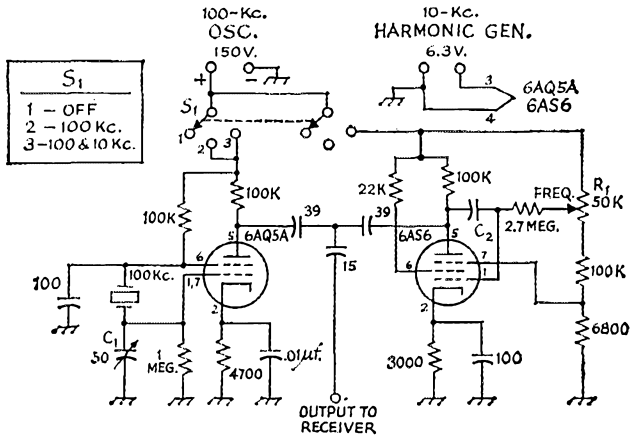


Fig. 1—Circuits of the 100-kc. oscillator and harmonic generator. Except as indicated, capacitances are in pf.; resistances are in ohms (K = 1000). Fixed capacitors are mica or NPO ceramic. Fixed resistors are ½-watt.

C_1—Air trimmer.

C_2—50 pf. for 10 kc. with 6AS6; increase in inverse proportion to frequency; e.g., 500 pf. for 1 kc. Multiply values by 10 if 6CB6 is used.

R_1—Linear control.

S_1—Double-pole three-position rotary switch.

only one component — the timing capacitor C_2 — to make the circuit operate at any frequency from 10 kc. to 1 cycle.

The 100-kc. calibrator circuit included in Fig. 1 is the same as that described in ARRL *Handbooks* and needs no further explanation. The 10-kc. generator receives its drive through two series capacitors, and the combined 100- and 10-kc. harmonics are taken off from the junction of these capacitors.

Frequency Counter

The block diagram of the frequency counter appears in Fig. 2. An examination reveals that it consists of only three sections: (1) a gated, or electronically-switched input amplifier, (2) a time base providing 1-second pulses for switching the amplifier on and off to fix the interval over which the counter counts, and (3) the counting circuits proper. The latter are nothing but a series of flip-flops (d.c.-coupled multivibrators).

Time Base

The time base drives the gated-amplifier flip-flop which turns the amplifier on and off. The time-base circuit divides a standard frequency down to obtain the required 1-second pulses. Since we have already divided the 100-kc. calibrator signal to 10 kc. in the harmonic generator, it might seem logical to go ahead and divide it further. This, however, would require four additional dividers. The divider circuit shown in Fig. 3 uses the 60-cycle line frequency as the standard, and therefore requires but two dividers. We are counting to a maximum of only 5 kc., and it has been found that the accuracy is sufficient for a count to the nearest cycle. It will be noticed that the circuit of each stage is essentially the same as that of the harmonic generator in Fig. 1.

The first divider uses a timing capacitance of 0.05 μf. and produces output at 10 pulses per second (6:1 ratio). The second divider has a 0.5-μf. timing capacitor and produces output at 1 p.p.s. (ratio 10:1). Cathode coupling is used between the two dividers, and from the second divider to the gate flip-flop which follows. The 60-cycle drive for the first divider may be taken directly from one side of the high-voltage secondary of the power-supply transformer through series resistor R_3.

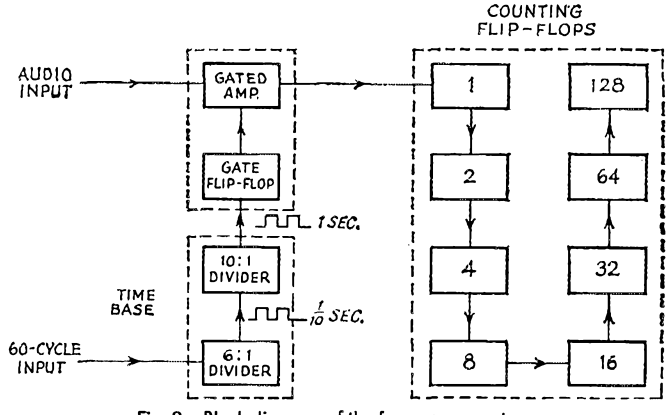


Fig. 2—Block diagram of the frequency counter.

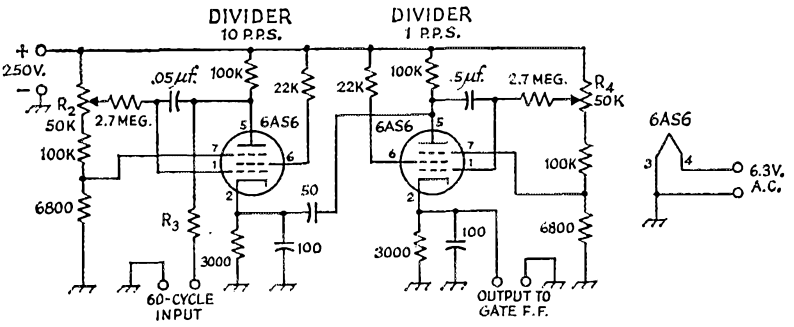


Fig. 3—Phantastron time-base divider circuit. Except as indicated, capacitances are in pf., resistances are in ohms (K = 1000). Fixed capacitors of decimal value are paper; others are mica or NPO ceramic. Resistors are ½ watt. R_2 and R_4 are linear controls. R_3 should have a value of 1 megohm per 100 volts of transformer voltage. See text.

Gated Amplifier

The circuit of the gated amplifier is shown in Fig. 4. The pentode section of a 6U8A serves as the amplifier proper. Screen voltage is supplied through a cathode follower using the triode section of the same tube. The cathode follower is driven by a d.c.-coupled flip-flop. The circuit of the flip-flop is the same as used in the counting flip-flops, Fig. 5, minus the reset switch. The neon bulb in this flip-flop flashes on and off in synchronism with the 1-second output pulses.

Counting Flip-Flops

The circuit used in each of the eight counting flip-flops is shown in Fig. 5. This counter is of the binary type, and counting is indicated by the lighting of the neon bulb in each flip-flop stage. The counting is in steps of the powers of 2; *i.e.*, 1, 2, 4, 8, 16, 32, 64, 128, and so on. The counts of the stages whose neon bulbs remain lighted after the 1-second count are then added to obtain the total frequency count. With the bulbs of the first two stages lighted, the count will be $1 + 2 = 3$. With the bulbs in the second, third and sixth stages lighted, the count is $2 + 4 + 32 = 38$, and so on. Thirteen flip-flop stages will count to 8192. This is the minimum number of stages that will count to the necessary 5000 cycles, since 12 stages will count to only 4096. However, if a frequency higher than the maximum limit of the counter is applied, the counter will recycle and resume counting until the applied frequency is reached. Since the audio oscillator has an accuracy of ±100 cycles, the counter need count only to 200 cycles to establish the true frequency within the limits of this error, as will be explained later. The counter shown in the photos counts to a maximum of 256 before recycling. All bulbs are lighted at the count of 255; all are out at a count of 256, or any multiple of 256.

Those familiar with manufactured counters may wonder why a decimal readout, rather than a binary readout, has not been provided. The latter requires considerable extra circuitry and components, and it was felt that the saving in labor and materials, as well as the ease of adjustment, makes up for the slight inconvenience of having to add up the indicated numbers after a count.

The first flip-flop in the string receives its input signal from the plate of the 6U8A gated amplifier. A negative pulse is required to trigger succeeding flip-flops, so the input from the preceding flip-flop, in each case, is taken from the plate of V_{1A} as shown. A coupling capacitance of 30 to 50 pf. is used to couple between flip-flop stages. The switch S_3 is common to all counting stages and is used to reset the counter to zero before a counting operation by momentarily opening the ground return of the V_{1A} sections.

Construction

The layout of the counter built by the author is shown in the photographs, although most constructors will probably prefer an arrangement of their own. Components are assembled on a 3 × 6 × 15-inch aluminum chassis. Each stage was constructed on a Vector socket and, after test, was mounted on the chassis. A very simple, neat layout results. The neon indicators

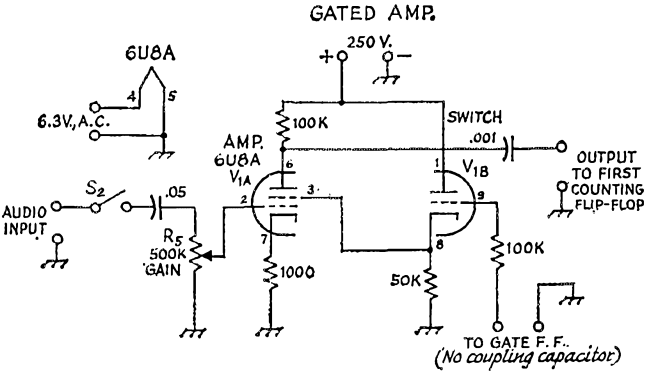
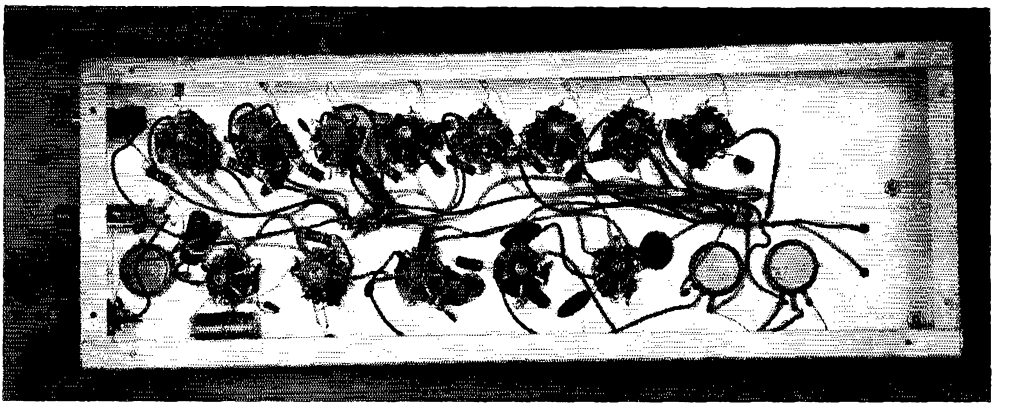


Fig. 4—Circuit of the gated amplifier. Capacitances are in μf.; resistances are in ohms (K = 1000). Capacitors are paper or disk ceramic. Fixed resistors are ½ watt. R_5 is an audio-taper control. S_2 is a normally-open single-pole push-button switch.



Bottom view of the electronic-counter chassis. The neon bulb in the gate flip-flop is to the right of the electrolytic capacitor in the lower left-hand corner. It protrudes from a hole drilled in the top of the chassis.

are simply allowed to protrude through holes along one side of the chassis and are labeled 1, 2, 4, 8, 16, and so on.

Preliminary Adjustment

The only adjustments required in the counter are the setting of the potentiometers in the divider circuits of the time base. There are various ways of doing this, but there is one way that does not require the use of a scope. Open up the coupling connection between the two dividers. Place a probe from a signal tracer (or a piece of hookup wire from a receiver antenna terminal) in proximity with the second divider, so that the pulses may be heard. Adjust R_4 for slightly less than 1 p.p.s., or about 55 to 57 per minute. Reconnect the coupling between dividers, and adjust R_2 to obtain 1-second pulses from the second divider. The first divider will divide by 5, 6, 7, and so on and, if the adjustment is incorrect, there will be a noticeable speeding up or slowing down of the pulses heard in the receiver. The neon bulb of the gate flip-flop will be flashing on and off in synchronism with the pulses, but it is easier to match to WWV 1-second ticks by ear than by eye.

The adjustment may be checked by counting 60 cycles, or preferably some multiple of 60 cycles, such as 240 cycles, on the counter. For 240 cycles, the 5th, 6th, 7th and 8th neon indicators should be lighted.

Measuring Frequencies

As mentioned previously, the counting system is used to measure the frequency of an audio oscillator that has been adjusted to zero beat with the audio beat produced in a receiver by the mixing of the signal of unknown frequency with the nearest 10-kc. marker from the harmonic generator. If desired, the audio beat from the receiver may be measured directly if the beat is 256 cycles or less (and the audio system of the receiver is capable of passing frequencies that low), but the audio oscillator is required for higher frequencies to determine the number of times the counter has recycled. The frequency of the audio oscillator is first adjusted to zero-beat with the audio signal from the receiver. This is done most conveniently by feeding the audio output from the receiver into the vertical input of a scope, and the audio oscillator into the horizontal input, and adjusting the audio oscillator for a 1:1 Lissajous. It can also be done aurally by feeding the oscillator into a loudspeaker, and the receiver into headphones, or another speaker. As the frequency of the audio oscillator ap-

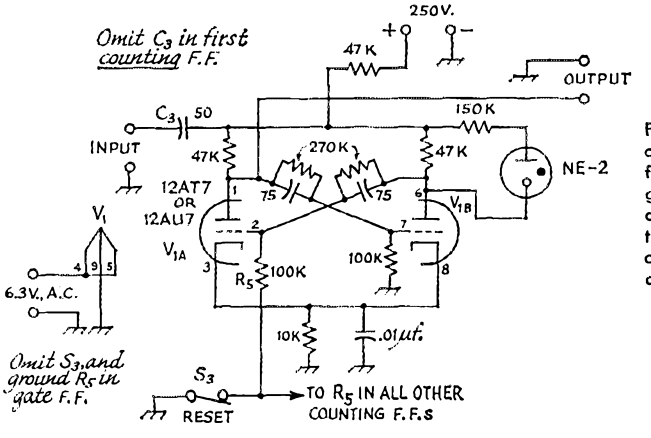


Fig. 5—Circuit used for all flip-flops, except that C_3 is omitted in the first counting flip-flop, and that R_5 is returned directly to ground in the gate flip-flop. Except as indicated, capacitances are in pf.; resistances are in ohms (K = 1000). Capacitors of decimal value are disk ceramic; others are mica. Resistors are ½ watt. S_3 is a single-pole normally-closed spring-return lever switch.

proaches the beat from the receiver, the ear will detect pulsations which become slower and slower until no pulsation is heard when the two signals are at zero beat.

When the audio oscillator has been adjusted for zero beat, a reading should be taken from its calibrated dial. Then, being careful not to disturb the adjustment of the oscillator, feed it into the counter. Turn the counter on, and watch for the flash of the neon bulb in the gated-amplifier flip-flop. Close S_2 during one of the 1-second intervals when the neon bulb is out, keep the switch closed during the next 1-second interval when the bulb is lighted, and open it again during the next 1-second interval when the lamp is extinguished again. Read the counter by adding up the numbers assigned to the neon bulbs which have lighted.

The only thing that remains to complete the reading is to determine the number of times the counter has recycled. An example will explain how this is done. Suppose the dial on the audio oscillator reads 700, and the counter has registered 175. The accuracy of the meter is ±100 cycles, so we know that the frequency must lie somewhere between 600 and 800 cycles. Subtract the counter reading from each:

$$600 - 175 = 425$$
$$800 - 175 = 625.$$

Dividing each of these by 256 should give us an indication of the number of times the counter has recycled:

$$\frac{425}{256} = 1+ \qquad \frac{625}{256} = 2+$$

This indicates that the counter has recycled more than once, but less than three times, so it must have cycled twice. It is evident, then, that the frequency is $(2 \times 256) + 175 = 687$ cycles.

It will be found that the use of the higher of the two limit frequencies always yields the correct result, so the procedure can be simplified as follows:

1) Add 100 (the plus limit on the accuracy of the audio oscillator) to the dial reading.

2) Subtract the counter reading.

3) Divide by 256.

4) Multiply the whole number before the decimal point in the result by 256.

5) Add the counter reading.

If the division of (3) results in zero before the decimal point, the counter has not recycled, and the frequency is simply that indicated by the counter. This calculation can be avoided, of course, by using the full complement of 13 flip-flops, which will read out the frequency directly.

There are two cases which may arise in which measurement becomes difficult. One is when the signal is nearly the same as one of the 10-kc. markers. The other is when the signal is nearly midway between two markers. Both of these difficulties may be avoided by a procedure requiring only a signal generator, such as a grid-dip oscillator or a v.f.o. The only requirement for the signal generator is that the frequency stay put for the 1-second period required to measure it. The procedure is as follows:

Set the audio oscillator to some selected frequency — 3 kc., for example. Use the counter to set the frequency at exactly 3 kc. Then beat the signal generator against the incoming signal to produce a 3-kc. beat note by matching it with the frequency of the audio oscillator. Then measure the frequency of the signal generator in the same way that you would measure an incoming signal. Finally, subtract 3 kc. from or add it to the measured frequency.

The counter requires a fairly high level of input voltage — about 35 to 50 volts — to trigger the first flip-flop. A squaring amplifier between the audio oscillator and counter may be required, or preferably a trigger generator, between the input amplifier and first flip-flop may be added.

The cost of the counter, not including power supply (250 volts at 75 ma.), was $42, using surplus parts, and including a lucky find of Vector sockets at 25 cents each. QST

Strays

Here, at a recent Swap Fiesta in El Paso, are W5PZS of Midland, South Texas SCM W5QEM, and ARRL West Gulf Division Director W5QKF.

Tracking the Moon—In Simple English

Practical Ideas for Designing and Aligning a Polar Mount

BY VICTOR A. MICHAEL,* W3SDZ

A MAJOR pitfall facing the prospective moonbouncer is the antenna mount and tracking system. Even a 50-foot dish is of no value in lunar communication, if it cannot be pointed at the moon and kept there. When we began our moonbounce efforts, many hours were spent pouring over astronomy texts. It was determined rather quickly that a whole new language would have to be learned for a proper understanding of the moon-tracking problem. Gathered together here are some of the essentials involved.

Earth-Space Relationship

Understanding the earth-moon relationship in space is the first step in solving the moon-tracking problem. This relationship is best illustrated with a polar mount, as in Fig. 1. A polar mount is simply an elevation-azimuth mount with its azimuth axis parallel to the axis of the earth. Thus a polar mount at the equator would have its axis parallel to the earth (horizontal, to the viewer on the ground), while at the North Pole the axis would be vertical, or at a 90-degree angle to the plane of the earth. Your latitude determines the position of the polar axis with respect to the earth's surface, as illustrated in Fig. 1. Once this is determined, we can proceed to a few other terms.

Celestial Equator. An extension of the earth's equator; the circle that would be formed at a right angle around the polar axis.

Meridian. The north-south line directly overhead.

Hour Angle. The angle in degrees to the right of the meridian. (Degrees can also be transferred into time: 15 degrees equals 1 hour; 1 degree equals 4 minutes.)

Declination. Angle in degrees north or south of the celestial equator.

Using the Nautical Almanac

This is the most important tool you will use in setting up, calibrating, and using your moonbounce antenna. It is available from the U. S. Government Printing Office for $2.00. Be sure you get the right book; there is a similar publication from the same source titled *The American Ephemeris and Empirical Nautical Almanac.* This is more expensive, and harder to use for amateur applications.

On page 39 is a portion of the tables found in the *Nautical Almanac.* It will be noted that the position of the moon is plotted for each hour of GMT. As an example, at 1200 GMT Jan. 1, 1965, the GHA (Greenwich Hour Angle) is 15 degrees 16.5 minutes. This means that the moon has passed overhead at Greenwich, and is now 15 degrees 16.5 minutes, or just over one hour, to the right of the meridian, as the observer faces south. The declination is given as S 23 degrees 39.5 minutes, which means that the moon is at this position south of the celestial equator.

Once you know where the moon is at Greenwich, a simple formula may be applied to determine its position with respect to your own location. The declination is always the same, no matter where you live. The only factor that changes is the hour angle. The Local Hour Angle (LHA) can be obtained by the formula

$$\text{LHA} = \text{GHA} \begin{matrix} - \text{ west} \\ \\ + \text{ east} \end{matrix} \text{ longitude.}$$

Getting back to our example, suppose you I've at 75 degrees west longitude. We find that the moon would have an LHA of 300 degrees 16.5 minutes, or approximately 4 hours before meridian.

Mount Design Considerations

After you examine your almanac you will discover a few facts about the moon's habits that will help you to design a mount. First of all, the moon spends about two weeks above the celestial equator and about two weeks below. The maximum declination is about 25 degrees

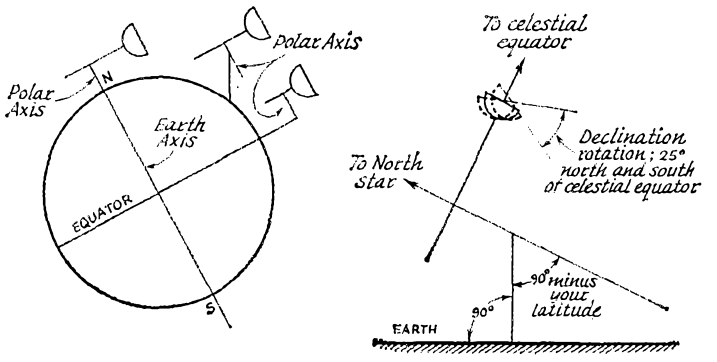


Fig. 1—Principles of the polar mount for moon tracking. At the left it can be seen that the polar axis is always parallel to the axis of the earth. Its position with respect to the earth's surface depends on the latitude of the observer. Two planes of rotation are required; the declination, which may be varied a small amount from day to day as required; and hour-angle, which should be controlled with a clock drive to follow the moon.

* Box 345, Milton, Pa.

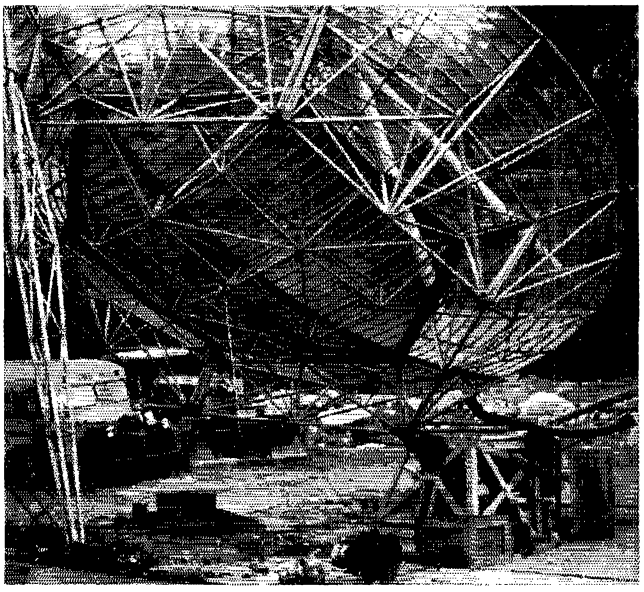


Fig. 2—Simplified polar mount and 28-foot dish at W1BU. Principles of the mount and its clock drive are explained in the text.

north or south of the celestial equator. Tracking ability for about 3 to 5 hours of hour angle each side of local meridian should be satisfactory.

At this point it is possible to make some compromises in order to simplify the mount in favor of a larger antenna. For instance, at W1BU, Sam gave up two weeks out of a lunar month in order to use the 28-foot dish of Fig. 2 in recent moonbounce tests. He can elevate the antenna above, but not below, the celestial equator. The high edge (upper left in the picture) is elevated to the desired position, while the lower edge rests on the pedestal at the lower right. The hour angle is controlled by a clock drive, just visible at the lower center. Though complex enough, this is far simpler than the true polar mounts used on the 18-foot dish at W1BU, or the mount and drive for the 256-element collinear array at W3SDZ, Fig. 3.

Calibration of the Mount

Obviously, if you are going to use the information in the *Nautical Almanac* with your mount, there must be some system of readout. There are

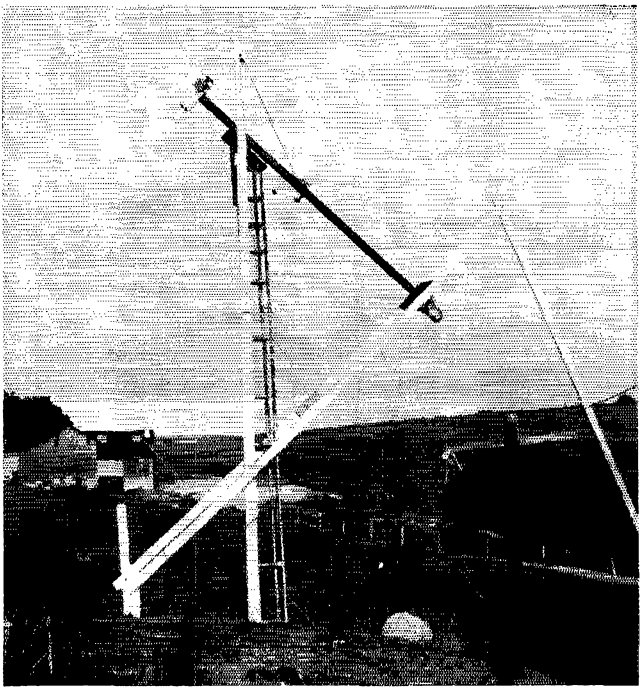


Fig. 3—Polar mount at W3SDZ, before the 256-element 432-Mc. collinear array was in place. The complete array is pictured in November 1964 QST, page 75.

many possibilities, and many different systems will evolve. As a starting point, a few ideas will be discussed here, and then "to each his own."

As a practical matter, the declination need be set no more than once per day, for it changes less than 2 degrees in 24 hours. For a few hours of moonbouncing effort each day, less than 1-degree variation is involved. Unless your antenna pattern is much sharper than the best amateur efforts to date on frequencies below 1300 Mc., this error is no problem. Declination readout can be rather simple: a calibrated scale on the antenna mount, a selsyn readout, or even a good 10-turn pot geared to the declination axis, and connected to a mercury battery and a meter. Anything accurate to plus-or-minus 1 degree should be all right.

Hour-angle readout and automatic tracking are the chief problems in moon tracking. The moon appears to move across the sky at slightly less than 15 degrees per hour. Actually, it is the earth that is moving at 15 degrees per hour. The moon is also moving, but at less than 1 degree per hour. Thus our basic problem is to drive the polar or hour-angle axis at 15 degrees per hour with a clock. The simple procedure of turning off the hour-angle drive for about 3 minutes once each hour, until the moon catches up, keeps things more than accurate enough for antenna tracking.

Now a "clock" doesn't necessarily have to look like a clock. For instance, a large synchronous 60-cycle motor driving a gear train at 1 revolution per day, coupled directly to the hour-angle axis, will work. The W1BU system is shown schematically in Fig. 4. Actual readout can be by any method that will develop plus-or-minus 1-degree accuracy.

When the mount is made, the antenna mounted, and the readout devices reading, the next question will be where is the antenna *really* pointing? This may sound simple, but most would-be moonbouncers have had trouble with this problem. Fortunately, nature has provided

G.M.T.		SUN				MOON					
		G.H.A.		Dec.		G.H.A.	v		Dec.	d	H.P.
d	h	°	′	°	′	°	′	′	°	′	′
1	00	179	09·2	S23	02·3	201	09·9	11·7	S22	48·3	4·9	54·0
	01	194	08·9		02·1	215	40·6	11·7	22	53·2	4·7	54·0
	02	209	08·6		01·9	230	11·3	11·7	22	57·9	4·7	54·0
	03	224	08·3	··	01·7	244	42·0	11·6	23	02·6	4·5	54·0
	04	239	08·0		01·5	259	12·6	11·6	23	07·1	4·4	54·0
	05	254	07·7		01·3	273	43·2	11·5	23	11·5	4·4	54·0
	06	269	07·4	S23	01·1	288	13·7	11·6	S23	15·9	4·2	54·0
	07	284	07·1		00·9	302	44·3	11·5	23	20·1	4·1	54·0
	08	299	06·8		00·7	317	14·8	11·4	23	24·2	4·0	54·0
F	09	314	06·5	··	00·5	331	45·2	11·5	23	28·2	3·8	54·0
R	10	329	06·2		00·3	346	15·7	11·4	23	32·0	3·8	54·0
I	11	344	05·9	23	00·1	0	46·1	11·4	23	35·8	3·7	54·0
D	12	359	05·6	S22	59·9	15	16·5	11·3	S23	39·5	3·5	54·0
A	13	14	05·3		59·7	29	46·8	11·4	23	43·0	3·5	54·0
Y	14	29	05·0		59·5	44	17·2	11·3	23	46·5	3·3	54·0
	15	44	04·8	··	59·3	58	47·5	11·3	23	49·8	3·2	54·0
	16	59	04·5		59·1	73	17·8	11·2	23	53·0	3·1	54·0
	17	74	04·2		58·8	87	48·0	11·3	23	56·1	3·0	54·0
	18	89	03·9	S22	58·6	102	18·3	11·2	S23	59·1	2·9	54·0
	19	104	03·6		58·4	116	48·5	11·2	24	02·0	2·7	54·0
	20	119	03·3		58·2	131	18·7	11·2	24	04·7	2·7	54·0
	21	134	03·0	··	58·0	145	48·9	11·1	24	07·4	2·5	54·0
	22	149	02·7		57·8	160	19·0	11·2	24	09·9	2·5	54·0
	23	164	02·4		57·6	174	49·2	11·1	24	12·4	2·3	54·0

Table I—Section of a page from the *Nautical Almanac*, showing solar and lunar data for each hour of January 1, 1965, at Greenwich.

us an almost constant radio signal that permits a rather accurate calibration of the antenna system to be made. That signal comes from the sun. It will be seen that the almanac gives identical information on GHA and declination for the sun; thus, by listening to solar noise you can calibrate your polar mount in the same terms of reference as you will use in moon tracking. Some time spent reading K2LMG's "Antenna Patterns from the Sun," *QST* for July, 1960, will be well spent at this point.

What you have just read covers some of the essentials. It is hoped that enough information has been given to enable the prospective moonbounce enthusiast to determine his requirements for mounting and tracking. If any serious experimenter in this field needs help at this point, the author will be glad to try to be of assistance. QST

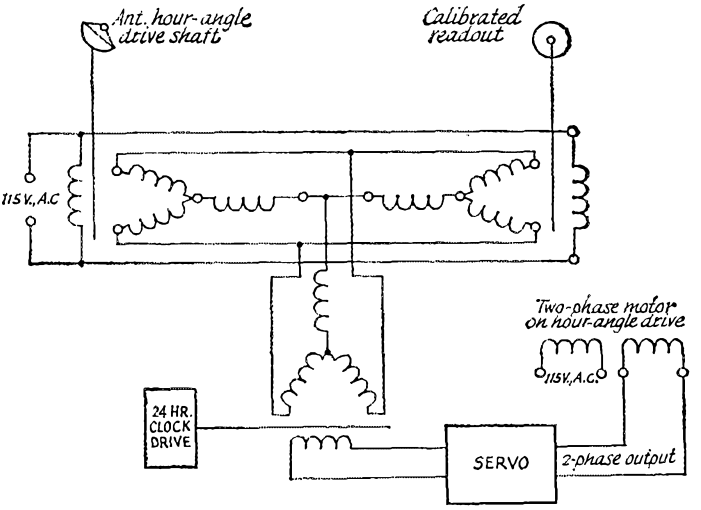


Fig. 4—Schematic diagram of the clock drive and readout system at W1BU.

The World Above 50 Mc.

CONDUCTED BY SAM HARRIS* WIFZJ

Official Experimental Station

The League's OES Appointment is available to all who are interested in experimenting on the v.h.f./u.h.f. bands. I guess that it is understandable if you ask what the OES appointment can do for you. Usually the most important thing it does for you is the last one to get mentioned. Mainly, because it requires some effort on your part. Not a lot of effort. It's just that you have to quit fooling around and start experimenting. You do this by simply making a record of what you do. This record, in the form of a monthly report, is the price you pay for your appointment. In return you get to share in experiments made by others. You get on the mailing list for all v.h.f.-oriented bulletins and other timely League mailings. You become eligible for participation in the C.D. (Communications Dept.) contests. In short, you become a participating member of the field organization which has provided the backbone of amateur radio activities for the past 50 years.

Put an Object in your Operating

Everyone knows that it is fun to operate the amateur bands. It's fun to drive a car too, but most people drive with an object in mind. They are trying to get somewhere. One way to insure that you are going somewhere is to participate as an OES appointee. Contact your local SCM (page 6, *QST*) and see if you can qualify for an OES appointment.

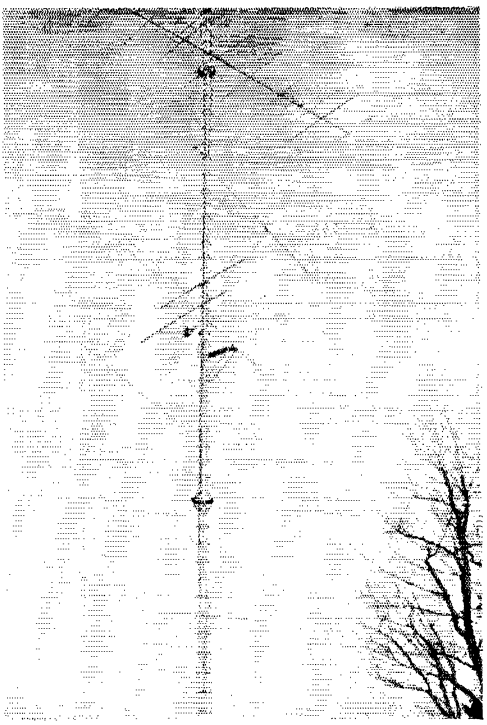
18th V.H.F. Sweepstakes

January 9–10 will mark the 18th running of the V.H.F. Sweepstakes. (rules on page 105, December *QST*.) This annual event is not just a contest. It is a station capability test. It provides an opportunity to prove your operating ability under adverse conditions. Anyone can run up a big score with a kw. to a 164-element beam on top of a 150-foot tower. The real test is how much can you do with what you have. The V.H.F. S.S. is knowing people, knowing your band, knowing your equipment and operating procedure. Taking advantage of your know-how to get the job done. In short it is participation in one of the basic functions of amateur radio — traffic handling.

144 Mc. and Up

Bill Lewis, WØIDY, out in Cedar Rapids tells us that the best 432-Mc. opening observed occurred during the evening of October 30. W8JLQ and W8RQI were worked by Bill for state #7. Ohio, on 432 Mc. Others worked that night were WØIKQ, W8PT and W8YIO. At Ames, Iowa, WØPFP sez he's glad to be back on after three months off. Jim did work state #9 on two meters back in August but nothing since. He'd also like anyone having any dope on converting the UPX-6 to 1296 to get in touch with him. We hear that W9ZND is preparing for some 432 Mc. contacts using the newly built transceiver and 4 foot dish mounted 60 feet up. Paul, located at Round Lake, Illinois, would like skeds with others in the northern Illinois and southern Wisconsin area. Out in Janesville, Wisconsin K9DBR seems to have his winters' work cut out for him. Neil says that at the present time "equipment under construction" consists of two-meter s.s.b. transmitter, two-meter and 432-Mc. converters and 432-Mc. transmitter. In the planning stage — RTTY equipment. Bud Davis, K8TLO, sez that conditions on 432 were fair for the month of October. Stations heard at Bud's QTH on 432 Mc. included W8JLQ, W8RLT, W8MNT, W8YIO and K8AIY. Blake, W8MNT has completed his par-amp for 432 Mc. and seems mightily pleased with same. K4FJZ sez he's working on the construction and testing of an 8-ft. parabola for 1296 Mc. and hopes to have two or three APX-6's converted to 1296 and on the air within the next few months. Good luck, John! Nice to see all this ambition being put to v.h.f. use.

220-Mc. activity seems to be picking up slightly in some areas. W2SEU says that "activity on 220 Mc. is getting better and now includes WA2FBB, K2JHR, K2JDI, WA2-SVG and W2SEU." Fred mentions that 220 Mc. was good toward the north on October 9 and 10 and he hopes by the time of the next good conditions he'll have the 500 watt rig completed. In New Jersey WA2JVO tells us that he and WB2FYB are continuing their 220-Mc. skeds and that Ray is running a homebrew 6360 rig, 15 watts and TRC-8 receiver. Out in the west WØWYZ sez that although nothing unusual has occurred, activity on 220 Mc. and 420 Mc. is picking up considerably. Ray expects that local nets will



220-Mc. Moonbounce antenna at K2CBA.

*P.O. Box 334, Medfield, Mass.

soon be operating at 220.050 Mc. and 432.015 Mc. According to Don, WB2EGZ, "November 11 was a great night on 432 Mc. W4API at Arlington, Virginia worked four states, Virginia, Maryland, Delaware and New Jersey with three watts and an 11-element yagi." Other stations in this area are active and anxious on 432 Mc.

Amateur TV seems to be picking up new customers all the time too. Among other projects WB2GKF, K2OKA and WA2YN are all collecting parts for cameras etc. K2AOU has finished his camera and now has a 432-Mc. transmitter under construction. WA2KIX completed his TV stations and is now running 90 watts input on 432 Mc. Antenna is a corner reflector. K2GGA is working on an interlaced pulse generator for his camera and the intercarrier set up. WB2OSA has a coax cavity for 432 Mc. under construction. WA2KIX is the third operational TV ham station in Syracuse. He started a year ago and has built all of the equipment including camera and antennas. Keep up the good work, fella! We do need our "diggers". Out in Wauwatosa, Wisconsin, WA9FUH sez that "ham T.V. has dropped into a lull here with purchase of an APX-N. Conversion should be complete by the time this is in print." Well is it now? And — are you back at the T.V. Ray?

Up in Winnipeg, Manitoba VE4GI reports a good QSO with WØHZM on October 27 on 144 Mc. with signals four S units above normal. Bill sez: "Four hours of tuning and calling netted me one other signal on 144. WAØFDY (425 miles) was putting in a Q5 c.w. signal but he could not hear either VE4JX or myself." KØFPC would like to hear from others who have tried long distance mobile work on 144 Mc. (50 miles or so, that is.) Bob sez that skeds run on 144 Mc. indicate that the band is much better for mobile work than 50 Mc. which the group at Harrisonville was using a year ago. KØJWN, WAØDSE, WØLOM and KØFPC all copied WA7BCL during a net session on 144 Mc. Of course it didn't take too long (even with the sometimes weak signal) to find out that that lovely "7" coming through on two meters was Mobile ø of course. An interesting letter received from W9OII concerning his two meter work. "A card in the mail tonight confirms my contact with K3ARN, Maryland, on tropo opening of September 1 for state #30. Worked W5RCI on September 3 for state #31 and made it with K5TQP during the Orionids for state #32. With W1MEH and K3OBU worked during the Perseids this gives me 5 new states on 144 Mc. this year. I have raised the power to 500 watts but after dropping a pair of 14 feet yagis 50 feet the antenna is one bent 14 feet yagi." Nice to hear how things are progressing out thet-a-way Keith. W8VCQ sez he's still working on the 432 Mc. system. Converter is working OK and he hopes to have the new beam up shortly. "144 Mc. is generally very good," sez Walt, "with occasional extended groundwave conditions up to 150 miles or more." Out in Kansas City, Missouri, WAØFLL sez he has finally found a co-worker for some work on 420 Mc. and will now "get with it". Bob also comments that activity is picking up in his area on 144 Mc. and that he did hear a WØ in Wichita recently on that band. WA6LVS sez he operates the low end of two (144.04 Mc.) nightly from 2100 to 2230 listening for stations to the north. Jim has heard a number of two-meter stations in the Bay area and has worked WA6RTM in San Miguel. He has also heard K7ICW 4/3/9 on Sunday morning, November 1. Anyone who'd like to keep skeds with Jim, WA6LVS, on 144 Mc. should get in touch with him)at any reasonable hour. sez he).

At Albuquerque, New Mexico, K5TQP is working hard on that "states worked" box on 144 Mc. Fred kept skeds during the Orionids and made contact with W9QII and WØEMS. The Geminids will be the next major effort for K5TQP and he's looking for skeds with Oregon, Idaho, Wyoming, Minnesota, Tennessee, Alabama, Nevada and Ohio. Come on you fellas, let's keep Fred busy during the Geminids. Write to him for skeds at — 1003 Shirley St., N.E.; Albuquerque, Nex Mexico. Skeds kept by W4WNH and W4AWS (Kentucky and Florida) started on two meters on September 30 and first contact was made on the morning of November 2. Shelby (W4WNH) sez they hope to keep the skeds going until the middle of January. However, on November 12 they again made contact and this time it was via tropospheric scatter. "Just too weak and steady for m.s. We chewed the fat for twenty minutes with signals peaking S4 and with very little QSB. First non-meteor scatter Florida signal ever heard here" sez Shelby. You're bound to hit those openings once in a while (even on 144 Mc.) if you're just persistent (or stubborn) as Shelby and

2-Meter Standings

W1REZ	32	8	1300	W5WAX	11	5	735
W1AZK	28	8	1205	W5VY	10	3	1200
W1KCS	24	7	1150	W5BEP	9	3	1000
W1AJR	24	7	1130	W5EDZ	8	5	1375
W1MEH	24	6	1000	W5YYO	7	4	1330
W1MMN	22	8	1200	W5UNH	6	3	1200
W1J8M	22	7	1330				
W1HDQ	22	6	1020	W6WSQ	15	5	1390
W1IZY	20	7	1080	W6NLZ	12	5	2540
W1AFO	19	6	920	W6DNG	9	5	1040
K1CRQ	19	6	800	K6HMS	8	4	1010
K1AFR	17	6	675	W6AJF	6	3	800
				W6ZL	5	3	1400
W2NLY	37	8	1390	WB6KAP	5	3	1300
W2CXY	37	8	1360	K6GTG	4	2	800
W2ORI	37	8	1320	W6MMU	3	2	950
W2BLV	36	8	1020				
K2LMG	32	8	1200	K7HKD	20	7	1330
K2GQI	35	8	1365	W7LHL	10	4	1170
W2AZL	29	8	1050	W7CJM	5	2	670
K2IEJ	27	8	1060	W7JIP	4	2	900
K2CEH	25	8	1200	W7JU	4	2	235
W2AMJ	25	6	960				
W2ALR	24	8	1100	W8PT	40	9	1260
W2RXG	23	8	1200	W8KAY	39	9	1210
WA2PZE	23	7	1200	W8SDJ	37	8	1220
W2SMX	23	7	1090	W8IFX	35	8	980
W2LWI	23	7	1050	K8AXU	34	9	1275
K2HOD	23	7	950	W8SPG	34	8	1040
W2DWJ	23	6	860	W8MVE	33	9	1155
W2PAU	23	6	753	W9LOF	32	8	1060
W7PUA/2	22	7	1150	W8GGH	32	8	1180
W2ESX	21	6	750	W8BAX	32	8	960
K2KIB	21	5	700	W8RMH	32	6	910
W2UTH	20	7	880	W8NOH	31	8	1090
W2WZR	19	7	1040	W8EHW	31	8	860
W2RGV	19	8	720	W8SVI	30	8	1080
WA2EMA	19	6	1010	W8EHW	30	8	860
WA2PZE	18	6	750	W8LPD	28	9	850
W2RLG	17	6	980	K1CRQ/8	28	8	690
WA2YXS	17	6	720	W8WRN	28	8	680
K2OEI	16	6	1010	W8DX	26	8	720
WB2CCO	16	6	780	W8ILC	25	8	800
K2JWT	16	6	550	W8JWV	25	8	940
				W8WNM	25	8	900
W3RUE	33	8	1100	W8GFN	23	8	540
W3SGA	31	8	1070	W8LCY	22	7	680
W3GKP	31	7	1180	W8BLN	21	7	610
W3TDF	30	8	1125	W8GTR	17	7	550
W3KCA	28	8	1110	W8NRM	17	7	550
W3BYF	28	8	1070				
W3FPH	22	8	1110	W9WOK	42	9	1170
W3LST	22	6	800	W9KLR	41	9	1160
W3LNA	21	7	720	W9UIF	41	9	1150
W3NKM	20	7	730	K9AAJ	35	9	1070
W3LZD	20	7	650	W9AAG	35	9	1050
W3MFT	19	6	600	W9GAB	34	9	1075
K3OBU	17	7	930	W9OII	32	8	1090
W3HHC	16	6	550	W9REM	31	8	850
K3CFA	16	6	600	K9SGD	30	8	1100
K3HDW	12	6	1015	W9ZIH	30	8	830
				W9PBP	28	8	820
W4HJQ	39	8	1150	W9LVC	27	8	950
W4HHK	37	9	1280	W9OJI	27	9	910
W4WNH	35	9	1350	W9IFA	26	6	1000
W4LTU	34	8	1160	W9ZHL	25	8	700
W4ZXI	34	8	954	W9BPV	25	7	1030
W4MKJ	34	8	1149	W9CUX	24	7	1000
W4AO	30	8	1120	K9AQF	24	7	900
K4IXC	27	8	1255	W9WDD	23	7	900
W4LVA	26	8	1000	W9LF	22	7	825
W4EQM	25	8	1040	W9KPS	22	7	690
K4QIF	25	8	1000	W9ALU	18	7	800
W4RFR	24	9	820				
W4MNT	24	8	1170	WØBFB	42	9	1350
W4TLV	23	7	1000	WØLFE	32	9	1040
W4JC	23	6	725	WØIHD	31	8	1030
W4RMU	21	7	1080	WØSMJ	29	9	1075
W4OLK	20	6	720	WØQDH	27	9	1300
K4YYJ	20	6	720	WØENC	25	6	1225
W4LNG	19	7	1080	WØDQY	24	7	1000
K4MHS	20	5	800	WØRUF	23	7	901
W4YUX	18	8	830	WØMOX	23	6	1150
K4VWH	18	6	590	WØIC	22	7	1360
W4MDA	17	6	775	WAØDZH	21	7	1170
				WØTGC	21	7	870
W5RCI	39	9	1280	KØITF	21	6	940
W5AJG	33	9	1360	WØINI	21	6	830
W5FVZ	33	9	1275	WØRYG	20	8	925
W5WVL	29	7	1150	WØJAB	19	7	1130
W5DFU	29	9	1300	WØAZT	18	7	1100
W5PZ	28	8	1300	KØAQJ	16	6	1120
W5LPG	25	7	1000	WØIPS	16	6	1100
W5KTD	23	8	1200	VE1CL	8	5	800
K5TQP	20	7	1250	VE3DIR	37	9	1300
W5SWV	20	5	960	VE3AIB	29	8	1340
W5UKQ	18	8	1150	VE3BPR	24	7	950
W5ML	16	6	700	VE3BQN	23	7	1180
W5KFU	15	5	1360	VE3AQG	18	8	1300
W5UGO	13	4	635	VE3DER	17	8	1340
W5FSC	12	5	1390	VE3HW	17	7	1350
W5HEZ	12	5	1250	VE6HO	1	1	915
W5CVW	11	5	1180	VE7FJ	2	1	365
W5NDE	11	5	620	KH6UK	2	2	2540

The figures after each call refer to states, call area and mileage of best DX.

his cohorts are. K3CFA at Lemont, Pennsylvania tells us that his M/S skeds kept during the month of October produced no contacts although he did hear an occasional SB signal from W9IFA. Joel sez that October was quite a let down on two meters after the good propagation during September. Sam King, W3BDP (ex K4EUS of Chester, Virginia) wrote to us from Wilmington, Delaware to tell us although we had better take his call out of the two meter States Worked Box he expects to get it back in the box soon and this time it will be with the calls from 3 land. The new location is a good one for v.h.f. and with W3CGV and W3GGR pushing and pulling, Sam will soon be heard again on 144 Mc. and 432 Mc. K3OBU, also in Wilmington, sez that although he hasn't been able to make any M/S skeds from October through December he is open for skeds during January for the showers. Those who'd like to nab Delaware on 144 Mc. drop him a line for sked during January. Joe also mentions the opening of November 2 when he worked WA2RAT and W2IMB (both on s.s.b.) plus W2LSG, WB2HSW and WB2BRZ. "C.w. and s.s.b. activity on two is good," sez Joe. In New York WB2FXB worked his 13th State on 144 Mc. on September 7 when he worked W4FSO in Raleigh, North Carolina. "Greatest opening I've ever heard on two," sez Bob, and to prove it he worked stations in Pennsylvania, Virginia, Delaware, North[4]Carolina and Maryland. WB2HZY is hearing 8's and 9's on 144 Mc. and he doesn't even have a beam. He doesn't have a transmitter either so is sure by the time he does get a transmitter and beam percolating the band will once again become inactive. That's almost for sure, Charlie.

Shower skeds kept by W8PT during October had fair to middlin' results, but no contacts. Sked with K7NII on 144 Mc. produced some good bursts with complete calls heard on October 19 and 20 but no QSO. During the sked on 220 Mc. with WØEYO only five scattered pings were heard by Jack in Watervliet, Michigan. Jack goes on to tell us that he was working WØIDY on 044.012 Mc. (in Iowa) on October 30 when they decided to sheck 432 Mc. WØIDY's signal was 30 db. over S9 on 432 Mc. He then worked W8YIO, W8-JLQ, W8RQI and WA9HUV. W8HCC was heard at Jack's QTH with good signals; W8JLQ and W8RQI from Ohio were very strong. The boys feel they could have worked much farther but as usual, no activity. W8RQI reports working VE3EMT (432.010 Mc.) and VE3BRI (432.280 Mc.). W8JLQ was reportedly heard in Western New York, but no one seems to know who it was that heard him. K4-QIF is looking for two meter skeds with stations in Maine and Vermont. Rusty runs a kw. on 144.0175. If you're interested drop a card to H. Holshouser, K4QIF — Box 212 — Salisbury, North Carolina. WA4BMC tells us that "a relay system is being set up from Key West to Pensacola so that when a hurricane comes and all big beams are down we can still be of service in 'ARPSC'. Interested stations should get in touch with WA4BMC at 1510—17th Ave., North — Lake Worth, Florida.

The Baycoms, a group of repeater enthusiasts in the San Francisco Bay Area, is now working on a two-meter multiple-repeater-link from Sacramento to San Diego. Repeater locations are being considered in Sacramento, San Jose, San Louis Obispo, Los Angeles and Fresno. Amateurs interested in working on repeaters for any of these locations should contact WA6WEB.

220- and 420-Mc. STANDINGS

	220 Mc.				420 Mc.		
W1AJR	12	4	480	W1AJR	12	1	410
W1AZK	9	3	412	W1BU	11	3	390
W1BU	14	5	600	W1HDQ	10	3	250
W1HDQ	12	5	450	K1JIX	9	3	230
K1JIX	11	4	615	W1MFT	8	3	170
W1OOP	12	4	400	W1OOP	11	3	390
				W1QWJ	10	3	230
W2AOC	15	5	530	W1UHE	10	4	430
K2AXQ	9	3	240				
WA2BAH	4	2	167	W2AOD	6	4	290
K2CBA	16	7	660	W2BLV	12	5	360
K2DIG	4	3	140	K2CBA	8	4	220
W2DWJ	15	5	740	WA2DTZ	6	3	200
W2DZA	12	5	410	W2DWJ	10	4	196
K2DZM	12	5	400	W2DZA	5	3	130
K2ISA	11	4	300	K2DZM	10	4	390
K2ITP	10	5	265	WB2EGZ	9	4	260
K2ITQ	11	5	265	WA2EUS	7		
K2JWT	6	3	241	K2GGA	4	4	383
K2KIB	12	4	300	WA2HQE	8	4	280
W2LRJ	10	4	250	K2KIB	4	2	100
W2LWL	12	4	400	W2NTY	3	2	100
W2NTY	12	5	300	W2OTA	10	4	300
K2PPZ	11	4	400	K2UUR	9	3	280
K2QJQ	13	5	540	W2VCG	9	4	280
W2SEU	12	5	450	W2YPM	6	3	300
K2UUR	6	3	210				
				K3CLK	9	4	
W3AHQ	4	3	180	K3EOF	6	3	250
W3FEY	11	5	350	W3FEY	8	4	296
K3IUV	9	3	310	K3IUV	8	3	310
W3JYL	8	4	295	W3LCC	3	2	
W3JZI	4	3	250	W3RUE	7	4	410
W3KKN	10	4	255	W3SDZ	5	4	300
W3LCC	10	5	300	W3MMV	5	3	240
W3LZD	15	5	425	W3UJG	4	2	350
W3RUE	10	5	480				
W3UJG	13	5	400	W4HHK	9	4	550
W3ZRF	5	4	112	W4TLV	6	2	500
				W4RFR	5	2	665
K4TFU	8	4	400	W4TLV	4	2	500
W4TLC	5	1	315	K4QIF	3	1	210
W4UYB	7	5	320				
				W5RCI	14	4	725
W5AJG	3	2	1050	W5AJG	6	2	665
W5RCI	8	5	700	W5HTZ	5	3	140
				W5SWV	7	3	525
K6GTG	2	1	240				
W6MMU	2	2	225	W6FZA	1	1	280
W6NLZ	3	2	2540	K6GTG	1	1	180
				W8TYY	9	5	580
K7ICW	3	2	250				
W7AGO	2	1	160	W7LHL	2	1	180
K8AXU	11	5	1050	W8PT	9	5	400
W8IJG	9	5	475	K8AXU	5	3	660
W8LPD	6	4	480	W8HCC	3	2	355
W8NRM	8	4	390	W8HRC	3	2	250
W8PT	10	5	660	W8JLQ	6	3	275
W8SVI	6	4	520	W8NRM	3	2	390
				W8RQI	6	3	270
W9JCS	6	2	340	W8UST	3		25
W9JEP	9	4	540				
W9OVL	6	3	475	K9AAJ	9	5	425
W9UED	4	4	605	K9UIF	9	5	390
W9ZIH	10	5	500	W9AAG	8	4	525
				W9GAB	9	4	608
KØDGU	5	3	425	W9OJI	6	3	330
KØITF	6	3	515				
KH6UK	1	1	2540	WØIDY	7	3	430
VE3AIB	7	3	450	KØITF	3	2	158
VE3BPR	3	3	300				

The figures after each call refer to states, call area and mileage of best DX

50 Mc.

VE4GI writes that six-meter s.s.b. activity is very good in openings and that locally the s.s.b. gang gets together at 0400 GMT on Thursday nights. On October 6 Bill caught an opening during which he worked stations in 4, 5, 8, 9 and Ø lands and on the 17th he worked stations in 4 and 8 lands. At Needham, Massachusetts, K1VPJ mentions the "fantastic" opening of October 4 when 2's, 3's, 4's, 8's, 9's and Ø's were heard at his QTH with good signals. In 2 land WB2JCP and WB2IPX both noted the October 4 opening with the central and mid-western states coming through. WA2TQT caught an opening to the southern states on October 13. At Amsterdam, New York WA2NXZ notes good groundwave conditions throughout the month of October but sez not even one c.w. station was heard. (Don't you know yet, Gary, that you never hear the c.w. stations until you make a bit of it on the air yourself first?) K3LTI at Milton, Pennsylvania sez that the opening of October 4/5 lasted almost two hours at his QTH with stations from 8 and 9 lands coming through. "Big Bert", WA4BMC, has been one of the many v.h.f.ers who does more than her share of traffic handling, emergency work, civilian defense work, you name it — she's doing it. Bert sez that she needs more six-meter amateurs to participate in VHFTN on 50.200 Mc. at 0100Z, and also needs net manager and NCS for each night. If you are interested get in touch with Bertha Eggert, WA4BMC — 1510—17th Ave. North — Lake Worth, Florida, 33460. Reports received from Kentucky, Tennessee, and Virginia all note the openings of October 4/5 and 9 with 1's, 2's, 9's and Ø's being predominantly heard. Out in La Mesa, California, W6IEY reports an opening on October 19 when he worked K5WIB, the only station heard. K6DLM sez: "Band was erratic during the last third of the month. There were two short openings to Argentina but did not make out any calls or know of any contacts in this area. Also several openings into Washington and Oregon." In Michigan WA8DXW observed the opening of October 4 hearing 1's, 2's and 3's at his QTH in Marshall. John also noted an opening on the 8th when stations in Kansas, Nebraska, Mississippi and Texas were coming through. John and his dad WA8IGQ share the rig so it depends on who is there when the band opens. On October 16 K8UDJ heard stations in South Dakota and Nebraska and W8SH heard Texas and Pennsylvania. The Texas and Pennsylvania stations were on s.s.b. and running about Q5 S3.

Mike Murray, WA8HYR/8 sez: "I haven't had any luck on six meters since I came here on September 13. Not a sin-

(*Continued on page 146*)

Keeping Up Interest in Your AREC Group

What To Do Until the Next Emergency Comes

BY GEORGE HART*, W1NJM

Some of our AREC groups start off with a bang, then gradually die because there are no emergencies to keep them busy. Here are some ideas for non-emergency activities to keep up interest.

Most of us think of an AREC group as a bunch of amateurs equipped with emergency operating equipment who stand ready to serve in emergencies and maybe drill once or twice a year just to check out their gear and procedures. Many of our AREC units do just this and nothing more; and as a result, many of them gradually deteriorate as interest wanes or wanders to another field. In the end, the group finds that come the real thing they are unprepared — the equipment isn't working, the personnel aren't available or can't be found, and valuable official contents have been lost.

Enterprising emergency coordinators have found that a concerted program of activities is required to keep up interest among the AREC membership, especially in those areas where emergencies in the form of natural disasters are not so apt to hit. So often we have heard AREC officials express variations of the "It Can't Happen Here" theme. And yet, these are the very places where, when emergency does strike, it finds the amateurs totally unprepared, and we are faced once again with the necessity of operating "from the seat of our pants."

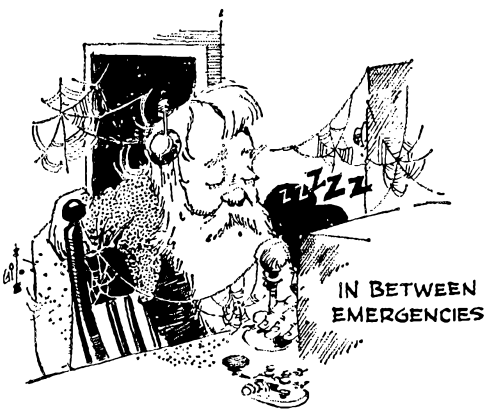
Public service does not involve just emergency communication, although this is of course the ultimate phase of it. There are many other things the local AREC group can do in between emergencies, or even in the complete absence of them, to fulfill the following very important objectives: (1) to keep the group intact and operationally prepared for any emergency, (2) to point up operational faults in procedures and tactics, (3) to perform a public service in connection with non-emergency every-day activities, and (4) to stay in the public eye so the potential of amateur radio as a public communications service will not be overlooked officially.

We think non-emergency AREC activities can be broken down into the following categories: (1) Service to public agencies in connection with routine operation; (2) Services to public agencies in connection with special events; (3) Drills and tests involving served agencies; (4) Intra-AREC contests and activities. (5) Social events.

* National Emergency Coordinator, ARRL.

During the past year in *QST*, under the heading "Diary of the AREC" in the monthly ARPSC column, every one of these activities has been described, some in detail, some several times. Of course the groups conducting them deserve the mention, but this isn't the main reason we print them; *QST* space is too valuable just to give "publicity" to a small group for some miscellaneous activity. Our real purpose in printing them is to give other AREC groups ideas for their own programs. Much of this depends on your emergency coordinator, how aggressive he is, how well known in the community, in addition to his organizational and leadership ability. It also depends on the quality of the group organized to perform the services offered or available. So the EC has to be at once a promoter, an organizer and an administrator. Lest this drive away some good prospects, let us hasten to point out that in larger cities, where there are more amateurs and a wider scope of activities to choose from, specific phases of the EC work can be delegated to assistants while the EC, as his title implies, *coordinates* the work of each.

Let's discuss some of the categories listed above.



Routine Activities

Although it is far preferable for AREC units to be set up to serve *any* agency, with maximum cooperation directed at the agency which *gives* maximum cooperation, some groups have set up regular facilities serving government agencies at various levels. The most common of these, operating usually at state level or above, is the weather reporting net, in which members report in at regular intervals with routine weather reports to a centralizing station located at, or having a close connection with, a weather central, usually located at an airport.

Some groups cooperate regularly with police in "road patrols." AREC mobile units, under the direction of the net control, make regular patrols of roads in the area and report anything untoward. This information is passed along to proper authority, usually the police, if warranted. Some of this type of activity has met with criticism because it is considered "stool pigeoning." This is nonsense. If properly and discreetly performed, it can be a most valuable community service. Amateurs working with the police, however, should stick to communicating and never take action on any matter (unless duly authorized and qualified to do so, of course) except to report it to proper authority. In some places selected amateurs have been made auxiliary police or otherwise deputized and trained to perform police work in addition to communicating. This is a matter entirely aside from AREC work. While you are participating in an amateur net, you are an amateur. If you have police pants in addition to this and put them on to perform a police job in the midst of your amateur communicating, you are not an amateur at that time. But you *can* give amateur radio (and the police department, too!) a bad name if you try to do police work as an amateur that you are not authorized to do as a policeman.

Traffic control on a regular, daily basis, is a facet of the above. AREC mobiles, themselves on the road at rush hours, can report traffic conditions to a control station in order that police headquarters can be advised of tie-ups and the apparent reason for them. Again, if properly handled, such a service can be most valuable.

Then there are such things as hospital nets, school nets, nets connecting police precinct stations, fire stations, power company substations and many others. Some of these nets operate regularly, some combine many of the above strategic locations and operate on an "intercom" basis — that is, with receivers on a stand-by squelch at all times so that communication is always (or almost always) available.

Special Activities

There is an almost unlimited number of special activities in which an AREC group might have an active part. Most of these just await the AREC's initiative to develop the ability, both in equipment and operator performance, and grasp the opportunity. During the past year, AREC groups around the U.S. and Canada have reported participation in parades, fund drives, athletic events, Hallowe'en patrols, crowd control problems, polio immunization drives, airplane meets, Boy Scout camporees, dedications, election returns, collecting and relaying holiday greetings from hospital patients, setting up a Santa Claus network for the kiddies, assisting c.d. authorities in conducting radiological checks, and conducting demonstrations of various kinds. Anywhere and everywhere that communication is required, your AREC group has a potential for service.

The pattern is usually pretty much the same, although the details of implementation show a great deal of variety, not to mention ingenuity. There is usually a net control station who coordinates the activity, whatever it is. This is sometimes the EC, but just as often it is a member station operated by someone skilled at controlling while the EC roves the field. Fixed stations at strategic points are used as relays for weaker stations that sometimes cannot be heard at control. Mobiles are deployed to points where they are likely to be best employed and move about at the direction of the EC or control. If hand-carried units are available, these can be used to cover points inaccessible by mobiles, and make contact either direct to control or, if this is not feasible because of low power, to a nearby mobile, possibly one they are working out of. A typical mobile unit might carry two operators, one driving the car and one operating the rig in contact with control, with a battery-operated hand-carried unit in the back seat. It becomes desirable to investigate in a place the mobile cannot go, so the hand-carried unit is brought out, put into operation, the mobile unit switched to the same frequency (after the operator checks out with control), and the operator takes off on foot while the driver operates the rig in the car.

Intra-AREC Activities

There are other ways in which the EC may keep up interest and activity on the part of the AREC membership without necessitating cooperation on the part of civic agencies or officials. One that is used extensively is the hidden-transmitter hunt, in which a unit is stationed at an unknown location and is "tracked down" by mobiles, a prize going to the first mobile to find the hidden transmitter. While somewhat questionable as a practical emergency exercise, a great deal of interest and excitement can be generated in an exercise of this type if well planned and not repeated too often. As members of the group become more skilled at radio-tracking, interesting quirks can be added, such as moving the hidden transmitter from place to place, or keeping it in motion. One group we remember had one of its members dressed as a

girl, with the hidden transmitter secreted in "her" purse at a busy pedestrian crossing.

Most ECs have two or three drills a year, apart from the annual Simulated Emergency Test, to give all units, members and equipment a check and set up some sort of problem. Some of these are simply a matter of advance notification, calling of the roll, assigning functions and carrying them out. Others are combined with complex simulated emergency conditions requiring all kinds of procedures which might be required in a real emergency. Their success or failure depends primarily on the extent of the EC's imagination in working out the problem in realistic detail. One danger in this type of activity is creeping boredom with playing "make believe," and also the feeling of some that it is childish.

This is where the element of competition can be introduced to make it more interesting. Some ECs use a "point" system for grading AREC members, either on a particular activity or on a cumulative basis; for example, points can be awarded for attendance, for alertness, for operating ability, for originality and ingenuity in construction, for leadership (as NCS, assistant EC, or leader *pro-tempore* in any particular activity), for possession of special gear especially built for emergency operation (including mobile), and many others. Some ECs have even designated "classes" of AREC members, based on a point system such as the above — very good if you can reap the positive benefits without suffering from the negative reaction of those members who don't make the higher classifications.

Many AREC groups are now turning to third-party traffic handling as a means of keeping active, especially those groups which are somewhat spread out geographically. To be useful in routine traffic handling, an AREC net should meet at least three times weekly, and each meeting should include liaison stations to and from the section NTS net, or one of them if there are more than one. The caper here is to get traffic from the section net and shoot it to the member of the emergency net nearest its destination, to be delivered from that point. You might say that this is silly, because any member of the emergency net, including the liaison station, probably can deliver it immediately upon receipt by toll-free telephone — and indeed, if the message has a high precedence (P or EMERGENCY) of course this is the procedure that should be followed. For routine traffic, however, little or no harm is done and much valuable emergency practice obtained by routing the message to its nearest point before delivery.

Then of course net members should originate traffic, too, to be transmitted to the designated liaison station to be taken to the section net and put into the system. Originating messages is often neglected, and our traffic nets suffer from lack of traffic.

One *very bad* practice: passing a message around all members of a net without too much regard for its destination, so everybody will get a crack at it (and make points toward BPL). Let's knock this off, fellows and gals.

Social Events

It might well be said that performing a public service is no picnic, but an occasional picnic or other strictly social get-together can create an atmosphere of fraternity and camaraderie needed in any AREC group. All work and no play make the AREC a dull group, to adapt an old saying. There is a time for serious work and a time for relaxing and having a good time. In amateur public service work we too often mix the two together, to the detriment of our efficiency. The fetish for exchanging names, for example, during drills or special activities, is neither useful nor progressive. It also does no harm, except to give the whole procedure an appearance of frivolity.

The term "serious work" does not necessarily mean drudgery. One can be mighty proud of taking part in a net that is all business, snappy, precise, efficient, and one can get mighty bored with meaningless exchange of platitudes and pleasantries in network operation. The serious work of performing a public service can be interesting, challenging, satisfying and an outlet for pent-up drive and leadership capabilities. We think it should be kept separate from the social aspect, but that the latter should not be neg-

(*Continued on page 148*)

Silicon Replacement of Tube Rectifiers

Some Necessary Precautions

BY G. L. COUNTRYMAN,* W4JA

Silicon diodes can be used to advantage in the power-supply circuits of existing equipment, as well as in new construction. This article discusses some of the precautions that should be taken to assure trouble-free operation.

TUBE manufacturers won't like to read this, but the vacuum-tube rectifier is about to go the way of the coherer. Those who still use tubes for new design, or for replacement are, in most cases, wasting money, losing some high voltage and shortening the life, or reducing the stability, of other components by the generation of unnecessary heat. Furthermore, silicon-diode rectifiers virtually will last indefinitely, provided certain precautions are taken. This article is an attempt to accumulate in one place for easy reference the procedures necessary in using semiconductor diodes, some simple methods of construction, and sources of inexpensive components.

Let's start with a relatively insignificant item. The 6X4 bias rectifier in the author's Navigator required replacement. Was another 6X4 purchased? Not on your life! A Vector P7D 7-prong plug with an aluminum shell was obtained, and one 400-p.i.v. 600-ma. silicon diode was wired inside it. Burstein-Applebee sell these diodes for 59 cents, their No. 18C44. Barry's new catalog lists a similar rectifier, 600 p.i.v., 750 ma. for only 39 cents.

Next, it was decided to replace the 5U4GB high-voltage rectifier tube in the Navigator. Diodes could have been wired into an octal base for plug-in replacement, but it seemed simpler to obtain an octal-base 1800-p.i.v. 700-ma. unit from Barry's for $3.10. An unexpected dividend resulted from this operation. With no other changes, the increase in high voltage enabled the Navigator to drive a 500-watt triode amplifier to full output, Class C, on all bands.[1]

Selecting Diodes

In selecting silicon diodes for a particular application, there are five important ratings that must be observed. These ratings are:

1) Peak-inverse (or peak-reverse) voltage.
2) Peak recurrent current.
3) Surge current.
4) Average forward current.
5) Operating temperature.

P.I.V.

The p.i.v. (or p.r.v.) is the peak value of the reverse voltage that appears across the diode on the nonconducting portion of the cycle. In both the center-tap and bridge full-wave rectifier circuits, the p.i.v. across each diode (or each string of diodes in the case of diodes in series) is approximately 1.4 times the entire transformer r.m.s. secondary voltage. Most diode manufacturers recommend a safety factor of at least 1.5 (with suitable precautions to suppress transients), so the diode you select should have a p.i.v. rating of at least twice the total transformer r.m.s. voltage measured at minimum load on the supply.

In cases where the p.i.v. rating of a single diode is not sufficient, similar diodes may be connected in series, the p.i.v. dividing equally across the units of the series when proper precautions have been taken.

Peak Diode Current

The peak recurrent current is the peak value of the rectified current wave passed by the diode. With a choke-input filter having a choke of at least "critical" inductance value, (*L_h = full-load output voltage/maximum load current in m.a.*) the peak value will be limited to about twice the d.c. current drawn from the supply. With a choke of less than critical value, or with a capacitor-input filter, the peak-current value may be several times the d.c. load current. Although the peak-current ratings of silicon diodes are at least twice as great as comparable tube rectifiers, most diode manufacturers place a lower load-current rating on their diodes when a capacitor-input filter is used — about 75 per cent of the rated load current for choke input.

Maximum Surge Current

Maximum surge current is the peak nonrepetitive current for a single cycle. In normal amateur operation, it is related principally to the charging current to a capacitor-input filter at the instant the supply is turned on. Although this rating is in terms of several amperes for even small silicon diodes, a limiting resistance of 5 to 10 ohms in series with the diode is recommended. In most amateur supplies, however, the resistance and leakage reactance of the transformer will supply more than this value, so an external resistor may be required in only very-low-voltage supplies where the transformer impedance is unusually low.

The large peak- and surge-current ratings of silicon diodes permit the use of sufficient capacitance in a capacitor-input filter to provide at

* 75 East Bay St., Charleston, South Carolina 29401.

[1] A certain amount of caution should be used in making such substitutions, since some components may not be able to take the increase in voltage. — *Editor.*

least as good voltage regulation as that normally obtained with a choke-input filter. Thus, advantage may be taken of the approximately 50 per cent increase in output voltage provided by the capacitor-input filter in cases where the higher voltage is desirable.

Maximum Load Current and Operating Temperature

The maximum average forward current is the maximum d.c. load current that should be drawn from the supply. A temperature restriction is attached to this rating. Most of the silicon units suitable for amateur transmitter plate supplies are of the type designed to be mounted by their wire terminal leads. For these types, ambient temperatures (temperature of the air surrounding the unit) are specified. (The temperature of stud-mounted units is usually referred to the stud or case.) Maximum rated temperatures vary from about 25 degrees C. (77 degrees F.) to 100 degrees C. (212 degrees F.). It is obvious that unusual precautions are necessary when units rated for the low end of the temperature range are to be used. The most practical measure for an amateur to take would be to derate the unit according to curves supplied by the manufacturer. However, on the average, the difference in price between low-temperature units and those rated for higher temperatures is negligible, so there is no point in using low-temperature units for most amateur applications. But keep the temperature restriction in mind when selecting a diode; temperature restrictions are often not specified for "bargain" diodes.

Regardless of the temperature rating, silicon diodes should be mounted well away from heat-generating components, and placed so that they will be well ventilated, using a fan or blower, when necessary, to keep the ambient within rating.

Diodes in Series

The back resistances of diodes, even of the same type, are not uniform, so a reverse voltage across units in a series will not divide evenly. The voltage distribution can be equalized by connecting a resistor across each diode. The resistance value should be low compared to the back resistance of the diode; values of 100K to 500K are commonly used.

Transients

Various high transient voltages are developed in power supplies, in normal operation as well as when switching. These have much more serious consequences for silicon diodes than for tube rectifiers. The most violent transients occur when switching the power supply off, particularly when a choke-input filter is used. It is essential that measures be taken to attenuate these transients to avoid permanent damage to the diodes, particularly when several diodes are used in series to accumulate the necessary p.i.v. rating. (Silicon diodes don't open up when they fail; they short out, placing the total voltage across fewer diodes. The result is that when one diode goes, the rest in the string follow suit.) A capacitor connected across each diode unit will take care of most transients. Disk capacitors of 0.01 μf. with 1000-volt ratings are usually adequate.

When a choke-input filter is used, a transient-suppressor across the choke is good insurance. This consists of a capacitor and resistor in series across the choke. The capacitor should have a value of not less than

$$C_{\mu f} = \frac{LI^2 \times 10^5}{4E^2}$$

where L is the inductance of the choke in henrys at minimum load, E is the d.c. output voltage of the supply, and I is the maximum d.c. current drawn from the supply. The resistor should have a value not greater than E/I.

It should perhaps be pointed out that the higher the p.i.v. rating of the diode used, the less susceptible it will be to damage from transients. Therefore, where the difference in price is not too great, the diode with the higher p.i.v. rating should be chosen (or the number of diodes in series increased).

Circuits and Construction

Fig. 1 shows a typical center-tap full-wave circuit. The total transformer-secondary r.m.s. voltage is 3330 at minimum load. (The minimum-load voltage should be used in estimating p.i.v. ratings.) The p.i.v. across each rectifier string is therefore $1.4 \times 3330 = 4662$ volts. If the recommended 50-per-cent safety factor is provided, the p.i.v. rating of *each* rectifier *string* will be $4662 \times 1.5 = 6993$ volts. To accumulate this p.i.v. rating, it will be necessary to use a minimum of 9

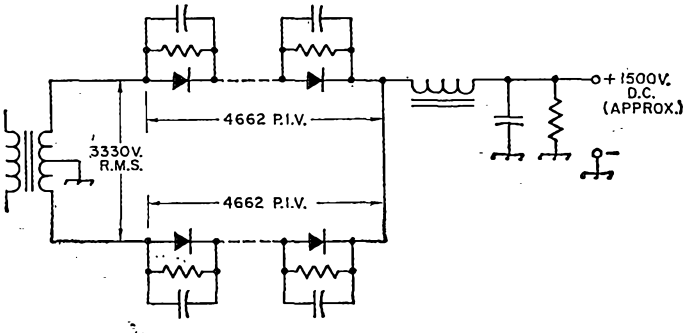


Fig. 1—Typical center-tap full-wave circuit showing voltage-equalizing resistors and transient-suppressing capacitors across each diode in the series strings. The resistors are each about 470K, ½ watt. The capacitors are 0.01-μf. 1000-volt disk ceramics. See text for diode ratings.

diodes with a p.i.v. rating of 800 volts each, 12 diodes rated at 600 p.i.v., 14 rated at 500 p.i.v., or 18 rated at 400 p.i.v. in *each* of the two strings. The current rating of the diodes should be at least half of the maximum d.c. current to be drawn from the supply, with derating according to the manufacturer's curves if the units are to be operated above rated ambient temperatures.

If the choke has at least critical inductance, the output voltage will be approximately 45 per cent of the total secondary r.m.s. voltage (measured at full load) minus the voltage drop across the d.c. resistance of the choke.

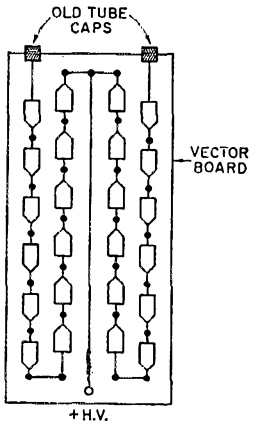


Fig. 2—Sketch showing diodes mounted on a perforated board for plug-in use. The shunting resistors and capacitors are mounted on the reverse side of the board. Further details will be found in the text.

The high-voltage supply in most transmitters uses this circuit with 866s or 3B28 tubes. For direct replacement, a plug-in unit can be made up. This may take the form of a strip of Vector board (0.093-inch holes on 0.265-inch centers) with Vector T9.4 push-in terminals to hold the diodes,

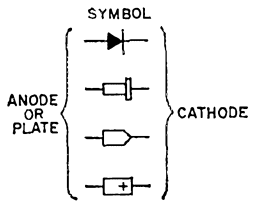


Fig. 3—Sketch showing the polarities commonly associated with diodes of different types.

resistors and capacitors. If two plate caps, removed from defunct tubes, are attached to the top end of the board, as shown in Fig. 2, the original cap connectors may be used in making connections to the transformer. A pair of 4-pin tube bases can be attached to the bottom of the board with a spacing to fit the original rectifier sockets in the equipment. The diode leads are soldered to the push-in connectors on one side of the board, and the resistors and capacitors to the same terminals on the opposite side of the board. If the plug-in unit is not desired, the board can be mounted on stand-off insulators. Wiring is simplified because no filament connections are needed.

At times there may be confusion as to which terminal of a silicon diode is the anode, and which is the cathode. Refer to Fig. 3, which shows the designs most commonly used. Particularly in the case of surplus diodes, which often bear no marking, this information will be useful.

A typical bridge circuit is shown in Fig. 4. The p.i.v. across each of the four rectifier legs is 1665 (no-load r.m.s. value) × 1.4 = 2331 volts. Adding the 50-per-cent safety factor brings the total p.i.v. rating for each leg of the bridge to 3496 volts. This will require at least 5 diodes rated at 800 p.i.v., 6 rated at 600 p.i.v., 7 rated at 500 p.i.v., or 9 rated at 400 p.i.v. in each of the four legs.

With an input choke of at least critical in-

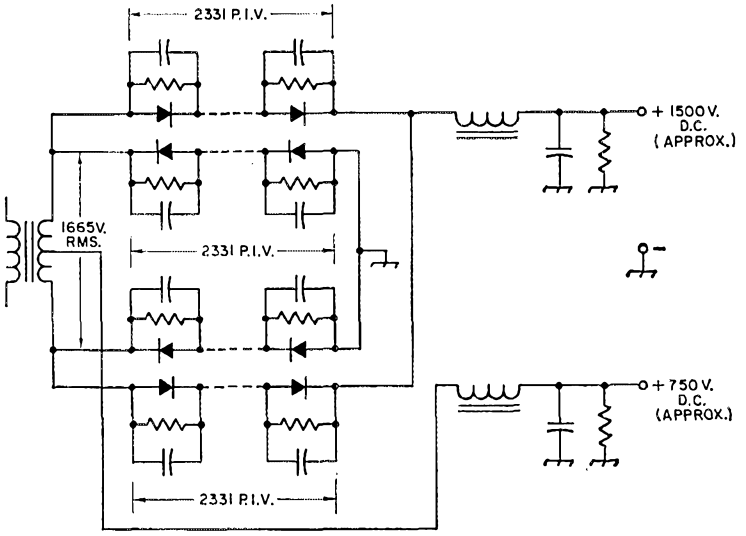


Fig. 4—Typical bridge circuit with half-voltage tap. Diode-shunting resistors and capacitors are the same as in Fig. 1. See text for diode ratings.

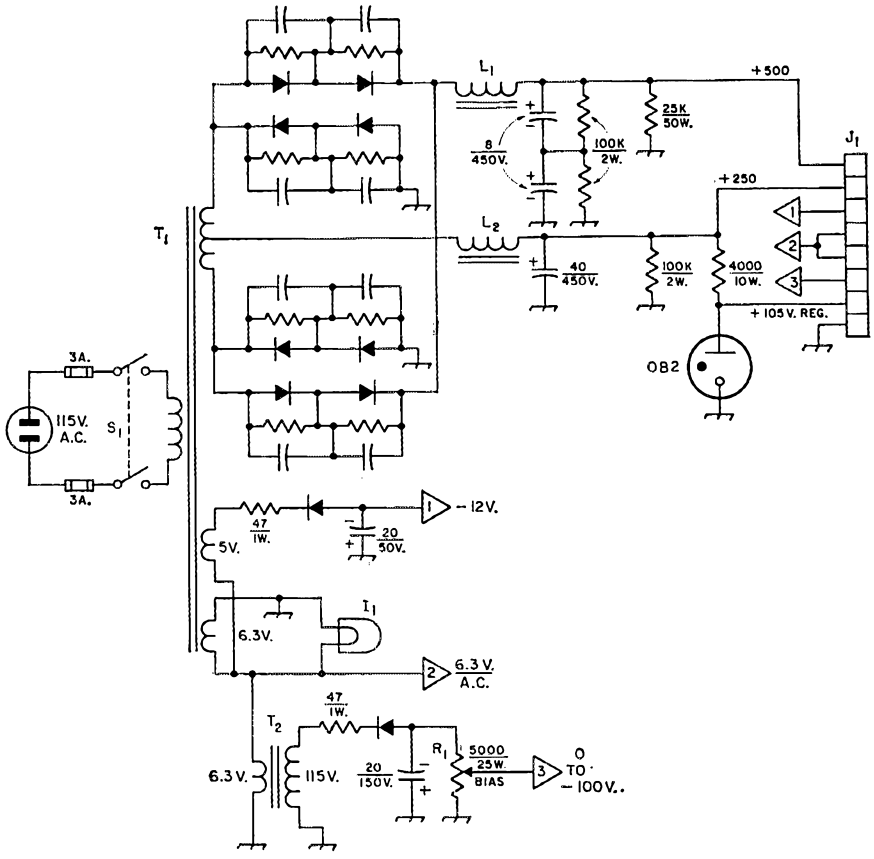


Fig. 5—Circuit diagram of a general-utility power supply using silicon diodes. Capacitances are in μf., and resistances are in ohms (K = 1000). Capacitors with polarity markings are electrolytic; others are 0.01-μf. 1000-volt disk ceramic. Unmarked resistors are 330K, ½ watt. All diodes are 700-p.i.v. 750-ma. silicon (see text).

I1—6.3-volt panel lamp.
J1—Octal tube socket.
L1, L2—Filter choke (see text).
S1—D.p.s.t. toggle switch.
T1—Power transformer; 600 volts, r.m.s., centertapped; 5 volts, 3 amp.; 6.3 volts, 9 amp. See text.
T2—6.3-volt 1-amp. filament transformer used as step-up transformer.

ductance, the d.c. output voltage from this circuit will be approximately 90 per cent of the total transformer r.m.s. voltage (measured at full load), minus the d.c. drop across the choke. Half voltage may be obtained from the center tap, as shown.

The current rating of the diodes should again be at least half of the maximum d.c. current to be drawn from the supply. This must include the current drawn from the low-voltage tap if it is used.

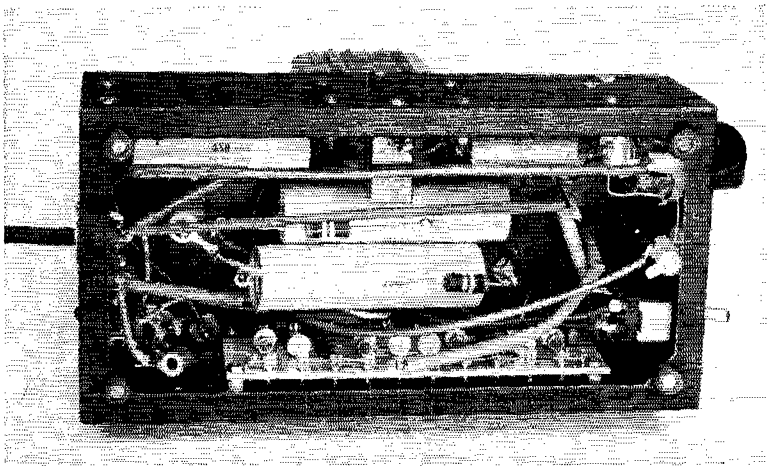
A General-Utility Supply

The photographs show a power supply designed by the author to power an auxiliary 80-watt transmitter and also to be available in the shack for experimenting and testing. Requirements were somewhat unusual, the voltages needed being 500, 250 and regulated 105 volts positive, a fixed negative voltage of 12, a negative voltage variable from 0 to 100, and 6.3 volts a.c. at 7 amperes. Fig. 5 shows how this is accomplished.

A bridge circuit with a half-voltage tap provides the positive voltages. The transformer is a husky Burstein-Applebee No. 3A118 costing $7.99. If you should require higher output voltages, B-A No. 13A162 will provide 750 and 375 volts at the same price. The diodes are "top-hat" 750-ma. 700-p.i.v. units (B-A No. 18B195) selling for 59 cents each. While you are making out your order, pick up a few of their No. 18A73 feedthroughs at only 19 cents each. They are excellent for r.f. use and up to 1500 volts d.c. They fit into a ⅜-inch hole.

The filter chokes are bargain items from World Radio Laboratories costing only 89 cents each. They were manufactured for Collins and are rated at 8 henrys, 100 ma. However, experience has shown that they will carry a considerably larger current. At around 350 ma., the inductance is reduced considerably, but is adequate for sufficient smoothing.

The supply is constructed on a Premier AF510 amplifier foundation having a 5 × 10 × 3-inch chassis and a cover 6 inches high. Rubber feet



Bottom view of the general-utility supply. Diodes are mounted on a perforated board attached to one side of the chassis. Shunting resistors and capacitors are on the opposite side of the board. The power-input cord emerges from a grommeted hole in the left-hand end of the chassis.

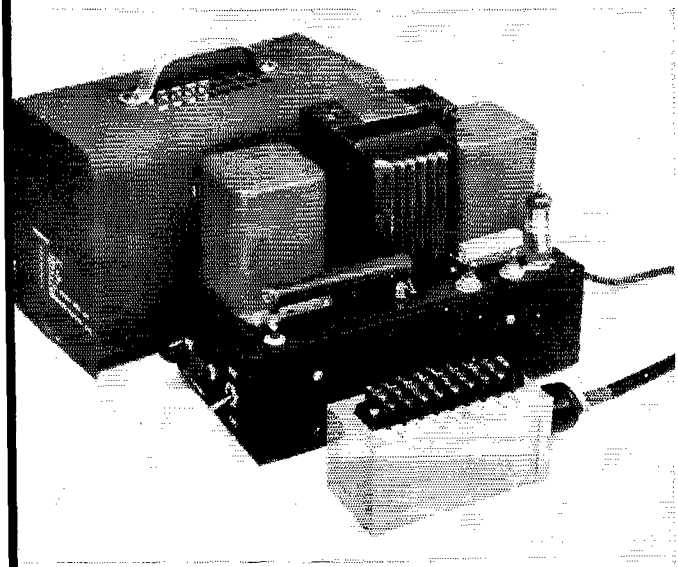
were added at each chassis corner and a Bud handle to the top of the cover. The total weight is 24 pounds. The power-supply cable is Belden No. 8418 microphone cable. There are 8 No. 20 conductors enclosed in a shield with an outside coating of rubber. A male octal plug at one end of the cable goes to the supply; a female plug at the opposite end goes to the transmitter, or into a small terminal box constructed around a $5 \times 2\frac{1}{4} \times 2\frac{1}{4}$-inch Minibox which is mounted on the workbench and can be seen in one photograph. The various supply voltages are then available for experimental work at the terminal strip on the Minibox. Because of the high current required at 6.3 volts, two conductors were used for the 6.3-volt lead, and one conductor *plus* the shield for the ground connection. In connecting the two filament windings in series, the polarization must be correct. If the —12-volt supply doesn't work with the first connection you try, reverse connections to the 5-volt winding.

Three Vector boards were used, one cut to $6\frac{1}{4}$ by 2 inches for the h.v. rectifiers, capacitors and resistors, one $3\frac{7}{8}$ by $1\frac{3}{4}$ inches for the 250-volt filter components, and one $2\frac{3}{4}$ by $1\frac{1}{2}$ inches for the components of the variable negative supply.

The 50-watt bleeder resistor, the 3500-ohm dropping resistor for the 0B2 tube, and the 0B2 tube itself are mounted along one side of the top of the chassis near the ventilating holes in the side of the cover. The feedthroughs mentioned previously are used here. The power supply runs stone cold, hour after hour.

The front of the chassis contains the rheostat for negative-voltage adjustment, pilot lamp, and the d.p.s.t. on-off switch. At the rear of the chassis are installed an octal socket for the power cable and the a.c. cord with its fused line plug. Tekni-Cals are used appropriately fore and aft.

The supply pictured is only one example of the compact, efficient and cool-operating supplies that can either be constructed separately as in this case, or incorporated in a transmitter or receiver by the use of silicon-diode rectifiers. QST



The general-utility supply is built on an amplifier-foundation chassis. The large resistor is the high-voltage bleeder; the smaller one is the VR-tube dropping resistor. At the left-hand end of the chassis are a control for the variable-bias output, pilot lamp, and power switch. The output cable plugs into an octal socket at the opposite end. The supply may be plugged into equipment having an appropriate male input connector, or into the terminal unit shown in the foreground for experimental use on the work bench.

"Bugless-Bug" Modifications

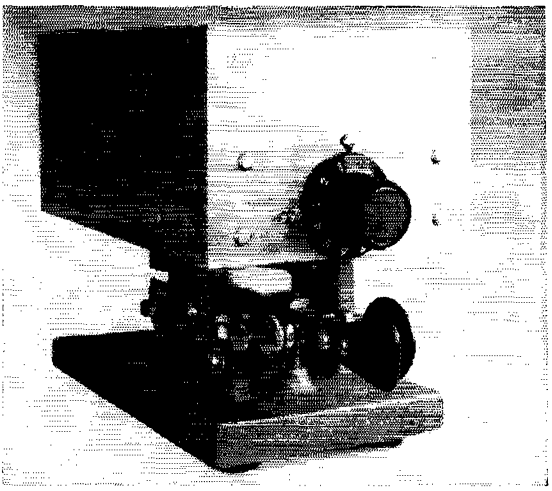
BY RAY G. HEDGECOCK, * K4KXK

In searching for a transistor electronic-key circuit not too complicated, the W2EUP design in September 1963 *QST* looked good, so I rounded up some parts and started to build. The final result was a "Bugless Bug" that performs in a very dependable and satisfactory manner. However, the first result to final result was no straight, easy road, and I found some modification of the original circuit to be beneficial. The revised circuit is shown in Fig. 1.

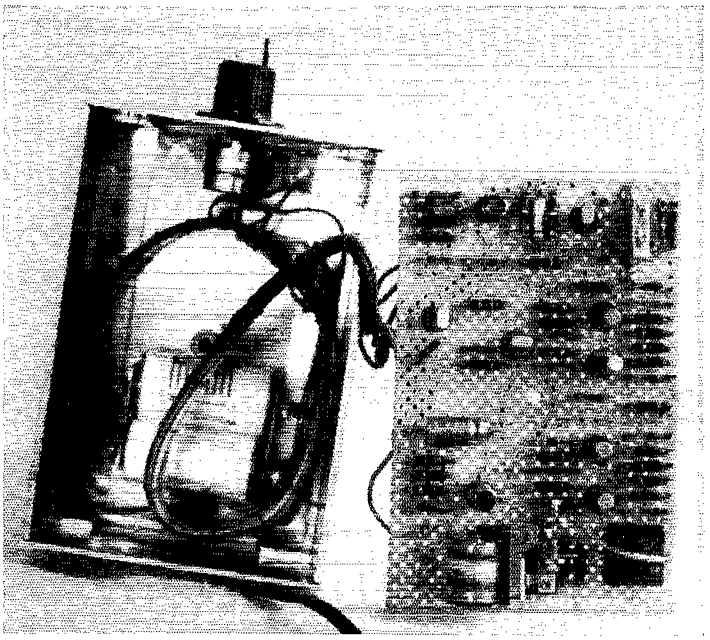
The operation of the circuit was explained by W2EUP in his original article, so I will discuss only the modifications that have been made. The first two units constructed followed W2EUP's original circuit, but each had the same defect. I could not enable FF_2 fast enough to coincide with the first blocking-oscillator spike. Therefore, each string of dahs was preceded by one dit. The letter T came out A, an M came out W, and so on. I then simplified the FF_2 trigger connections as shown in Fig. 1 and enabled FF_2 at all times, except when generating dits. The dah generation was now perfectly normal, and all pulses were self-completing.

The dit generation now required that FF_2 be disabled. This was accomplished by a switch transistor similar to Q_1. Transistor Q_9 disables FF_2 by placing 8 volts positive on the diodes CR_3 and CR_4, and thus locks FF_2 in spacing condition. The zener diode used by W2EUP was then unnecessary.

* 10407 Sunlight Lane, Valley Station, Ky.



K4KXK has his electronic keying-circuit assembly mounted atop an old bug which has been modified to serve as the control lever.



In this view, the perforated board containing most of the components has been removed from the 3×4×6-inch aluminum housing. The two 4-volt mercury cells are mounted in retaining clips, and the speed-control variable resistor is mounted on the front wall of the box. Connections between these components and the perforated board are made through a laced multiwire cable.

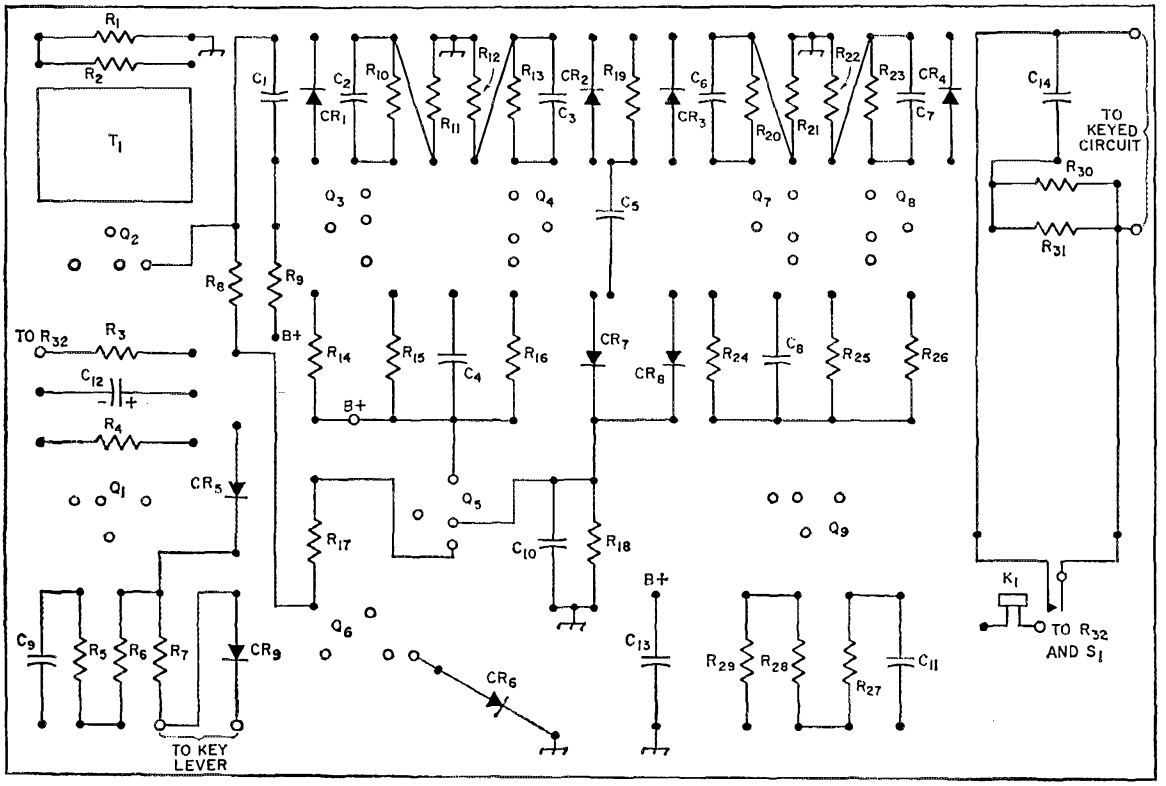
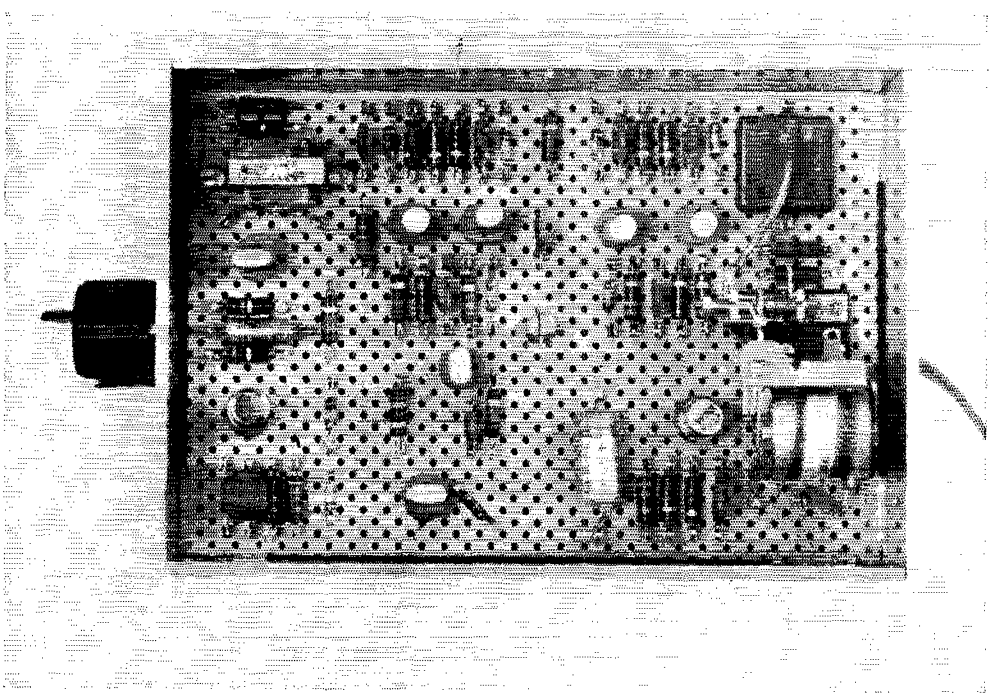


Fig. 2—Layout of components on the perforated board. Notice that all connections are not shown. Refer to Fig. 1 for missing connections.



Top side of the perforated board. This view may be compared with the sketch of Fig. 2.

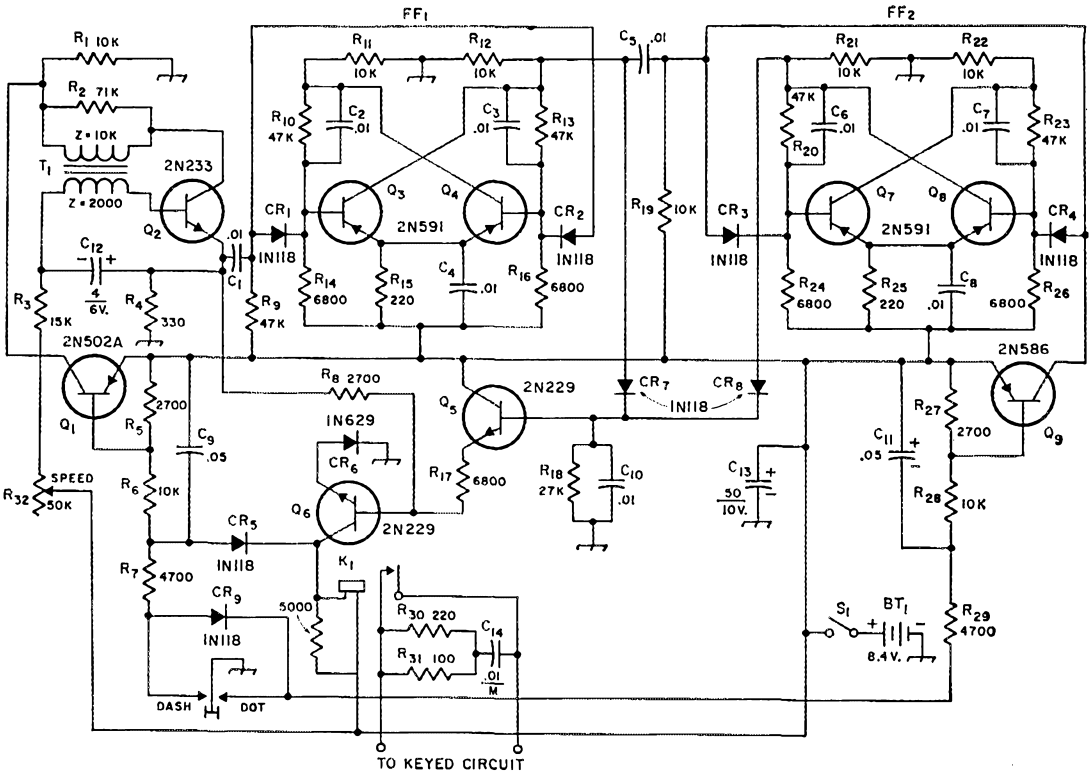


Fig. 1—Circuit of K4KXK's electronic keyer. Capacitances are in μf. and resistances are in ohms (K = 1000). Capacitors are disk ceramic except where polarity indicates electrolytic and M indicates mica. Resistors are ½-watt composition. BT_1 consists of two 4.2-volt mercury batteries (Eveready E233 or similar) in series, K_1 is a sensitive s.p.s.t. relay with 1000-ohm coil (Sigma 4F-1000-SIL or similar). R_{32} is a miniature linear-taper control with s.p.s.t. switch S_1 attached. T_1 is a 10,000- to-2000-ohm transistor transformer (Olson T230, Stancor TA-35 or similar). Other component designations are in reference to Fig. 2.

The unit is powered by two mercury cells having 4.2 terminal volts each.

Construction

The mechanical arrangement is very important; in fact, a loose, sloppy mounting and wiring job can spoil the finest of electronic designs. I mounted my units on a 4 × 6-inch piece of perforated plastic board. See Fig. 2. Each resistor and capacitor is soldered to terminals made of "flea pins" inserted into the perforated board. The transistors are all mounted in sockets. My first design was a failure, mostly due to soldering the transistors directly into the circuit. I found that being able to shift the transistors around was a great help in locating defects and securing normal operation. The actual transistors and diodes I used are indicated, the only reason they were used being that they were on hand and they worked. I found that 2N270s also worked in both flip-flops.

The 4 × 6 × 3-inch aluminum box is homemade and mounts upon the top of an old bug unit found in my junk box, as shown in a photograph. The box has a transparent plastic top. Of course, the unit could be built into any box or mounting, provided good mechanical construction is observed. The dot spring of the bug was broken off and the collar remaining was flattened and adjusted opposite the former dot contact. The stops were moved, and the old tie strap was cut so that the bug now functions as a single-pole double-throw switch. Three terminals were properly mounted and connected to the associated unit terminals.

The final performance meets the requirement set up by W2EUP, and has been tested at speeds around 40 w.p.m. Some improvement in high-speed operation would result from mechanically-improved paddle and contacts, but I was interested in speeds around 20 w.p.m., so no effort was made in this direction. QST

Strays

A Ham Astronomers Net is being formed for those who are interested in both of these scientific hobbies. Contact WAØFEX, Iowa Training School for Boys, Eldora, Iowa.

A 64-page cumulative index to *QST* is available for 25¢ postpaid, covering the years 1950–1963. Request your copy from ARRL Hq., 225 Main St., Newington, Conn.

• Recent Equipment —

The Heathkit SB-400 Transmitter

WITHOUT a doubt, the new Heathkit SB-400 transmitter is the most elaborate amateur kit that the Heath Co. has come up with. The transmitter is part of their new sideband line and fits in with the SB-300 receiver and SB-200 linear amplifier.

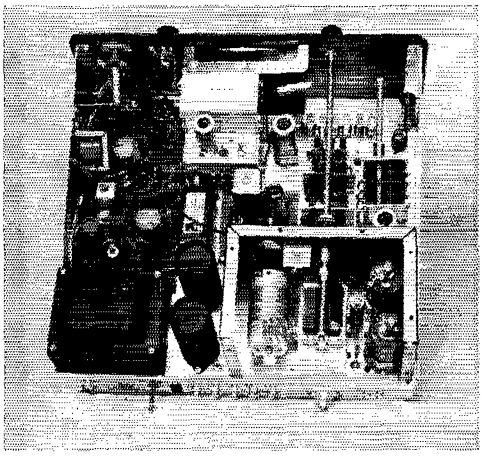
Basically, the SB-400 is a 180-watt p.e.p. sideband or 170-watt c.w. input rig, covering the 80- through 10-meter bands complete with all necessary crystals and built-in power supply. However, there is a great deal more to the rig than that simple description. The SB-400 is a lot of transmitter in a relatively small package.

Circuit Details

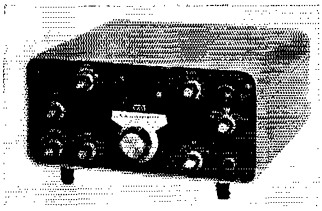
Fig. 1 is a block diagram of the transmitter. Input from the microphone is fed into the audio preamplifier, V_{1A}, and the output from this stage is coupled into V_{1B}, a cathode follower. Two types of operation are provided for in the s.s.b. position, either push-to-talk, or VOX, voice-operated control. A portion of the microphone input is fed to V_{12A}, the VOX amplifier, and its output is fed to V_{12B}, the relay amplifier.

A triple-triode, V_2, with two of its sections serving as crystal-controlled oscillators, is used to produce the upper and lower sideband carriers or the c.w. carrier. The remaining section of the tube is used as a cathode follower and its output is fed to the diode balanced modulator. Output from the balanced modulator approximately at 3395 kc. goes through the balanced-modulator transformer to an isolation amplifier, V_3, which serves to isolate the balanced modulator from the crystal filter and also provides proper impedance matching to the filter. V_3 also is used to provide a.l.c. action for the transmitter.

[1] "Recent Equipment," *QST*, July, 1964.



Top view of Heath SB-400 transmitter. Just in front of the power transformer at the left rear corner is the carrier-generator board. At the front center is the LMO unit, and to its right are the heterodyne oscillator crystals. To the rear of the crystals (below, in this view) is the bank of slug-tuned coils for the heterodyne oscillator and the driver-stage grid and plate. The variable capacitor to the right of the coils is for the driver grid and plate. The final-amplifier components are enclosed in a shielded box, the cover of which has been removed for this view, in the right rear corner.



The filter is a 2.1-kc. crystal lattice designed to pass the upper sideband signal at 3396.4 kc., the lower sideband at 3394.4 kc., and the c.w. carrier at 3395.4 kc. Output from the filter and the linear master oscillator (LMO) is fed to V4, the LMO mixer can be considered the heart of the SB-400. The LMO operates over a frequency range of 5 to 5.5 Mc. and one revolution of the LMO dial (the large dial on the front of the transmitter) covers 100 kc. With a knob ratio of 4 to 1, this amounts to a bandspread of approximately 10 feet per megacycle. The 500-kc. coverage takes care of each band with one band-switch setting with the exception of 10 meters where the band, 28.0 Mc. to 30.0 Mc., is covered in four steps.

Output from V_8, the LMO mixer provides a coverage from 8.395 Mc. to 8.895 Mc. V_4 is the heterodyne oscillator and oscillator amplifier. The oscillator is crystal-controlled, using a total of eight crystals to cover the frequency range of the transmitter. Output from the oscillator is fed to the heterodyne mixer along with signal from the LMO mixer. These two signals are mixed to produce the desired output signal which is fed to the driver stage, a 6CL6. Output from the 6CL6 drives the final-amplifier stage, a pair of 6146s.

The 6146s are a linear amplifier operated in Class AB_1. A fixed bias supply provides a negative 50 volts which limits the zero-signal plate current to 50 ma. Peak driving voltage on c.w. is continuously variable, controlled by a level control. This same control is used to adjust the level in either of the sideband modes. The plate circuit of the 6146s is a pi network,

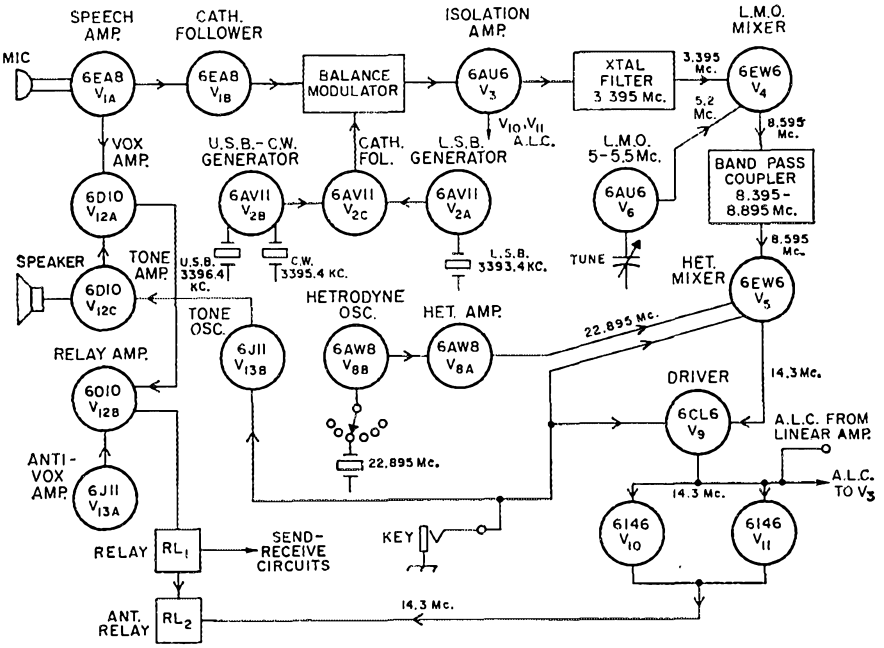


Fig. 1—Block diagram of the SB-400. To show frequency conversion, the frequency of 14.3 Mc. is used as an example.

designed to work into a 50-ohm load with a range up to 150 ohms.

When operating in either of the sideband modes, the a.l.c. circuit is connected to V_3, the isolation amplifier. Whenever the grids of the final amplifier start to draw grid current, a rectified d.c. voltage is fed back to the grid of the isolation amplifier, reducing the output of the stage. This limiting prevents the 6146s from being overdriven.

The power supply uses silicon rectifiers and the supply provides a plus B of 750 volts for the 6146s, 250 volts for the low-voltage stages, and a negative 150 volts for biasing. The LMO and the heterodyne oscillator are operated with regulated 150 volts on their plates and screens. Metering of the transmitter is accomplished with a single meter, switched to read amplifier grid and plate currents, amplifier plate voltage, a.l.c. voltage, and relative output.

In c.w. operation, one of the features of the SB-400 is a side-tone oscillator. V_{13B} is a tone oscillator and V_{12C} is a side-tone amplifier. The tone oscillator generates an audio signal of about 1000 cycles. The audio tone performs two functions. It is used to key the VOX amplifier, permitting break-in operation, and the tone is also fed to the receiver speaker to enable the operator to monitor his sending.

For those amateurs who own the SB-300 Heath receiver, the receiver and SB-400 can be used together as a transceiver. In this function, the receiver LMO is used as the frequency-determining element.

Putting the Kit Together

We might as well warn you now, the SB-400 isn't a kit that can be put together in a couple of evenings. Heath Co. informs us that they had some builders, who had never wired kits before, wire the SB-400 in about 50 hours. However, Heath also said that they would prefer the builder take a little more time and care, and that 75 hours seemed a reasonable time. We *really* took our time and ended up with about 100 hours.

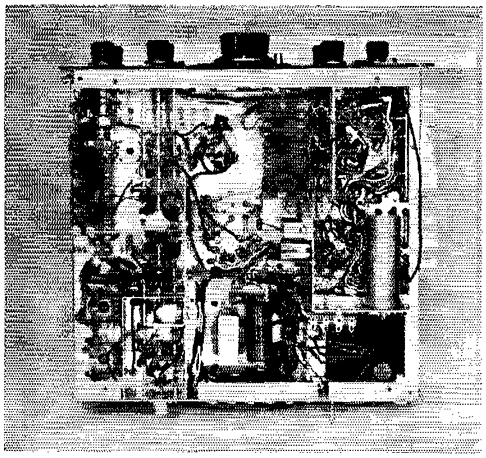
The instruction book, as usual, is excellent and there are no difficult wiring steps, either mechanical or electrical. Part of the kit makes use of printed circuitry, and while you have to wire the circuit boards, it is a simple procedure. The LMO comes completely wired (and sealed) so that job is taken care of for you. Also, preassembled wiring cables are furnished.

Even though Heath goes to considerable pains to warn you about using good soldering techniques, we managed to end up with a couple of bad connections. Fortunately, the testing section of the manual is very extensive, complete with ohmmeter and voltage checks, and these checks quickly turned up our difficulties.

In order to align the transmitter you'll need a v.t.v.m. with r.f. probe, a 50-ohm dummy load, and a calibrated reciever, either ham-band or general coverage.

Performance

After the transmitter was aligned, the first thing checked was power output. Heath claims 100 watts output on all bands up to 10 meters and 80 watts on that band. We found these claims justified; in fact, the output was slightly over the rated figures. Stability appeared to be excellent, even when changing the line voltage by as much as 10 per cent either side of 115 volts.



Bottom view of the SB-400 transmitter. At the right side is the carrier-generator printed-circuit board. RL_1 is mounted on the shield just to the left of the generator board. The other printed circuit, the mixer-bandpass coupler, is in the center of the chassis. The final-amplifier components and tube sockets are grouped at the lower left-hand corner. The long switch assembly extending from the front to the back of the chassis is the band switch.

Although no precise measurements were made on carrier or unwanted sideband supression, all indications show the suppression was very good. On-the-air reports indicate a crispness of audio quality and no detection of carrier or undesired sideband.

On c.w., the heterodyne mixer and final amplifier are grid-block keyed. There was no detectable chirp and the make and break were without clicks. Heath claims instantaneous break-in on c.w., but this is a debatable point. On c.w., as with voice, the antenna relay is keyed, and the relay delay is adjusted by the VOX controls. It would be difficult to break in between characters or even words at anything but slow speeds. On the other hand, the relay can be set to open or close quite quickly. We don't mean to make a mountain out of a molehill, but break-in by definition means that you can break the other guy *instantaneously*. You can do this with the SB-400 if you use a separate receiving antenna.

As we said earlier, the SB-400 is a lot of transmitter in a relatively small package. Just how small can be seen from the figures in the accompanying box. The cabinet is wrap-around type, with a hinged lid; both the sides and top are perforated to allow plenty of ventilation. Raised rubber feet are used on the bottom front to give a tilted front. The finish is a green crackle and is the same as the SB-300 receiver.

All in all, the SB-400 appears to be an excellent addition to the Heath Co. line of kits.

— *W1ICP*

Heathkit SB-400 Transmitter

Height: 6⅝ inches.
Width: 11⅞ inches.
Depth: 13⅜ inches.
Weight: 26½ pounds.
Power Requirements: 105-125 volts a.c., 260 watts.
Price Class: $325.

NEW BOOKS

Electronic Instrumentation, by Sol D. Prensky, Published by Prentice-Hall, Inc. Publishers, Englewood Cliffs, New Jersey. 534 pages, including index, 6½ by 9¼ inches, cloth cover. Price, $13.35.

The book, divided roughly into three sections, provides a thorough understanding of principles underlying electronic measuring and test instruments for use in service or laboratory. The author assumes the reader's knowledge of basic electronics, and the text is aimed at the "engineering associate" or "semiprofessional technician" level, and second- or third-year college student.

The first section discusses electric and electronic measurement fundamentals. The next third discusses the primary group of general-purpose electronic instruments, such as electronic voltmeters, oscilloscopes, signal generators and recorders with their transducers. The last third explains highly-developed instruments with accepted testing and specific instrumentation procedures illustrated and described. At the end of each chapter are questions and answers and problems to be solved.

Examples are taken from the fields of communication, radiation detection, analog and digital computation automated systems, and included, also, are specialized applications from the chemical and biomedical fields.

There is an extensive bibliography at the end of each chapter. These references, plus a listing of Manufacturers' Literature and a Glossary of Instrument Terms, are include in the Appendices.

GE Transistor Manual, 7th edition, by the Semiconductor Products Dept., General Electric Company, Electronics Park, Syracuse, New York. 652 pages, 5½ by 8½ inches, paper cover. Copies are also available from authorized G-E semiconductor distributors. Price, $2.00.

This seventh edition, larger than the previous one by 200 pages, offers approximately 80 per cent new material. Included now are tunnel-diode circuit applications, oscillators, small signal characteristics, including high-frequency considerations, and logic. The circuit diagrams included in the manual are not intended for constructional use, but are for illustration of typical transistor applications. There is also a chapter on transistor measurements.

The manual is aimed at the student, teacher, experimenter, and electronic-design engineer. It is well illustrated, and has a bibliography at the end of each chapter. The publishers point out that the manual has been translated into a number of languages, including Japanese, Spanish, Portuguese and Turkish.

The last chapter contains useful reference material such as a list of definitions and a table of characteristics of G-E transistors. This is indeed an excellent reference book on semiconductors. — *W1ZLM*

1965 ARRL International DX Competition

Amateurs the World Over to Compete for Section and Country Awards

Phone: February and March 13-14
C.W.: February and March 27-28

FEBRUARY and March are special periods for the contest DX'er. This is the season for the ARRL International DX Competition, the time of year to put your station through the paces and see how you rate compared with others in your own section or country. The rules are the *same* as in *past* affairs. DX'ers see how many W/VE stations they can work and vice-versa. The rules that follow detail contest requirements for all participants. DX amateurs are reminded that their multipliers per band are based on the following 21 call areas:

Call Area: W/K WA/WB/	**Call Area:** W/K WA/WB/
1. — CONN MAINE	*KL7* — ALASKA
MASS NH RI VT	*8.* — MICH OHIO VA
2. — NJ NY	*9.* — ILL IND WIS
3. — DEL MD PA DC	*0.* — COLO IOWA KANS
4. — ALA FLA GA KY	MINN MO NEBRA
NC SC TENN VA	NDAK SDAK
5. — ARK LA MISS	*VE1* — NB NS PEI
NMEX OKLA	*VE2* — QUE
TEXAS	*VE3* — ONT
6. — CAL	*VE4* — MAN
KH6 — HAWAII	*VE5* — SASK
7. — ARIZ IDAHO MONT	*VE6* — ALTA
NEV ORE UTAH	*VE7* — BC
WASH WYO	*VE8* — NWT YUKON
	VO — NFLD LAB

For DX contest purposes, all amateurs in the four California counties due for March resectionalizing (see notice of an Orange Section in Operating News, February *QST*) will submit their scores for *both* February and March weekends as under the present or old section name.

Be sure to send a copy of your log (not your FCC log which must be retained at your station) in the required form with a complete summary to ARRL Communications Department, 225 Main Street, Newington, Connecticut 06111, U.S.A. You can obtain free log forms at this address. Logs must be postmarked by April 24, 1965, to be eligible for awards and *QST* listing. All reports, big or small, are welcome, as are photos.

Banned Countries

U.S. amateurs may not work amateurs in *Cambodia* (XU), *Viet-Nam* (3W8), *Indonesia* (PK, JZØ) and *Thailand* (HS).

Canadian amateurs may not work *Cambodia* (XU), *Viet-Nam* (3W8), *Indonesia* (PK, JZØ), *Laos* (XW8), *Rumania* (YO) and *Jordan* (JY).

EXPLANATION OF DX CONTEST EXCHANGES

Stations in U.S. and Canada Send:

	RS or RST Report of Station Worked	*Your State or Province (or Abbreviation)*
Sample (c.w.)	579	ORE
Sample (phone)	57	Oregon

Stations Outside U. S. and Canada Send:

	RS or RST Report of Station Worked	*Three-Digit Number Representing Your Power Input*
Sample (c.w.)	579	075
Sample (phone)	57	500

Rules

1) *Eligibility:* Amateurs operating fixed amateur stations in any and all parts of the world are invited to participate.

2) *Object:* Amateurs in the 50 United States and Canada will try to work as many amateur stations in other parts of the world as possible under the rules and during the contest periods.

3) *Conditions of Entry:* Each entrant agrees to be bound by the provisions of this announcement, the regulations of his licensing authority, and the decisions of the ARRL Awards Committee.

4) *Entry Classifications:* Entry may be made in either or both the phone or c.w. sections: c.w. scores are independent of phone scores. Entries will be further classified as single- or multiple-operator stations. Single-operator stations are those at which one person performs all the operating functions. Multiple-operator stations are those obtaining assistance, such as from "spotting" or relief operators, or in keeping the station log and records.

5) *Contest Periods:* There are four weekends, each 48 hours long; two for phone work and two for c.w.

6) *Valid Contacts:* In the phone section, all claimed credits must be made voice-to-voice. In the telegraph section, only c.w.-c.w. contacts count. Crossband contacts may not be counted.

7) *Exchanges:*

a) *Amateurs in U.S. and Canada* will transmit a three-figure number, representing the RST report, plus their state or province. (The latter may consist of an appropriate abbreviation.) Phone participants will transmit a two-figure number consisting of the readability-strength report plus the state or province. *Example:* W6YY might transmit "579CAL" on c.w., "57 California" on phone.

b) *Amateurs outside* the United States and Canada will transmit six-figure numbers, each consisting of the RST report plus three "power" numbers; the power indicator will represent the approximate transmitter power input. Phone contestants will transmit five-figure numbers, each consisting of a eadability-strength report and the three "power" numbers. *Example:* I1GO, with 150 watts input, might transmit "569150" on c.w., "56150" on phone. If the input

LOG[1], ARRL INTERNATIONAL DX COMPETITION

Call...W1AW........ ARRL Section...CONN.........

Band....14....Mc. Sheet..1...of...15.........

COUNTRY*	Station worked	Date/ Time (GMT)	Exchange sent	Exchange received	COUNTRY*	Station worked	Date/ Time (GMT)	Exchange sent	Exchange received
SPAIN	EA4CE	3/23 1300	587 CONN	479100	UKRAINE	UB5MZ	2/23 1245	599 CONN	599100
	EA5FL	" 1345	579 "	579075					
ENGLAND	G4CP	2/23 1306	599 CONN	469150	AUST.	VK2GW	3/23 1003	569 CONN	569100
	G6AQ	2/24 1245	579 "	469150		VK2ACK	3/23 1101	569 "	559120
	G2DC	" 1255	567 "	579130					
	G2OT	3/23 1420	469 "	559150					
	G3EYN	" 1822	579 "	589150					
	G3APN	3/24 1251	979 "	459150					

*Canadian entrants should allow two "blocks" for each country, but may record no more than eight contacts therein.

[1]This report form to be used by W/K and VE/VO c.w. participants.

CD-54 (R764) -over- Printed in U.S.A.

Sample of log form that must be used by W/VE c.w. participants. When a station is worked for less than the maximum number of points allowed, the additional contact to make up the points not earned in the first contact should be entered at the bottom of the sheet. Canadian entrants should allow two blocks for each country, but may record no more than eight contacts therein. A separate set of sheets should be used for each band.

power varies considerably on different bands, the "power" number should be changed accordingly.

8) *Scoring:*

a) *Points:* One point is earned by a W(K) or VE/VO station upon receiving acknowledgment of a contest exchange sent, and two points upon acknowledging an exchange received. Two points are earned by any other station upon receiving acknowledgment of a contest exchange sent, and one point upon acknowledging an exchange received.

b) *Final Score.* W(K) and VE/VO stations multiply total points earned under Rule 8(a) by the number of countries worked on one band plus the number of countries worked on each other band. All other stations multiply total points earned under Rule 8(a) by the sum of the number of W(K) and VE/VO licensing areas worked on one band plus the number of W(K) and VE/VO licensing areas worked on each other band.

There are 21 licensing areas: 12 in the United States (W1-Ø, KH6, KL7), 9 in Canada (VO, VE1-VE8).

9) *Repeat Contacts:* The same station may be worked again for additional points if the contact is made on a different frequency band. The same station may be worked again on the same band if the complete exchange for a total of three points was not made during the original contact on that band.

10) *Quotas:* The maximum number of points per country per band which may be earned by W, K, KL7, KH6 stations in the *c.w. section* is 18, and contacts made on the same band with the same country after the quota is filled will not count. Thus complete exchanges with 6 stations in one country on one band fill the band quota for that country. The maximum number of points per country per band which may be earned by VE/VO stations *in the c.w. section* is 24, and contacts made on the same band with the same country after the quota is filled will not count. Exchanges with 8 stations in one country on one band are thus permitted Canadian participants. There is *no quota* for stations in the c.w. section *outside* of the U.S. and Canada. *There is no quota* for *any* station in the phone section.

11) *Reporting:* Contest work must be reported as shown in the sample forms. Each entry must include the signed statement. Contest reports must be mailed no later than April 24, 1965 to be eligible for *QST* listings and awards. All DX Competition logs become the property of the American Radio Relay League and none can be returned.

12) *Awards:* To document the performance of participants in the 31st ARRL International DX Competition, a full report will be carried in *QST*. In addition, special recognition will be made as follows:

a) A certificate will be awarded to the high-scoring single-operator phone and to the high-scoring single-operator c.w entrant in each country and in each of the mainland U.S. (plus Alaska and Hawaii) and Canadian ARRL sections (see page 6, *QST*) from which valid entries are received. In addition, a certificate will be awarded to the high-scoring multiple-operator station in each section or country from which three or more valid multiple-operator entries are received.

b) A suitable certificate will be awarded to the operator making the highest single-operator phone score in each ARRL-affiliated club, provided the club secretary submits a listing of a minimum of three phone entries by members of the club and that these scores are confirmed by receipt at ARRL of the individual contest logs from such members. The highest single-operator c.w. scorer in each club will be awarded a certificate under the same conditions. Only a bona fide resident member, operating a station in local club territory, may compete for club certificates.

c) ARRL will award a gavel to the affiliated club submitting the greatest aggregate phone and c.w. score by its members, whether single- or multiple-operator entries, provided such scores are confirmed by receipt at ARRL of the individual contest logs from such members. Only scores of bona fide resident members, operating a station (his or another club member's) in local club territory, may be included in club totals.

13) *Judges:* All entries will be passed upon the ARRL Awards Committee, whose decisions will be final. The Committee will void or adjust entries as its interpretation of

LOG[1], ARRL INTERNATIONAL DX COMPETITION

Sheet..1.... of..18.. CALL..I1GO... ARRL Section............or Country..ITALY....

DATE & TIME (GMT)	STATION WORKED	COUNTRY	RECORD OF NEW COUNTRIES FOR EACH BAND 1.8	3.5	7	14	21	27	28	EXCHANGE SENT	RECEIVED	POINTS
2/22												
0001	W1BCS	W1			1					579150	579 PA	3
05	K1NOL	K1			2					579 "	579 MASS	
07	W4BJ	W4			3					579 "	569 FLA	
09	K8WVF	K8			4					569 "	469 OHIO	
13	W3TMZ				4					569 "	579 MD	
16	W3BIP				4					569 "	--	2
20	W3MFW				4					589 "	589 PA	3
28	W2GWE	W2			5					589 "	559 NJ	
40	W1EVT				5					589 "	569 MASS	
41	W2GKE				5					569 "	569 NJ	
42	W1TS				5					579 "	579 CONN	
0200	K4GSU				6					479 "	579 KY	1
04	W4DHZ				6					579 "	579 PA	
06	WB2APG				6					579 "	579 NJ	
1110	K4AOU	K4				1				579 "	579 GA	
22	VE1YB	VE1				2				579 "	579 NB	

Total points:

[1]This report form to be used by all phone entrants and by those c.w. participants outside W/K and VE/VO.

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these rules may require.

14) *Disqualifications:* Each participant agrees to observe the contest rules as well as all regulations established for amateur radio in his country. Violation of any regulation, as confirmed by a single FCC citation or advisory notice or two ARRL accredited Official Observer reports, may constitute grounds for disqualification. Some examples of practices which can result in disqualification: off-frequency (out-of-band) operation, harmonics, spurious emissions, low tone reports in logs, key clicks, splatter, excessive sidebands, W(K) stations working banned countries, interfering with channels handling amateur emergency communication.

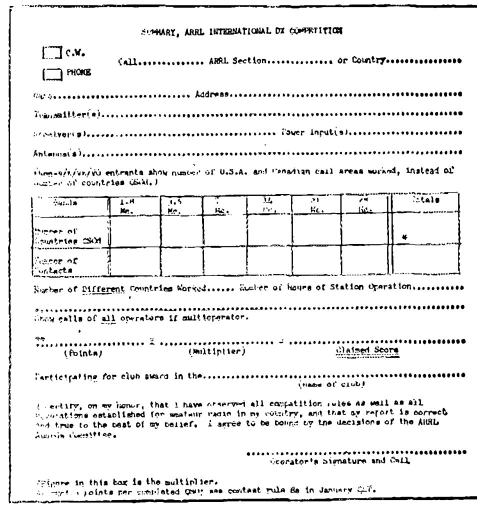
CONTEST PERIODS

Phone Section:

Starts	*Ends*
Feb. 13, 0001 GMT5	Feb. 14, 2400 GMT
Mar. 13, 0001 GMT	Mar. 14, 2400 GMT

C. W. Section:

Starts	*Ends*
Feb. 27, 0001 GMT	Feb. 28, 2400 GMT
Mar. 27, 0001 GMT	Mar. 28, 2400 GMT



SUMMARY, ARRL INTERNATIONAL DX COMPETITION

C.W.
PHONE

Call............... ARRL Section............... or Country...............

Address...............

Transmitter(s)...............

Receiver(s)............... Power Input(s)...............

Antenna(s)...............

(Non-W/K/VE/VO entrants show number of U.S.A. and Canadian call areas worked, instead of number of countries (SM).)

Bands	1.8 Mc.	3.5 Mc.	7 Mc.	14 Mc.	21 Mc.	28 Mc.	Totals
Number of Countries (SM)							*
Number of Contacts							

Number of Different Countries Worked...... Number of Hours of Station Operation...............

Show calls of all operators if multioperator.

.... X .... = ...
(Points) (Multiplier) Claimed Score

Participating for club award in the...............
(name of club)

I certify, on my honor, that I have observed all competition rules as well as all regulations established for amateur radio in my country, and that my report is correct and true to the best of my belief. I agree to be bound by the decisions of the ARRL Awards Committee.

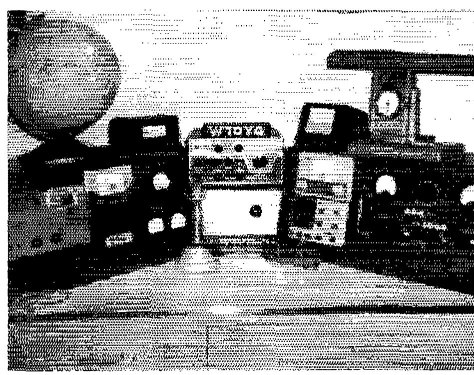
....
Operator's Signature and Call

*Figure in this box is the multiplier.

Sample summary sheet that must accompany all reports

Strays

Even the XYL is happy with this handsome console. W7OYQ's operating desk is topped by ¾-inch plywood, linoleum covered, and sturdy equipment enclosures are custom-cut masonite and furring. Each of 26 equipments and controls are within easy reach of the operator. Out of the photo below and to the left are shelves for books and the inevitable etcetera (which probably includes a lot of "tnx first Nevada" QSLs; W7OYQ runs a kw. on voice and c.w.) ▶



◀ KG6FAE shows members of the Anderson AFB (Guam) Boy Scout Troop 20 what a capacitor looks like, during a weekly code and theory class that he conducts. (Photo by KH6BZF)

W1BVG, of Westfield, Mass., recently received the First Air Force Reserve Region Certificate of Appreciation from General Royal Hatch, for communications service he rendered to the 831 1th Air Force Reserve Recovery Group at Agawam. He operated his station for the Group on training weekends, and was always available in emergencies. ▶

AMATEUR RADIO PUBLIC SERVICE CORPS

CONDUCTED BY GEORGE HART,* W1NJN

HAMMING FROM YOUR FALL-OUT SHELTER

The United States Civil Defense Council is a national association of local civil defense directors. It meets twice annually to hear papers presented by many of its members, representatives of government and industry and the chairmen of its various committees. The annual meeting in the fall occupies a full week, the semi-annual meeting in March or April two or three days.

Naturally, one of its committees has to do with communications, and naturally its chairman is an amateur, W5CZ of New Orleans and Alexandria, La. It was through his good graces that ARRL was invited to send observers to both the March and November meetings, held last year in Washington, D.C. and Colorado Springs, Colo., respectively. These conferences do not deal exclusively with communications, and so it was not practical for us to spend full time attending them, but the little time we were able to spend was well worth while in making contacts and in becoming acquainted with some of the problems local c.d. directors wrestle with in the far-flung corners of the nation.

At the latest U.S.C.D.C. Conference in Colorado, one c.d. director told us that he had no use for hams because they wouldn't survive. Asked to elaborate on this subject, he said that not one of the hams in his area was building a fall-out shelter, so that in the event of an atomic attack the chances of survival were practically nil — and what's the sense of building your c.d. communications around a group of operators that aren't going to be around?

Although the gentleman (darned if we can remember where he came from) seemed to feel that amateurs were peculiarly negative in this respect (that is, willingness to build home fall-out shelters), and although we expressed disbelief that this was so, this is really beside the point, isn't it? The federal government has been pushing its survival plan for some time, and has been meeting with a great deal of public apathy. It almost goes without saying that in the event of an all-out nuclear attack (and any made will *have* to be all-out), those without fall-out shelters will *not* survive. Even some of those *with* shelters won't survive, but many will, and these are the ones who will have to render civil defense services.

How many amateurs do you suppose have fall-out shelters, and of these, how many do you suppose have radio gear installed and ready to operate in them? Many? Frankly, we doubt it, although we'd be glad to be proved wrong. So supposing the worst happened and we are all caught without shelter and we all perish — what then of our fine plans to put RACES into operation?

We communicators have been told so many times, both by others and by ourselves, that communication is basic, that nothing can be done without it, that we have come to accept this and feel that our only duty is providing ourselves with the ability to communicate. But there is something even more basic than communication if humanity resorts to the ultimate holocaust, and that is *survival!* Before any plans can be made for post-attack, plans must first be made for survival.

The Office of Civil Defense, Department of Defense, Washington, D.C., or your nearest OCD regional office can supply you with full details on constructing fall-out shelters. Some of them are surprisingly inexpensive — less, for example, than you might spend for a new receiver or

* National Emergency Coodinator.

W4MFK, SEC of North Carolina, copies a message in his communications van. Jim has used this set-up or previous ones similar to it effectively in many communications emergencies. The van is operational on 2, 6 and 75 meters, has a half kilowatt transmitter available and contains just about every home comfort, *including* a kitchen sink.

transmitter of modern design, although of course the more elaborate you make them the more expensive they are.

When you have yours built and your gear completely installed and operating, send us full details for a *QST* article entitled "Hamming from Your Fall-Out Shelter." — *W1NJM*.

Diary of the AREC

During the flood in Montana in June, 1964 (See p. 85, Oct. 1964 *QST*), the following stations are known to have participated: *W7s* BUT CPV LVY OBF OCD VHA VOS, *K7s* DCB IZI KLF PFQ QHP RXO YLR ZSY, WA6YZF. — *W7UWY*

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On Aug. 22, tornadic winds struck in Calhoun and Monroe Counties, Mich. While damage was light, amateurs in both counties assisted police and fire officials by providing extra mobile units to aid in the clean up operation. Those amateurs known to have participated are: *W8s* AGT AQU KHY NVH NZ VZY YAN ZEJ, *K8s* AEM DBZ EGO IXU NEY REM RSU TOF UCQ WPO YYE ZQV, *WA8s* AHM CZJ DTA EFK FJK FLV FOK GVM HOV JQK JWD.

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Additional reports have been received on operation during Hurricane Cleo (see p. 78, Dec. 1964 *QST*). A "Hurricane Net" was formed on 20 meters for the purpose of keeping track of the storm and handling traffic. This operation lasted from the time Cleo became a threat to Puerto Rico until such time as she had dispersed. Those stations known to have participated are: *W1s* BLT ICP KDK TZ, *K1s* AXB BUU ESG THQ UCC VBU ZJA, *W2s* AKR AU JOH JRU MIN NJ/4, *K2s* NFU SGH/7 SWL, *WA2s* DEW JOW LCG TVQ, *WB2s* IOG JWB, *W3s* AFE CJT CJX IPB JCC/4 NSU, *K3s* HZS/4 JCC/4 JYZ TOX, *W4s* AET BHU BVE CPW CQA CQR DDY DLA DUF ESJ FPS FQR FTH HBQ HDN ILF JJI/2 KUV KKA LAS LES MLA MWE MXF MXU NIJ/4 NSO NUR OAH/4 ODR OHP PED PIM PNM PQA PSA PSI PUA PVR/8 QBY RHA RHL RLI RNS ROR SAS SAW SLP SQO SRI TCY/4 TMN TXX UAF/6 UGG VBQ WKC WKP WQY WOQ/M YE YHI YVS ZBA ZYS ZXV, *K4s* AED BZZ CII CPX DBR/5 EY FCL FDC FDP FGF HZC IZP IWT JGU JIY JKX KNF/VO1 LES MEL MDC MAW NAA NNI RNF RUQ RUZ TFS TMO TMD TTW UBM/4 VFY VSV VXD YWZ YZR ZZP, *WA4s* BAN BAS BDE BVD BWE CEL CLR COR CVT DAS DII DKA DKG DNL DUD ECY EMY EYZ FJM FTD GDC HAC HFE HHK IDI IJH IMC IYG JJX KNQ LDI LDR LYD MEH MDD MGH MNX NVX ODN OLP OXL PDS POU QHQ RLI SEF SJL SPY/4 STD SRX WKP YNF, *W5s* CEZ GYP GQJ HHN KWA MYA VFW WZ, *K5s* LIL TSR VUN/4, *WA5s* AWC CQV/4 DPT EFO FZQ GFJ IFT JPB KKE OUI QNH, *K8s* CFW DMS FDP LBU UXB, *WA8s* ANK CEZ CFJ CGZ CHA GYT HVR, *K9s* GAA QZN, *WA9s* ELY HPA JBS JDS, *W0s* ALA EXY, KØHNW, VE3FIB, *KP4s* AJZ APS JM USA, KZ5AW, *KV4s* BA CQ, KG4CG, FG7XL, *H18s* HA XHS XRM CLU HX, *HR2s* JII BL, VP5LV, VP7BY, YN1AA, *XE1s* FFF IMO.

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One of the worst forest fires in years gave Wyoming AREC members a chance to serve. The fire broke out on Aug. 26 and within a few hours it was evident that it would grow to large proportions. In fact, after four days of raging uncontrolled in the Laramie Peak area, the fire had ravaged 1700 acres of forest land and several ranch buildings had gone up in smoke.

On Aug. 27, W7HH, from Laramie, set up at the fire camp and maintained contact with AREC headquarters. The National Guard had no radio equipment of their own and had to rely on the AREC for communications. Fire-fighting planes were used to combat the blaze and AREC members helped coordinate flight plans with fire officials and the air field control tower.

The entire operation lasted some four days, by which time the fire was all but completely out. Those stations participating were: *W7s* ASB CQL HEB TZK, *K7s* CSW IAY KHI OVD UFQ WRR WRS, W8EPF/7, WØHOJ, KØWMD and WAØFUZ.

Here's an old timer most of you c.w. traffic men have worked—Cliff, W8DAE, former 8RN manager, Ohio RM, manager of the Hit & Bounce Net, holder of awards galore. The gear? Simplicity itself, but it packs a good wallop.

Additional reports on Hurricane Dora (see p. 78, Dec. 1964 *QST*) indicates that W4TUB, *K4s* CUE COO JGU SJH VFY, *WA4s* ECY HDH IJH LCH PDS RSQ also participated.

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We have received two different reports of an emergency, both by stations who actually participated.

On Sept. 15, WB6KHI was monitoring 20 meters when he came across a contact between CE3CZ and WØQMY/6. It seems that an American ship off the coast of Chile, the USNS *Eltanin*, had a crewman aboard suffering from a severe inflammation of the kidneys and the infection was beginning to spread. All contact with the ship had been lost and its last known location was needed so that medical supplies could be flown to it. WB6KHI broke in (on request from WØQMY) and offered assistance. He was asked to make a call to San Francisco to get the location, which was relayed to CE3CZ who in turn gave it to naval officials.

The other version is from K1TIH who received an emergency call from CEØZI aboard the USS *Altanan* off the coast of Juan Fernandez Island, requesting relay of a message to a doctor in Washington D.C. The situation was explained to the doctor by the ship's pharmacist mate. The doctor then informed K1TIH that emergency medical aid for the patient would be obtained from the U.S. State Department. The ship was unable to establish contact with Chilean stations and a schedule was arranged for one hour later at which time the doctor would inform them of his progress. It was decided that the medical supplies would be air-dropped to the ship so treatment could be started immediately. This was accomplished, and after sufficient recovery, the patient was flown to New York for further treatment.

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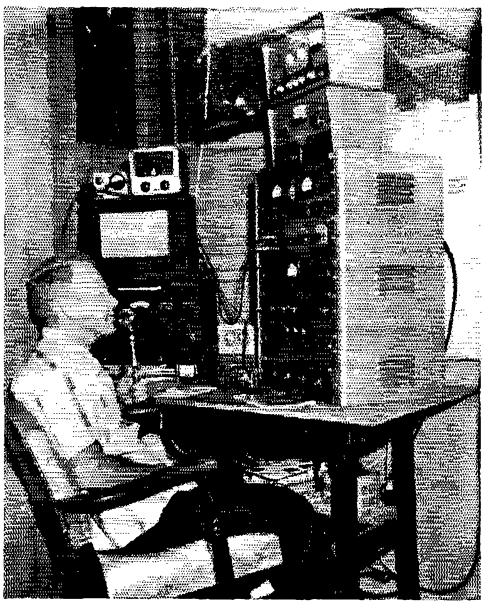
On Sept. 22, Hurricane Gladys hovered uncertainly some 200 miles due east of North Carolina's outer banks. In addition to extensive flooding, high tides whittled away five to ten foot sand dunes north of Buxton on Hatteras Island and poured the ocean through to Pamlico Sound, which separates the sand spit islands from the mainland. The crumbling of the dunes cut off the only highway to the mainland, leaving some 3,000 residents of Buxton, Hatteras village and Ocracoke without an escape route.

All four North Carolina h.f. nets went on a standby basis. The CCEN proved to be in a position to render communications services although a real communications blackout failed to materialize. When the weather station's radio failed, WA4IZV and WA4CXO at Hatteras supplied the hourly weather broadcasts to K4AF at the Pentagon at Washington via W4LCV at Elizabeth city.



KV4BA, above was the first to contact FG7XL, on Guadalupe, and report the damage caused by Cleo. Reports were phoned to the local radio station and then relayed to the U.S. mainland. This was the only means of outside communication available to people on Guadalupe for some time after Cleo.

The professional Red Cross personnel from Atlanta, Ga. set up headquarters for this area at Elizabeth City, N.C. They were able to keep in contact with vital areas throughout the entire outer banks area through the facilities of CCEN. Those amateurs supplying this service were: W4PCN and W4NPT. Shelters were made available throughout the coastal area but only the one at Kitty Hawk was used.—*W4MFK, SEC North Carolina.*

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At 0210Z Sept. 23, K3SGD was on his way home from work when he spotted several emergency vehicles. Upon investigation he found a multi-alarm fire and a street completely blocked. Calling on the local emergency frequency, he contacted W3RMD to whom K3SGD gave a resume of the situation. W3RMD called the local radio station who rebroadcast the location of the fire and requested motorists to stay clear of the area until it could be brought under control. —*K3SGD, EC Baltimore Area, Md.*

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Hurricane Isbell was Florida's third hurricane of the 1964 season. The Miami Hurricane Warning Center said it would probably be the last. Let's hope so.

The Florida AREC plan was alerted by a joint SEC bulletin establishing a Condition One (standby and monitor radio) at 0030Z Oct. 14. Isbell moved quickly across the water between Cuba and the southern tip of Florida, hitting Everglades City (same spot Hurriance Dona hit in 1960) the next day, Oct. 14 at about noon. W4ARU, the only amateur in Everglades City, was set up with emergency power in a well-built building. With him was an official Weather Bureau representative, making reports back to Miami. The hot-line phone was used for most of his reports; however, some reports were sent via Net C on 3940 kc.

As conditions became worse, a joint SEC bulletin was transmitted to all Florida Net Managers, ECs and Florida amateurs establishing a Condition Two for Nets C and D only, in Key Cities of Miami, Tampa and Orlando. Weather bulletins indicated Isbell would cut across the southwest tip of Florida and leave Florida on the lower south east coast. It was not necessary to alert other Key Cities. Highest reported winds over land were about 75 to 80 m.p.h., and Isbell was not considered to be too dangerous. She did dump millions of tons of water on south Florida and thanks to the excellent flood program that has been going on for the past four years, no flooding was reported in the Everglades or elsewhere in south Florida.

Condition Three (full emergency) was issued at 2355Z, Oct. 14 as Isbell moved swiftly across the state. The Key Cities of Miami, Tampa, Orlando and Jacksonville were alerted. Traffic moved smoothly on Net C which was officially alerted by Net Manager W1OVE at 1700Z. The Tallahassee Weather Bureau requested hourly reports from amateurs from the Ft. Myers-to-Vero Beach-line south. These reports were transmitted to Leon County EC K4DAD promptly on Net C. There was very little, if any, c.d. or Red Cross traffic moved during Isbell. About 90 per cent of the traffic handled was in the form of weather reports. Net Manager K4KDN reports 32 stations participated on Net D with only 29 messages handled between 2315Z Oct. 14 to 0245Z Oct. 15. Net D was well covered with many first-class operators. With two larger hurricanes and a SET, Isbell was considered as childs-play to many of the old pros. Condition 4 (mop-up) was established by a final SEC joint bulletin at 0225Z on Oct. 15.—*W4ITY, SEC E. Fla.*

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Thirty-seven SEC reports were received for September, representing 16,160 AREC members. This is an increase of two reports but shows a drop in membership of 197 members over last September's total. Those sections heard from this month are: Del., N. Mex., Los A., Miss., Nebr., W. Fla., Sask., Wyo., E. Mass., Minn., Wash., N.C., B.C., Nev., Ind., Ala., Alta., Ohio, Me., Okla., Va., Ark., N.Y.C.-L.I., S. Dak., N. N.J., Tenn., Mich., Ont., W. Pa., Utah, R.I., E. Fla., Ariz., Mo., S.C.V., Ga., Iowa.

RACES News

On Aug. 15 and 16, members of the Amarillo RACES assisted CAP members in a simulated airplane crash and search. RACES Mobile units, driven by W5EBS, K5HKN and WA5AOG, were used to provide communications between search parties and headquarters. After five hours of operation, the "wreckage and survivors" were found. The entire operation was considered successful and much was learned.—*W5JSM.*

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Several inquiries have been received concerning the fact that this subhead is occasionally missing. Some have even accused us of not giving proper support to RACES.

Well, we invite the latter to look at the record. As for the inquiries, it seems to be a case of lots of people wanting to read it but nobody wanting to write it. Anyway, when we have no suitable material for the RACES column, we just don't *have* a RACES column. By contrast, every month we get more material for the AREC "Diary" than we can print, and by far the greatest part of the column is devoted to amateur participation in actual emergency.

Now we can't promise to print anything we receive about RACES, no matter who writes it, what it's about, or how well it's written. But we do promise to give it the same consideration (as we always have) as any other material received in this department, using the same rules we apply to material for the "Diary." Only thing is, we can't dream up the material ourselves.

Fair enough?

National Traffic System

These are tough days for traffic handlers. As of the time we write, "skip" lengthens out shortly after dark so that signals closer than 500 miles or so become weak and watery, while those farther out boom in. Later in the evening yawpy, stuttering signals start to appear all over the band (we're talking about 80 meters, of course), and you run into foreign teletype, multiplex and yes, even jammers. The amount of garbage appearing on the band when skip gets long is fantastic, unbelievable. If it weren't for this, we could handle traffic even *with* the weak signals.

Despite these handicaps, our NTS nets continued to handle their traffic in stride. Oh, they may be slowed down a bit, but most of them keep right on going. What, A can't hear B and vice versa? Okay, relay your traffic through C. This type of caper is possible on area nets and some region nets, and even on section nets where they can get a station at a distance to do the relaying. Otherwise, the boys just slug it out, depending on sheer operating ability plus a bit of per-

sistence .NTS is going to survive another season of bad conditions, and come out of it fighting.

When you read this, we will be almost "out of the woods," but observance of the following rules, which will assist in NTS net efficiency any time, are of particular importance when conditions are bad:

(1) Be there on time. The necessity of relaying and/or copying weak signals slows down the net enough. You slow it down even more by being late.

(2) Pay strict attention to the NCS. There will be a lot of noises on frequency, some of foreign origin but nearly all of them not customarily heard at your location. Forget them, and keep your ears glued on the NCS's signal, especially if it's weak.

(3) Don't make excuses for not being able to copy. Just saying so (QNP) tells the whole story. Also, leave out requests for relay (QNB). If relaying is indicated and is feasible, the NCS will know it better than you.

(4) When sent off frequency to clear traffic, find a likely spot (for you) near the designated point and call first if you are to receive. If you are to transmit, *listen* for the other station about five kc. around the designated spot, then carefully zero him. Remember, if you are transmitting *you* don't have to copy *him*, so let him select the frequency. What you hear there may not even be audible at his location.

(5) Restrain that impulse to "help" the NCS. There are exceptions to this rule, but the exceptions apply only to experienced hands at the game; if you are even slightly green at it, let the experienced boys do it. For example, the NCS might not hear some station trying to report in. A quick "Someone calling" (QRZ) will notify the NCS of this. He may then say "Relay" (QNB), whereupon you will call the station trying to QNI, get his traffic list and relay it to the NCS. If you cannot copy the guy, but can only just hear him, don't waste the net's time trying to relay him.

All things considered, the best thing to do is just keep quiet; if the NCS can't hear someone, your desire to assist is appreciated, but usually your attempts to do so are abortive.

Here's a gimmick in NTS operation that some of the boys in the upper echelons are using. You have been dispatched down 5 to clear some traffic. After doing so with no pain, you come back to net frequency and get lined up with the NCS, then you hear your counterpart report his presence back on net frequency. It is not necessary for you then to do so. NCS knows you are there, or soon will be, and will call you when he has another assignment for you. This depends, however, on your getting back to net frequency promptly after your traffic is cleared, which is standard practice anyway. And of course if you don't hear your counterpart report back in, then you'd better do so. Make this a rule: first one back on net frequency report back in.

Gentlemen (and ladies), I want to say something in six-point type that has 18-point sincerity: you are the keenest bunch of operators on the amateur bands and it's a pleasure and a privilege to work with you.—*W1NJM.*

October reports:

Net	Sessions	Traffic	Average	Rate	Representation (%)
1RN	61	739	12.1	.292	80.8
2RN	79	1123	14.2	.664	98.2
3RN	66	706	10.7	.287	94.9
4RN	55	934	15.2	.363	92.8
RN5	90	1614	17.9	.357	94.3
RN6	62	583	9.4	.409	98.5
RN7	29	548	18.9	.488	86.2[1]
8RN	74	563	7.6	.290	79.2
9RN	29	600	20.7	.733	98.3[1]
TEN	62	773	12.5	.640	85.8
ECN	30	212	7.1	.132	91.1[1]
EAN	45	2571	57.1	1.072	98.1
CAN	45	1578	35.1	.649	98.5
PAN	37	1497	40.5	.601	100
Sections[2]	1172	8815			
TCC Eastern	141[3]	666			
TCC Central	137[3]	931			
TCC Pacific	124[3]	915			
Totals	1936	25,368	11.9	EAN	PAN
Record	2023	24,784	12.3	1.003	100

[1] Representation based on one or less sessions per day.
[2] Section nets reporting (41): RIPSN (R.I.), BN OSSBN (Ohio), OQN (Ont.-Que.), MDD MDDS (Md.-Del.-D.C.), Ark. SSB OZK QAN (Ark.), WFPN (W. Fla.), AENM AENO AENP (morn.) AENP (eve.) AENR AENT AENH AENB (Ala.), Mich. SSB, ETPN TN TSSBN TPN (Tenn.), BUN (Utah), PFN (Pa.), GBN (Ont.), NCN (late) NCCW (N.C.), WSBN (Wis.), SCN (Calif.), OSN (Ore.), NJN NJEPN NJNN NJ6&2 16N (N.J.), SCEN (S.C.), QMN (Mich.), VSN (Va.), VTNH (Vt.-N.H.), EM2MN (E. Mass.).
[3] TCC functions not counted as net sessions.

Some of the above figures include SET operation. Well, we broke two more records this month, thanks to the SET. We are really in the midst of winter conditions with the band dropping out around sunset; things get mighty frustrating when the skip paths change several times during the course of one net session.

W1BVR reports E. Mass. had perfect representation on 1RN. It seems that 2RN continues to improve in spite of skip condx. K3MVO has issued 3RN certificates to W3JKX and *K3s* JHF TJE YZF. A 4RN certificate went to K4FLR. K5IBZ sez that between Hurricane Hilda and the SET, RN5 was pretty busy the first week of Oct. Montana representation has dropped way down on RN7, but K7JHA is confident that it will improve. W8CHT has issued 8RN certificates to *W8s* BZX BEZ CKX DAE EU ELW GTL QHW RYP, *K8s* DIU IUZ KNQ LGA MJW, *WA8s* AJD CPH DNZ DGE FAE FIC KUW. W9QLW sez 9RN started off like a ball of fire, but then cooled down toward the end of the month. TEN is improving in almost every category and VE4JT has been issued a TEN certificate, reports WØLGG. While W9DYG is moving to a new QTH, W9CXY is taking over CAN. WB6JUH sez PAN is back up to 100% representation and hopes it will stay there. Many of the managers had comments on the SET operation but we're saving them for a later date. Happy New Year everyone!

Transcontinental Corps: W3EML reports a pretty fair month. Condx didn't wipe out many of the skeds and in some cases actually helped clear traffic. W7DZX is still looking for additional stations for TCC assignments. If interested, let him know.

October report:

Area	Functions	% Successful	Traffic	Out-of Net Traffic
Eastern	141	87.9	2109	666
Central	137	81.0	1767	931
Pacific	124	79.0	1830	915
Summary	402	83.3	5706	2512

Other net reports:

Net	Sessions	Check-ins	Traffic
20 Meter SSB	22	717	2567
EASN	30	71	38
7290	45	1314	650
North American SSB	27	380	448
Interstate SSB	31	1221	665
HBN	31	466	510
Central New England	27	704	3

NATIONAL CALLING AND EMERGENCY FREQUENCIES (KC.)

3550	3875	7100	7250
14,050	14,225	21,050	21,400
28,100	29,640	50,550	145,350

SWITCH TO SAFETY!

What ARRL Means to Me

BY KENNETH G. YOUNG,* WA2LBC

During its 50th anniversary year of 1964, the League conducted a Golden Anniversary Essay Contest on the subject which titles this article. While only two prizes were offered, many excellent contributions were received; in fact, the judges had so much difficulty in the final selection that it was decided to issue four special honorable mention awards. WA2LBC's essay won in the latter category. In subsequent issues QST *will publish the other winning essays.*

WHAT does the American Radio Relay League mean to me? Does it mean the receiving of a certificate to hang on a wall, or a card for my pocket or does it mean a magazine delivered to my door each month? True, ARRL does mean just that, but are the material benefits the only things derived from being a member? I must admit that until now the real meaning of the ARRL to me appeared nebulous and unclear. I then studied the question more thoroughly and it became apparent that to me the American Radio Relay League is an organization which expresses our fundamental democratic system, in combination with a fraternity of common interest.

Our fundamental democratic system is all too often put aside when referring to the American Radio Relay League. However, the first word in the league name, "American," to me signifies our country — a way of life. The ARRL since birth has used this system.

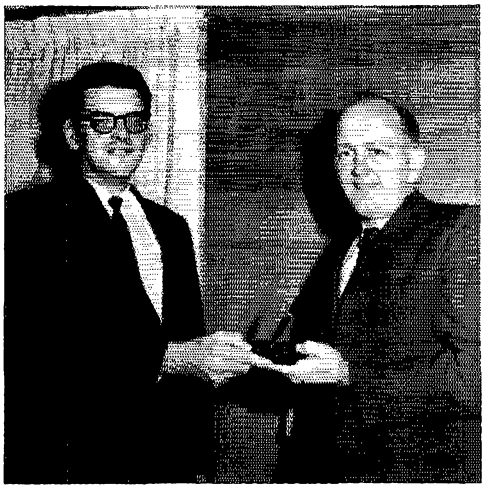
The League exercises the right of all members to elect their representatives; moreover, another freedom which distinguishes our system, and is constantly used by this organization, is freedom of speech whereby each of us has the right to air our opinions, and the ARRL as a whole, voices our needs to the very heart of our government. This freedom of speech guaranteed us by our governmental constitution was the foundation for all of the privileges we as amateurs enjoy today.

The functional part of the ARRL, of course, is "radio," the second word in the organization's name. The word — although it's small, consisting of only five letters — covers a lot of territory in more ways than one. Today, as never before in the history of man, has such a small word played a major part of our everyday life. The mass communication of radio enables us to hear word-by-word description of those events which illuminate our times. It is plain to see that the ARRL has and will continue to contribute to the knowledge and understanding of radio, through constant experiments and testing, and by means of helping others to comprehend the basic theory, and education in the international code.

Continuing to separate the words which make up the organizational name we come to the third word, "relay." This word by no means can be left out or put aside, for this was one of the very reasons why the League was founded. When Mr. Maxim (and his colleagues) set out on this new venture of relaying messages to all parts of the country, he knew that others interested in the same idea must join him or his cause and effort would have been discarded. Today, we still use the idea, and thanks to our new equipment and thorough knowledge the League's members continue to relay traffic and meaningful messages to all parts of the globe. *QST* magazine to me is another form of relaying, for by the use of this magazine and similar literature, all members are entitled to relay their own ideas and thoughts to others by use of the printed word.

(*Continued on page 146*)

* 74 First St., Keyport, N. J.



NNJ SCM Ed Erickson (left), W2CVW, presents an engraved desk pen set to WA2LBC in recognition of his winning honorable mention in the essay contest. The presentation was made at the home of K2OEI, an ARRL EC and president of Kenneth's club, the Shore Area Amateur Radio Club.

Annual ARRL Novice Roundup

NOVICES, this is your one and only opportunity to participate *as a Novice* in your own operating activity, the Fourteenth ARRL Novice Roundup Competition. Don't miss this chance to operate in this contest specially for Novices. The Novice Roundup begins on Saturday, Feb. 6, 1965, at 1800 local time, and runs *through* Feb. 21, Sunday, 1800 local time. Operating, listening, and logging time must not exceed 40 hours.

ROUNDUP PERIOD

Starts	*Ends*
Feb. 6 6:00 P.M. Local Time	Feb. 21 6:00 P.M. Local Time

How to Participate

Just get on the air any time during the two-week period and contact as many Novices and non-Novices as possible, exchanging QSO number and ARRL section. Non-Novices work only Novices, of course. "CQ NR" means CQ Novice Roundup and you can either answer such a call or call "CQ NR" yourself to get contacts. Here's an example. KNØBPO in Minnesota hears KN1QFC in the Western Massachusetts section calling CQ NR.

CQ NR CQ NR CQ NR DE KN1QFC KN1QFC KN1QFC K

KN1QFC KN1QFC DE KNØBPO KNØBPO KNØBPO AR

KNØBPO DE KN1QFC R HR NR 3 WMASS BK

KN1QFC DE KNØBPO R HR NR 1 MINN BK

KNØBPO DE KN1QFC R TNX ES 73 SK DE KN1QFC

On his next contact KNØBPO would send NR 2 (meaning contact number 2) then NR 3, NR 4, etc.

Scoring

A certificate is awarded to the highest Novice scorer in each ARRL section. Complete results will be in *QST* including the scores of those non-Novices that enter as well. To obtain your final score simply add the total of your NR QSOs to the highest w.p.m. from your Code Proficiency certificate. Multiply the sum by the number of *different* ARRL sections (see page 6, this *QST*) worked during the contest. That CP certificate really helps out your score, and you still have time to qualify, so don't miss out. Full details on the Code Proficiency Program are on page 88, this *QST*.

Novices should keep a look out just above and below the Novice frequencies (3700–3750 kc.; 7150–7200 kc.; 21,100-21,250 kc.; 145–147 Mc.) for the higher-power Generals.

Log forms like the one in the sample are yours for the asking simply by writing to: ARRL Communications Dept., 225 Main St., Newington, Conn. 06111. Study the following rules, and then stand by for the fun of your Novice career, the ARRL Novice Roundup Competition! But don't forget to send in a copy of your log to make your entry official; logs must be postmarked by March 5, 1965.

SUMMARY OF EXCHANGES ARRL NOVICE ROUNDUP

Call. KNØBPO.. Section... MINN.....
(See page 6 QST)

BAND	TIMES ON OR OFF AIR	DATE, TIME OF CONTACT	MY NR SENT	MY SECTION	HIS NR RCVD	HIS CALL	HIS SECTION	NUMBER EACH NEW SECTION AS WORKED
80	1800	FEB. 3						
		1803	1	MINN	1	KNØAKM	MINN	1
		1815	2	"	3	KN9WRX	ILL	2
	1835	1820	3	"	2	KN9ZDL	ILL	
15	1400	FEB. 6						
		1412	4	"	15	KN7MNL	NEV	3
	1425	1418	5	"	7	KN1QFC	WMASS	4

Summary: (Enter below on last sheet used)

Bands used.....80,15.....; Nr. diff. stns. wkd..5.....; Nr. diff. sections...4.....
Total hours operation....1:00.....; Code Proficiency award credit.....10.....w.p.m.
Type transmitter (tube line-up if home-built).....
Receiver.....; Antenna.....

SCORING:

....5.....QSOs plus....10.....c.p. points times....4.....sections equals 60

I have observed all competition rules as well as all regulations established for amateur radio in my country. My report is true and correct to the best of my knowledge.

Signature and call.....
Address.....
.....

This is a sample log form that must be used by all contestants and also shows how to score. You can obtain these forms free by writing to ARRL.

Rules

1) *Eligibility:* The contest is open to all radio amateurs in the ARRL sections listed on page 6 of this *QST*.

2) *Time:* All contacts must be made during the contest time indicated elsewhere in this announcement. Time may be divided as desired but must not exceed 40 hours total.

(*Continued on page 138*)

I.A.R.U. News

U.S.S.R.

The most recent edition of the Region I Bulletin contained the following article written by Ernst Krenkel, RAEM, President of the Radio Sports Federation, and translated from Russian by SM5ZD.

This year the Soviet Amateur Radio movement celebrates its 50th birthday. Starting in 1914 with a small group of enthusiastic experimenters the movement today engages many thousands of people of all ages and professions who are passionately keen on radio techniques. In the U.S.S.R. the movement forms a popular school for the training of radio specialists. In this school everybody who is willing can, without charge, study the basic principles of radio electronics. The movement is a "Laboratory for the People" in which enthusiastic amateur designers produce thousands of different items of electronic equipment each year. It is also a sporting ground for those who are interested in h.f. and v.h.f. work, "fox-hunting", radio traffic and competitions for operating skill, technical ingenuity and physiological strength.

Hundreds of radio clubs for construction and sport have been formed at schools and factories. Provision is made in each club for radio training, laboratories and collective radio stations. Novices and experienced radio amateurs come together. The novices study and take their first steps under the guidance of instructors. In this way they learn basic principles and receive instruction in the construction of equipment. The more experienced amateurs work in different sections, such as construction, television, h.f., v.h.f. Clubs have also been formed in many business enterprises such as collective farms and farms belonging to the State, and in universities.

The Amateur Radio movement in the Soviet Union is governed by the Radio Sport Federation of the U.S.S.R. and by Radio Sports Federations in the different Soviet Republics, sections and district centers. The Radio Sport Federation supports the constructional activity of radio amateurs.

Every year an Amateur Radio exhibition is arranged which covers equipment from the whole Soviet Union. This is preceded by exhibitions regionally arranged in cities, provinces and republics. During 1964 more than 140 exhibitions were arranged in different towns, at each of which a jury of prominent experts judged the quality of the exhibits, and selected the best items for the national exhibition. (The National Exhibition took place in Moscow during October.)

The range of work displayed at exhibitions is very wide. In addition to receivers, TV sets, complete amateur stations and measuring instruments there are many other types of electronic equipment which can be used in industry, scientific research and teaching. Also on display are items of equipment which directly affect the public, e.g., in medicine. Thus it comes about that radio amateurs who are physicians, have constructed many instruments which are used with great success for diagnosis and treatment at hospitals.

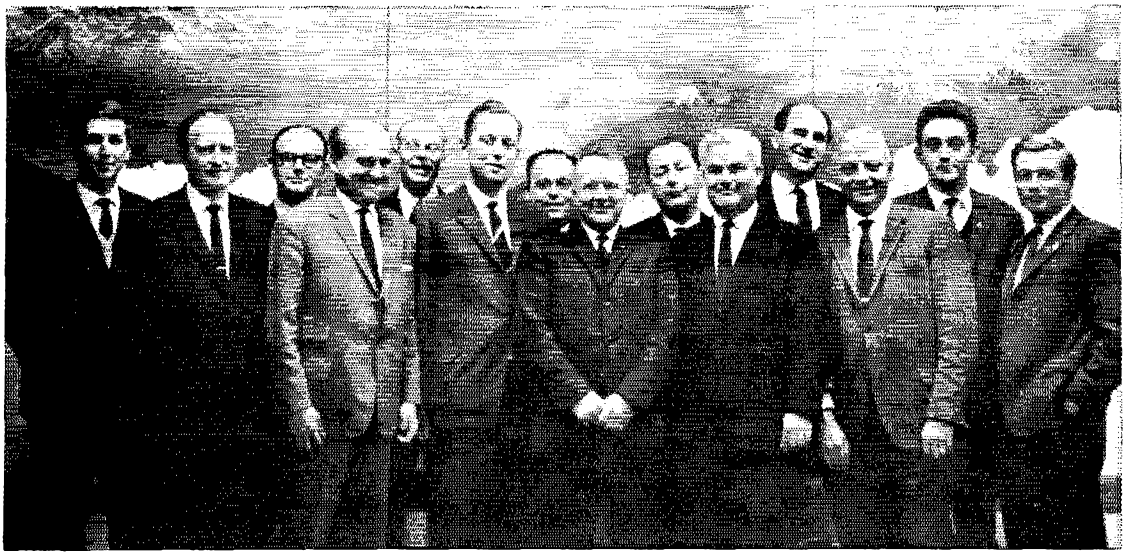
Soviet radio amateurs willingly place themselves at the disposal of scientists as assistants in different spheres. They cooperated as listeners to the signals from the first artificial earth satellite and gave the Soviet Academy of Science many kilometres of tape recordings from the orbit of the satellite. Very shortly after being called in they were ready to measure the electrical conductivity of the earth's surface and specialists rapidly constructed a special map. Soviet amateurs offer their services as voluntary radio guards every time mass radio investigations are necessary for scientific research.

Radio sport is very popular in the Soviet Union. A uniform classification is used; distributions of the honor "Champion of the Soviet Union" being in Classes 1, 2 and 3. Champions are awarded medals in gold, silver and bronze.

Each year the R.S.F. organizes national radio "fox-hunting" championships on the h.f. and v.h.f. bands, and competitions for radio operators, which include Morse code speed tests. Radio sportsmen also participate, enthusiastically, in National Soviet Competitions during the "Day of track-finding".

Each year h.f. competitions are arranged over the whole Soviet Union for feminine participants and for radio-sporters among the young people. Radio-sporters participate in contests arranged by I.A.R.U. Region I and by various Amateur Radio Societies and Journals. Many have achieved success in these competitions. The Russian Radio Sports "fox hunting" champions G. Rumjanzev and A. Grechichin have also been European "fox-hunting" champions and twice Sportsman A. Sjemjenov, UA9DM, from Sverdlovsk has won the Gold Cup in the CQ Magazine DX Contest.

There are on the air at present 12,000 amateur stations using call signs commencing with "U". All modes of transmission, including s.s.b., are in use. Many "U" amateurs are active on v.h.f. especially in the Baltic Republics, Uzbekistan, Leningrad, Lwow and Dnjepropjetrovsk. These are all areas where interest in 144 Mc. is high. Using troposcatter, radio waves are reflected



Present at a meeting of the International Amateur Radio Club this past fall, making plans for next year's IARC Convention, were the above IARC members. (l. to r.) HB9YK, W6GPQ, OK1KM, OK1WI (vice-president, IARC), ex-11BAG, OK1FY, HB9QC (treasurer, IARC), W1IKE, F8RU, HB9AEQ (president, IARC), DL1YJ (editor, 4U1ITU Calling), HB9UD, HB9AET, and G3PSA. The meeting was held adjacent to the 4U1ITU shack in ITU Headquarters, Geneva.

against the Northern Lights and traces of meteors. Soviet amateurs have established successful contacts with many distant stations on v.h.f. Recently G. Rumjanzev, UA1DZ, in Leningrad had QSOs over distances of nearly 2000 kilometres with HB9RG in Zurich and G3LTF in England. Outstanding results have also been achieved by K. Kallemaa, UB2BU, who has made v.h.f. contacts with 16 countries including SM, OH, OK, OE, DL, G, and SP.

Radio Sport is receiving an ever-increasing amount of recognition in the U.S.S.R. A "Spartakiad" (a national sport competition) is being arranged which covers the whole Soviet Union. This is devoted to the technical branches of sport and the program includes the driving of motorcycles, parachute jumping, gliding, air and boat-model sport, competitions in "fox-hunting" and in radiotelegraphy, sending and receiving of messages at high speed and signalling on h.f. and v.h.f.

CYPRUS

The Cyprus Council of Ministers met on September 3, 1964, under the chairmanship of Archbishop Makarios and decided to cancel all amateur licenses. This decision was promulgated in the newspapers the following day. Two days later amateurs *outside* the British Sovereign Base area were visited by Police and Post Office Representatives and all their gear was impounded. No reason has been given and letters to official quarters have not been answered. Sovereign base stations are still active, with ZC4 calls but the I.Q.S.Y. beacon 5B4WR at Limassol is off the air. QST

Strays

The latest country to join the ever growing Boy Scout Jamboree on the Air was Mozambique. Pictured is the headquarters station of the Mozambique society, CR7BS, operated by CR7GQ with several of the chief scouts, from Lourenco Marques. Exchanges were made with 43 stations representing scouts in South Africa.

Correspondence From Members-

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

BUILD OR BUY

¶ In regard to the November article, "Do It, and Rue It," we were amazed that such a concoction of verbiage could possibly be construed as a prizewinning article. It is dismaying that any individual's self reliance could fall to such an abysmal depth that he would advocate to others the futility of indulging in a "do-it-yourself project, solely because there looms the possibility of failure. Let's face it! Whatever be the undertaking, there always looms the possibility an individual may not be successful. This is as it should be. No one should derive any pleasure catching fish from a barrel.

For those lacking in personal knowledge, and who do not have any desire to acquire knowledge, the government of the United States has very kindly set aside a portion of the spectrum referred to in some circles as "The Citizens' Band." Unfortunately, due to a lowering of standards, many of the above-referred to type individuals have infiltrated into the amateur bands and can now be heard loudly lamenting their lot instead of preparing themselves for what they must learn in order to retain their present privileges.

We feel that if such apathy regarding incentive and experimentation and construction continues, there is a strong possibility that in the future no major contributions to the art will come from amateur radio ranks, and only, as advocated in the article, from the professionals. It will eventually become obvious to the Federal Communications Commission, and the powers at Geneva Conferences that this is the case, and that no trained and competent operators are available from our ranks, and thus our value will have decreased, and we may ultimately expect to lose our privileges. — *W5QMJ and Paul D. Balbin*

¶ According to the definition of the word "amateur" I am an amateur radio operator. By this same definition, I am also an amateur designer and builder of radio equipment. I do not hire professional radio operators to do my operating for me, and I do not use professionally-designed and built equipment in my amateur radio station.

I do not say that all amateur radio operators should also be amateur designers and builders. Many do not have the ability, or even the desire for this, or their circumstances do not permit it, but I do hope that no one will be discouraged by K4KXR's article from discovering the real satisfaction of operating with his own self-designed and built equipment. — *W2LYH*

¶ Thanks for K4KXR's insightful article. After six years of League membership, I have finally been rewarded with a piece of writing coincident with my own feelings. This article has been a long time in coming, and should be made required reading for all amateurs. — *W1BPE*

¶ That article by Mr. Weinstein is very hurtful to amateur radio and I thoroughly disagree with anything so contrary to the reason for our existence. — *WN3.1XN*

¶ One need not be an expert in a field nor possess a host of tools and instruments to do a proper job. Knowing one's limitations in both tool and knowledge is necessary before tackling any job. For example I change points and plugs and overhaul the carburator in my car but I have neither the know-how or facility to disassemble the transmission or install a new rear main bearing.

It has come to a sad state of affairs when the ham whose receiver has gone defunct shrugs and ships it back to the factory. In the great majority of cases a v.o.m. check would turn up a bum tube, shorted capacitor or burned up resistor, particularly when the manufactor's manual contains a voltage and resistance chart. If these checks turn up nothing then is the time to recognize one's limitations and have the repair done. — *K3PWX*

¶ Much can be learned from books, but let's not fool ourselves, you must experiment to determine if it will work. If learning is as simple as K4KXR says, then the schools and universities are wasting a lot of time and money on laboratories. Try learning c.w. by book. I don't mean novice type c.w. but 10, 15, or 20 w.p.m. You know it can't be done. Experimentation is the very heart of the amateur spirit. Without it the ham is not a ham at all but a radio announcer or operator.

The fellow who has never built anything is missing something. This is how you learn. You learn that the connections must be good or the thing will not work. You learn that the antenna will radiate a 40-meter signal even if it is an 80 meter antenna and the rig tuned to 80-meters (this is usually learned via an OO or a "QSL" from the Fierce Communications Commission). You learn to keep your "pinkies" away from the key contacts. (You can get this from the book but you never quite learn it for real until you have touched the key, only once, with the high voltage on!) There are many things to be learned from books, but for gosh sakes, let's not try to learn everything from them.

The fellow who has never built anything is really afraid to try. That is, he is sure he will fail. Ever try to learn typing by reading the book? You can learn where the keys are, but when you sit at the thing it seems like it is a wee bit harder than the book said.

We are creatures of habit. You can read until you turn purple (or red or blue), but you will not retain as much as one trial, unless you are a genius. The way one learns is to do it over and over and over. You learn when there is something that will not work. Theory is fine, but what good is it if you never put it into practice? . . .

Amateur radio is for the tinkerer, experimenter and the curious. You didn't fool me, Bob, you don't really believe what you wrote. You just wanted to write a different type of article, like "man bites dog."

Good luck on your next building project, OB! — *W1AIDUL*

¶ There is one aspect in particular in which I am *in complete accord* with the author. That is, the matter of obtaining the necessary components prior to building a pet item for use in amateur radio. . . .

I have found it increasingly difficult to obtain various components to fill my needs from current catalogs and it is either forgetting the whole project, or placing an order then waiting from thirty to ninety days until it is back-ordered, received from the manufacturer and finally doled out to me. On several occasions I have taken the initiative and ordered direct from the manufacturer in order to alleviate a long waiting period. This is somewhat inconvenient if you have to deal with several manufacturers rather than a single source.

If the present short-sighted electronic supply houses do not need the radio amateur, we certainly don't need them. From the continual flattened appearance of my wallet, I could easily dispense with the middleman with no undue loss of sleep. — *W4LCY*

¶ K4KXR's article contains so many inconsistencies and *non sequiturs* that it must be considered as satire. Unfortunately it is rather too subtle to be effective. Rather than exposing the flaws in his own "position", K4KXR has probably converted others to it. He has also, incidentally, presented a superb case on behalf of the Citizens' Band "hobbyist." Heaven help amateur radio if hams adopt this attitude. — *WA6LBV*

¶ Nothing could have made me feel more depressed. Of course, you hand us that old line "We don't necessarily agree. . . ." Well that's a lie, you not only agree but give full sanction to this depraved way of thinking by making it a "Prize winning article."

Don't get me wrong, I have nothing against Mr. Weinstein. He's evidently selling radio transmitters or has stock in some company. It's his privilege to look after his own welfare.

The ones I blame are the group of leaders who are supposed to guide us in fulfilling the obligations which come along with the dignity of an amateur radio license. In order to attain the license we had to prove our knowledge of radio theory. The government had hopes that in our experimenting, testing, building and studying, we would find something which would improve the state of the art of radio communications.

There are a few of our group who feel a little "twinge of conscience" as they use their manufactured equipment. They know they're doing nothing to help. But now with that article digested they can feel perfectly justified. After all they did read it in *QST*.

Let us assure the members of the FCC that this kind of article does not represent the thinking of a quarter million amateurs whose avocation is technical radio. — *W3BDM*

¶ It may be interesting to note that the job-seeking ham is rapidly losing the edge which he once enjoyed in the electronic industry. One explanation seems obvious from reading Mr. Weinstein's article. — *W6LQR*

¶ K4KXR's over-all theme of abandoning home building, and letting the experts (who they may be still puzzles me) do it, is about as sensible as advising the millions of successful do-it-yourselfers in the home building and improvement fields, to go out and hire contractors for all their projects. Anyone familiar with the electronics industry knows that the *working* models are built by expert technicians, *not* by expert engineers (unless they are coincidentally technicians). And many hams qualify as expert technicians. This is mostly a self-taught science, at least I never heard of any homebuilding technical schools.

"Amateur service" is, or should be, as close as possible to the original intent of the law governing same, and fully 80% of Section 97 of the Communications Act of 1934 (specifically Paragraphs b, c, d, e), refer to technical skills, *not* "having fun". The fun is a by-product of engaging in our hobby, not an aim in itself. — *K9IAH*

¶ I thought that we were supposed to do a little experimenting and improve the state of the art. I have a "tech" license and I was under the impression that it was meant for the serious experimenter on the v.h.f., u.h.f., and s.h.f. bands. This is the reason that I got the license in the first place. I built my two-meter transmitter from scratch. I followed a few schematics but I made numerous modifications in the transmitter. I now have, thanks to a well stocked junk box and three junk television sets, a one-hundred-watt input, plate modulated transmitter that cost me about fifty dollars, including the 829B. If I had capacitors on hand that were a little off of the indicated value, I redesigned the coils to resonate with the capacitor I happened to have. This required no real skill; only a handbook with the formulas of coil inductances. In the past year I have made several modifications, again from junk box parts that have greatly improved its performance. No commercially made transmitter on the market today can give me the same power and operation for fifty dollars.

I have also built a radioteleprinter converter for about twenty dollars. It is not the best one available by any means, but I am free to make any modifications on it that I want without fear of ruining the resale value. Pricewise, even the surplus units cannot come close to my price.

I have not attempted to build a receiver (except a simple converter for 80 meters) because I don't have the skill to do it yet. However, I still have plenty of time for that. I'm a freshman in college and will not be very active for a while; however eventually I will be on the air with a homebrew receiver and it will be one of my own design. I feel sorry for the people who will use the K4KXR article to rationalize their own shortcomings and inabilities. Meanwhile I will continue to build all of my own gear. I still say it will work better in the long run. — *WA9FNS*

¶ "Do It and Rue It" has presented in print (in *QST* yet) the feeling of the majority of amateurs, oldtimers and newcomers alike, relative to scientific contributions toward the improvement of the state of the art.

This matter of the amateur being able to really contribute something toward the advance of the state of the art in the field of two-way communications is really absurd when you consider the fantastic amounts of time and money being invested on the subject by industry. It is difficult for a hobbyist to "invent" radios in competition with the Ph.Ds who spend their lives in this endeavor. As a matter of fact, amateur equipment is today several years behind commercial and military equipment capabilities.

I have frequently stopped in the middle of a building project (which are numerous) and wonder just

what it was I was trying to prove. In any case I am sure that K4KXR will receive many comments on this article and probably more in disagreement with him, (since this is the more "chic" stand these days), and I wanted to toss in my two bits in agreement. — *KØDOM*

¶ Regarding "Do It and Rue It", I will ignore the attempt of Mr. Weinstein to categorize "most" average hams to his apparent level of technical and mechanical competence and, in fact, defend his views, by inquiring why the editor omitted his C. B. license number. — *K4EDM*

¶ Many new comers to amateur radio start out with commercially built equipment with no desire to learn more than how to turn it on or off and tune the dial. For amateur radio to be a real national asset its participants should be required to show ability to set up equipment all the way from key or microphone to the antenna. They should also know enough about their equipment to be able to make minor repairs to enable them to keep it on the air in emergencies.

It seems that now all one needs is the money to buy the equipment. Most dealers will be glad to help you set it up and get it on the air. If something goes wrong with it you can take it back to the dealer for repairs.

This type of operation is depleting the reservoir of radio operators that so ably demonstrated their ability to keep communications going during World War II. — *W5FXV*

¶ Thank you for printing "Do It and Rue It" by K4KXR. I agree 100% with the author.

There are a host of hams who feel the same way. Bob had the time and the ability to write the article. A few of us will write to you that we agree.

A great number of hams, who gain a great deal of recreation out of amateur radio won't write an article or a letter. Their operations (SSB, phone with kit and commercial gear) varies between zero and six hours a week and they won't want to spare any of their operating time to write you.

These guys built some gear when they first got into the hobby; back when surplus was readily available and they look forward to retirement and some time to try their hand at it again. Meanwhile, a few QSO's a week and vicarious participation through the ham magazines is keeping them interested and happy. —

Please don't ignore this bunch! — *K7WTT/6*

¶ The author says "Consider the economic aspect." I do very much so, I have a triple conversion ham band receiver, complete with all the goodies which are valued, including Collins accuracy on freq. readout, and it cost me about $50. I have been offered $100 for it and won't sell it for that. That is pretty good re-sale value, isn't it? Better than your crummy 90%. Not only that, I had the satisfaction of learning something, 'cause it *didn't* work when I turned it on. That is the secret of learning in case you didn't know. It works now even though it did take me some time (spare time) to get it in good shape. Let's "consider the economic aspect." If you don't have ham friends who have boxes of what they call "junk", then you just don't have "friends." Almost any ham has unlimited supplies, if he has friends, for little or nothing, or don't they work that way in Florida?

Second, what are guys going to do when they decide to get on, let's say, 432 Mc? Do you wait until the manufacturers have gear to buy, or do you manage to build something to get on the air and have fun with? I would imagine that you are content to let the other guys hold up your end of the amateur radio game. Part of the preamble to the ham regs says something about a "service of self-training". How much training do you get out of buying a rig and being afraid to open the box? I am sure that TOM is turning over in his grave if he had a chance to read what you think a ham should be. — *K9SGZ*

¶ His last sentence reads, "Contributions to the science of electronics come from the theorists, the thinkers, the laboratories, not *from the assembly line.*"

I submit, the wheel would yet be undiscovered if we waited for the "specialists to develop and build the tools".

K4KXR is a fine example of an amateur *operator*, not a ham. Tune in on 20 meters and you hear thousands like him. — *VE3CGG*

¶ I feel that building some of my own gear is a very rewarding experience. Thus far, I have made only about five small units, but future plans call for much more elaborate homebrew gear.

I don't know where K4KXR goes for his parts — maybe Joe's TV repair shop — but perhaps if he would try some mail-order houses, he would get what he wants.

As for the junkbox — sure, much of what I attempt ends up in the junkbox — only to be picked out again for another project.

He mentioned the "hundreds of gadgets" on hand. I can't see how a shack can operate without some good test equipment. What happens when his transmitter (commercial type) breaks down? With what does he check it? A neon bulb? Or does he send it back to the factory and "let the experts do it?" — *WA4HQW/9*

¶ The author talks of "Do it yourselfers" and refers to doctors, lawyers, teachers, plumbers electricians, barbers, and so forth. I wonder if he thinks that a lawyer does not take advantage of what he knows to further his cause, if the need should arise? Does the plumber well-versed in his trade, call in another plumber, or possibly the electrician calls in another to repair a light switch? Does the true amateur call in a professional when trouble arises? Never! He gets out the old trusty *Handbook* to get what he doesn't remember, and sets to work repairing that rig, whether it be a homebrewed rig or a commercially built one. I may add, you can rest assure that it will be back on the air, long before any depending on the guarantee!

Amateur radio originated for the purpose of allowing anyone, who shows and proves his ability to build, experiment and communicate with and by radio frequency media. If the first amateurs had not stepped forward and proved themselves, there would be no amateur radio today. They did not do this by only socializing; they donned their patched overalls and experimented and contributed to the science of electronics. — *WA4GRB*

¶ You can never beat experience. One can learn from studying but never learn what experience can teach you. There are just some things that are not in books. — *K4WOP*

¶ Over the last eighteen months, this is a small summary of what I did: I built a three-band Bi-Net or Tri-Net, for mobiling, after a design written up by

a Johnson engineer back in 1955. It really worked after

I rebuilt my mobile antenna tuner to allow for remote tuning on 80, 40 and 20 with the Tri-Net, giving me coverage of most of these three bands without changing antennas and to check s.w.r.,

I built a dual meter indicator for the s.w.r. bridge, with a lamp for night-time illumination, and about that time

I tore out the a.m. mobile gear, which included t.-r. switching for c.w. break-in operation, and a crystal filtered receiver, and I put in a s.s.b. transceiver to which

I added a transistorized side-tone oscillator for reading my c.w. keying, and a 100-kc. calibrator originally provided for and then

I built a completely shielded ignition system for my auto, about three times over before being completely successful,

Then I built a phased array of three sixty-foot aluminum towers for 80-meter work, erecting them all by myself and installing over two thousand feet of radials for a ground system, and

I learned to splice RG-17/U coaxial cable, so I could run 275 feet of it, along with control lines, in a ditch I dug to a central box for this array, where

I installed a relay control box and matching network, allowing directional control in thirty degrees increments around the compass and giving a low-standing wave ratio for work all across the 80-meter band, push-button controlled from the shack, and to compare something else in the way of a vertical with this array,

I built a matching network to feed my fold-over tower with 20-40 meter beam, on both ends of 80 meters, and also

I laid a new coaxial cable of RG-17/U to feed this beam, replacing a previous RG-17/U of improper impedance (even cable manufacturers make mistakes) and then

I built a new coax switch with a grounding contact to short out all unused antenna inputs to reduce unwanted signals degrading directional antenna performance, and

I made up a new relay control box for the rotator on my 20-40 meter beam, giving a small time delay between reversals to avoid "plugging" the motor by reversing it too fast and

I modified my remote antenna tuner for my long-wire antenna system to work on 160 meters as well as 80, 40, 20 and 15 meter bands and,

I went on vacation, only to find when I returned home, that in addition to my telephone line and several trees, a tornado had knocked down my sixty-foot fold-over tower with 20-40 meter beam and vertical radiator tuning system so

I spent the next two months salvaging such items as were usable, getting repair parts and I re-erected this tower and beam all by myself, involving ladders, gin-poles, hundreds of feet of rope, block and tackle, and a couple of hundred small tools and now that's done

I am going to take off a couple of weeks and hope things stay together until the contest season arrives this fall.

Oh yes, I managed to work nearly six hundred contacts in two hundred and fifty band-countries during the ARRL DX contest last winter.

So you see, while I haven't built any transmitters or receivers lately, I haven't given up construction completely.

So what else is new? — *W9ERU*

FLORIDA STATE CONVENTION

Miami January 23-24

The Florida State ARRL Convention will be run in conjunction with the sixth annual "Tropical Hamboree" on Saturday and Sunday, January 23 and 24, at the Miami Municipal Auditorium in Bayfront Park. The program will have something for everyone, including manufacturers' exhibits, a home-brew exhibit and contest, swap shop and auction, and technical talks by outstanding speakers in the field, including *QST* technical Editor George Grammer, W1DF. For those primarily interested in operating, there will be meetings of MARS, DXers and the Quarter Century Wireless Association, as well as ARRL organizational meetings, a code speed copying contest and a transmitter hunt on ten meters.

Festivities will include a banquet Saturday evening at the Everglades Hotel, at which the guest speaker will be Rev. Daniel Linehan, W1HWK, noted "earthquake priest". The banquet will be followed by a Royal Order of the Wouff Hong initiation ceremony.

Headquarters for out-of-town guests will be the Everglades Hotel at 244 Biscayne Boulevard; special rates will be as follows: single rooms, $8; doubles, $12; suites, $22. Convention/Hamboree registration fee is $1; banquet tickets, $4.95. For tickets, hotel reservations or further information, write to the Dade Radio Club, Inc., P.O. Box 73, Biscayne Annex, Miami, Florida, 33152.

COMING A.R.R.L. CONVENTIONS

January 23-24, 1965 — Florida State, Miami
February 20, 1965 — Michigan State, Muskegon
March 26-28, 1965 — Delta Division, Memphis, Tennessee
April 24-25, 1965 — New England Division, Swampscott, Mass.
July 2-5, 1965 — ARRL National, San Jose, Calif.
July 9-11, 1965 — West Gulf Division, Oklahoma City, Oklahoma

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Hamfest Calendar

New Jersey — On January 16, 1965, the Raritan Bay Radio Amateurs will hold their annual Christmas party in Sayreville, New Jersey. For details contact Richard Day, WA2JMV, RBRA, P.O. Box 73, Sayreville, New Jersey.

New York — The 17th Annual Dinner Dance of the Suffolk County Radio Club will be held at Land's End Inn, located at 80 Brown's Road, Sayville, L.I., New York, on Saturday January 16, 1965, at 7:30 P.M. Dinner will be prime ribs of beef. Tickets are $5.00. For further information and reservations write Art Rauch, W2DID, 451 Smith Street, Central Islip, L.I., New York.

Election Results

Commemorative Stamp

Exam Schedule

DIRECTOR ELECTION RESULTS

The contested portion of the ARRL autumn elections has resulted in the re-election of two directors and two vice directors, the election of three new directors and three new vice directors, and — for the second time in ARRL history — a tie vote in a director election.

The tie occurred in the Hudson Division, where Harry J. Dannals, W2TUK and Howard W. Wolfe, W2AGW each received 2426 votes for director, out of a potential 8500 ballots sent to members. Following the precedent established in 1944 (when Percy C. Noble, W1BVR and Frank L. Baker, Jr., W1ALP posted a 435-vote deadlock in the New England Division director election), the Executive Committee ordered a second balloting between the two candidates. Ballots were scheduled for mailing from headquarters during the first week in December, to members of record on November 20. The completed ballots must be in the League's offices before noon on January 20 in order to be counted. In the meantime, retiring Director Morton B. Kahn, W2KR, continues in office, under By-law 6. His present address is: 1150 S.W. Cypress Way, Boca Raton, Florida, 33432.

P. Lanier Anderson, Jr., W4MWH, director of the Roanoke Division since 1953, was returned to office by 1211 votes to 934 for Bannie L. Stewart, W4CE. In the Rocky Mountain Division, **Carl L. Smith, WØBWJ,** defeated Robert B. Miller, W7QPP 685 to 258 votes.

New England members chose **Robert York Chapman, W1QV,** of Groton, Conn., as director, giving him 1468 votes to 1427 for the four-term incumbent, Milton E. Chaffee, W1EFW. The new director earns his bread as director of the Acoustical Research and Development Division, U. S. Submarine Base, Groton. He is a Life Member of the Tri-City Radio Club, and has served as its president, activities manager and (for seventeen consecutive years!) as chairman of its annual New London Hamfest. He put in several years as director of Civil Defense for the Town of Groton. First licensed in 1924, OM Chapman is a member of the A-1 Operator Club, and holds ARRL appointments as Official Phone Station and Official Bulletin Station.

In November *QST* we mentioned that Northwestern Division Director R. Rex Roberts had chosen to run for vice director this time, and has been declared elected by reason of being the only candidate. To take his place as director, Northwestern amateurs picked the current vice director, **Robert B. Thurston, W7PGY,** of Seattle. The tally was 1068 to 659 for Herman F. Helgesen, W7AIB. In addition to serving as vice director for the past four years, OM Thurston has been Section Communications Manager of the Washington Section since 1958. He is trustee, past president, past secretary and past treasurer of the North Seattle Amateur Radio Club. W7PGY is Phone Activities Manager for Washington, and holds appointments as Official Relay Station, Official Phone Station and Official Observer. He's a member of the Air Force MARS, AREC, and the A-1 Operator Club. Licensed since 1951, Director Thurston is employed at the Naval Air Station, Seattle, as a telephone installer and repair man.

No procedures at headquarters are more exacting than the operations connected with the counting of ballots in elections for director and vice director. Unopened ballot envelopes are stored in a locked cabinet from the day they arrive until ballot-counting day, November 20. On counting day more than a dozen League employees drop their regular work to act as clerks to the Tellers. In the photo at left, clerks at one table are removing ballots from the inner envelopes, while at the other table director and vice director ballots are separated and stacked in order. Before this stage all outer envelopes have been removed, assuring a secret ballot for every member.

At the right, clockwise from the center, Tellers Noel B. Eaton, Charles G. Compton and Wayland M. Groves, Alternate Tellers David H. Houghton and F. E. Handy sort the ballots by candidate, and check each other's work by passing stacks back and forth. Standing at the left is John Luft, a certified public accountant from the firm of Ernst and Ernst, checking the ballot count with a Tickometer, a machine which counts paper with such accuracy it is used in banks to count currency.

Southwestern Division members gave **Howard F. Shepherd, Jr., W6QJW,** of Los Angeles, 2060 votes to 1810 for Ray E. Meyers, W6MLZ, director since 1959. W6QJW, a partner in the law firm of Shepherd and Shepherd, was vice director in 1961–1962 and has served as an assistant director for the rest of the time since 1959. He's presently a director of the Western Single Sideband Association and of Project Oscar, and has been president of the 50 Club of California. Howard is legal advisor and a past chairman of the Los Angeles Council of Radio Clubs and is Region I Radio Officer, California Civil Defense. His hamming dates back to 1938.

On the vice director side of the ballot, there was a six-way scramble in the Central Division with **Edmond A. Metzger, W9PRN** of Springfield, Illinois, emerging with the laurels. The race looked like this:

Edmond A. Metzger, W9PRN	1046
G. Wiley Bergman, W9CA	828
Sidonius M. Pokorny, W9NRP	509
William H. Siebenmorgen, W9IHO, GFV	473
Everett L. Hanna, W9NWK	395
Adrian Z. Hodson, W9HOT	79

The winner is auditor for the Kerasotes Theatres. OM Metzger has been an assistant director of the Central Division and SCM of the Illinois Section since 1957. He has been president and secretary of the Sangamon Valley Radio Club, Inc., and is trustee of W9DUA. W9PRN was general chairman of the 1961 Central Division Convention held in Springfield. He's a member of RACES and AREC and holds appointments as Official Bulletin Station and Official Experiment Station.

The Hudson Division vice director contest pitted **Stan Zak, K2SJO** against his call-mate and Hudson Amateur Radio Council colleague, Graham Berry, K2SJN. Mr. Zak received 2577 votes, Mr. Berry, 2192. The new vice director, who is an engineer for the New York Telephone Company and resides in Port Chester, was chairman of the 1962 Hudson Division Convention and co-chairman of the 1964 National Convention. OM Zak is a director and past secretary of the Westchester Amateur Radio Association and has been editor of its paper, *The Bandspread.* He is assistant communications chief for Port Chester-Town of Rye Civil Defense, and served on the New York State call letter license plate committee.

Teaming up with incoming Director Shepherd in the Southwestern Division is another man well versed in law, the Honorable **John F. Martin, W6ECP,** Presiding Judge of the Municipal Court within the San Diego Judicial District. The judge lives in Encinitas, California and has been licensed since 1928. He served as president of the Palomar Radio Club. The new vice director ran up 2040 votes in the election while his opponent, incumbent Virgil Talbott, W6GTE tallied 1821.

In the Roanoke and West Gulf Divisions, incumbent vice directors won re-election. The Roanoke's **Joseph F. Abernethy, W4AKC** received 1075 votes as against a close 1055 for L. Phil Wicker, W4ACY, to continue in the office he's held since 1959. **Ray K. Bryan, W5UYQ,** won a third term as vice director of the West Gulf Division, beating Favian M. Adair W5FKE by 1062 votes to 795.

Directors **Philip E. Haller, W9HPG** of the Central and **Dr. R. O. Best, W5QKF,** of the West Gulf and Vice Directors **Bigelow Green, W1EAE,** of New England, **R. R. Roberts, W7CPY** of the Northwest and **Col. John H. Sampson, Jr., W7OCX,** of the Rocky Mountain Division were the only eligible nominees for their posts, and thus were earlier declared elected without membership balloting, as was reported in the November issue of *QST*. All of the elections are for the term from noon of January 1, 1965 until noon of January 1, 1967.

EXTRA CLASS "WALLPAPER"

The special Extra Class certificates are still being used, but it now is necessary in most cases to request the certificate by letter from the District FCC Engineer-in-charge. A photocopy of the Extra Class license card should be attached for ready handling.

All grading is done at Gettysburg and actual license issuances are from Washington; thus, it is not possible for the field personnel to issue the certificate automatically.

COMMEMORATIVE STAMP ISSUED

Too late for inclusion in the December issue, the Postmaster General announced that the commemorative stamp honoring amateurs would be placed on sale at Anchorage, Alaska, on December 15, 1964, and in all other post offices on

December 16. The design, a simple symbolic one of dials and wave-forms, is adapted from one submitted by Emil Willett, a Hartford commercial artist who has done considerable work for *QST*. Anchorage was chosen as the first-day city to honor amateurs for the emergency communications work carried on after the Good Friday, 1964, earthquakes.

Some 30,000 orders for official ARRL first day covers have been received as we write. All will receive the special first day cancellation, despite the distance from ARRL headquarters.

In a later issue we expect to report on first-day ceremonies in Washington and Anchorage on December 15, plans for which are not complete at press time. We would also hope to receive photographs of local ceremonies sponsored by radio and stamp clubs on December 16, the best of which we will include in *QST* coverage of the stamp story.

In the meantime, may we suggest that amateurs lay in a good supply of the stamps for future casual use.

A.R.R.L. STAFF NOTES

The Ten Year Club at headquarters met recently to congratulate George Grammer, W1DF and General Manager John Huntoon, W1LVQ, on their years of service to the League, 35 for "GG" and 25 for "JH." At the same time, the club welcomed two green recruits each with a mere 10 years' service at headquarters, Technical Assistant Laird Cambell, W1CUT, and Senior Assistant Secretary Perry F. Williams, W1UED.

At the meeting, the general manager announced that Laird was being promoted to Assistant Managing Editor, and, beginning with the December issue would be the man primarily responsible for nuts and bolts of *QST* production. The post had been vacant since Ed Mehnert, K1EUK, entered Officer Training School for the USAF in June. Laird left W5TQD in Pampa, Texas ten years ago to work in the ARRL Communications Department, later switching to the Technical Department, where he has been editor of Hints and Kinks, Recent Equipment, liaison man between the Technical and Advertising Departments, and author of many articles on mobile noise, transistorized rigs and gadgets.

Douglas Blakeslee, W1KLK, joined our staff as a technical assistant direct from five years as an electronic technician in the USAF, during which he operated for part of the time as F7DB. Doug's initial responsibilities have been in the design of multi-purpose exciters for the revamped W1AW.

Charles Utz, K1QNF, who worked part-time for the League during his studies at the Ward School of Electronics now has joined the full-time staff as a technician at W1AW, also being involved extensively in the renovation work there.

EXAMINATION POINTS CHANGE

The Federal Communications Commission has recently made some changes in its schedule of amateur examination points. Amarillo, Texas, has been deleted from the list of points at which exams are given once a year. In its place, there will be two exams a year at Lubbock, Texas, the first scheduled for May 13, 1965. El Paso, Texas, has been changed from an annual point to a semi-annual; there will be tests on May 18, 1965. The FCC Marine Office at San Pedro will no

Director Carl L. Smith, WØBWJ, of the Rocky Mountain Division each year makes available PICON Plaques to the amateur having done the most in the "public interest, convenience and necessity" from the initials of which phrase the award gets its name. The Utah PICON Plaque for 1964 goes to Kenneth Gfeller, K7MPQ (at right) for his extraordinary devotion and loyalty to the Beehive Utah Net. The presentation was made by Vice Director John H. Sampson, Jr., W7OCX, (left) while Mrs. Gfeller, alias June, K7NCA, looks on (*Photo by Beverly Spencer, Moab.*)

longer offer examinations for commercial and amateur licenses, though restricted radiotelephone permits will still be handled. The Commission feels that the testing facility is not necessary at San Pedro in view of its proximity to the district field office at Los Angeles, where examinations continue to be available on Wednesdays. The complete examination schedule for January through June, 1965, appears later in this department.

EXAMINATION SCHEDULE

For the convenience of those planning to take an FCC examination for General or Extra Class license, we present below a tentative schedule of dates and places for the first half of 1965. All examinations begin promptly at 9 A.M. except as noted. IMPORTANT: New rules require that an applicant submit his application Form 610 (January 1964 revision) *in advance*, particularly when he wishes to appear at one of the field points. The application, accompanied by a check or money order for $4.00, should be sent to the Engineer-in-Charge of the district in which the applicant resides. Where the schedule below indicates a choice of dates or places, the applicant may indicate his preference. The District Engineer will then notify the applicant when and where to appear. (Applicants for Novice, Technician or Conditional Class licenses should follow the new procedures outlined on page 79 of December, 1963 *QST* or in current editions of the *License Manual*.)

Albuquerque, N. M.: April 12 at 1:00 P.M.
Anchorage, Alaska, 55 U. S. Post Office Bldg.: By appointment.
Atlanta, Georgia, 2010 Merchandise Mart, 240 Peachtree St., N.E.: Tuesday and Friday at 8:30 A.M.
Bakersfield, Calif.: Sometime in May.
Baltimore, Md., 415 U. S. Customhouse, Gay and Water Streets: Monday and Friday, 8:30–10 A.M. and by appointment.
Bangor, Me.: May 12.
Beaumont, Texas, 301 P. O. Bldg.: Tuesday by appointment only.
Billings, Montana: Sometime in May.
Birmingham, Ala.: March 4, June 3 at 1 P.M.
Boise, Idaho: Sometime in April.
Boston, Mass., 1600 Customhouse: Wednesday through Friday 8:30–10 A.M.
Buffalo, N. Y., 328 P. O. Bldg.: 1st and 3rd Fridays.
Charleston, W. Va.: Sometime in March and June.
Chicago, Ill., 1872 U. S. Courthouse: Friday.
Cincinnati, Ohio: Sometime in February and May.
Cleveland, Ohio: Sometime in March and June.
Columbus, Ohio: Sometime in January and April.
Corpus Christi, Texas: March 4, June 3.
Dallas, Texas, 1314 Wood St., Room 707; Tuesday, 8 A.M.–1 P.M.
Davenport, Iowa: Sometime in January and April.
Denver, Colo., 521 New Customhouse: 1st and 2nd Thursdays, 8 A.M.
Des Moines, Iowa: Sometime in March and June.
Detroit, Mich., 1029 Federal Bldg.: Wednesday and Friday.
El Paso, Texas: May 18.
Fairbanks, Alaska: Sometime in May.
Fort Wayne, Ind.: Sometime in February and May.
Fresno, Calif.: Sometime in March and June.
Grand Rapids, Mich.: Sometime in January and April.
Hartford, Conn.: March 10.
Honolulu, Hawaii, 502 Federal Bldg.: Tuesday through Thursday, 8–9:30 A.M., and by appointment.
Houston, Texas, 5636 Federal Office Bldg., 515 Rusk Ave.: Tuesday, 8 A.M.
Indianapolis, Ind.: Sometime in February and May.
Jackson, Miss.: June 2 at 1 P.M.
Jacksonville, Fla.: April 21 and 22.
Kansas City, Mo., 3100 Federal Office Bldg.: Thursday and Friday, 8:30–11 A.M.
Klamath Falls, Ore.: Sometime in May.
Knoxville, Tenn.: March 17, June 16, 1:00 P.M.
Little Rock, Ark.: February 3, May 5, 1:00 P.M.
Los Angeles, Calif., 849 So. Broadway: Wednesday, 9 A.M. and 1 P.M.
Louisville, Kentucky: Sometime in February and May.
Lubbock, Texas: May 13.
Marquette, Mich.: May 5, 1 P.M.
Memphis, Tenn.: January 7, April 8 at 8:30 A.M.
Miami, Fla., 51 S.W. First Ave.: Thursday.
Milwaukee, Wisc.: Sometime in January and April.
Mobile, Ala., 439 U. S. Court and Customhouse: Wednesday by appointment.
Nashville, Tenn.: February 3, May 5, 1 P.M.
New Orleans, La., 608 Federal Bldg., 600 South St.: Monday at 8:30 A.M.
New York, N. Y., 748 Federal Bldg., 641 Washington St.: before noon, Tuesday through Friday.
Norfolk, Va., 405 Federal Bldg.: Friday only, 9–11 A.M.
Oklahoma City, Okla.: January 15, April 16.
Omaha, Nebr.: Sometime in January and April.
Philadelphia, Pa., 1005 New U. S. Customhouse: Monday through Wednesday, code tests 9–10 A.M.
Phoenix, Ariz.: Sometime in January and April.
Pittsburgh, Pa.: Sometime in February and May.
Portland, Maine: April 13.
Portland, Ore., 441 U. S. Courthouse, 620 S.W. Main St.: Friday, 8:45 A.M.
Rapid City, S. D.: May 15, 11 A.M.
Roanoke, Va.: April 3, 9 A.M.–4:30 P.M.
St. Louis, Mo.: Sometime in February and May.
St. Paul, Minn., 208 Federal Courts Bldg.: Fri., 8:45 A.M.
Salt Lake City, Utah: March 12, June 11, 1 P.M.
San Antonio, Texas: February 4–5, May 6–7.
San Diego, Calif., Fox Theater Bldg.: Wednesday, by appointment.
San Francisco, Calif., 323-A Customhouse: Friday, 8:30 A.M.
San Juan, P. R., 323 Federal Bldg.: Friday.
Savannah, Ga., 238 P. O. Bldg.: By appointment.
Schenectady, N. Y.: March 10 and 11, June 9 and 10, 9 A.M. and 1 P.M.
Seattle, Wash., 806 Federal Office Bldg.: Friday.
Sioux Falls, S. D.: March 2, June 8, 1 P.M.
Spokane, Wash.: Sometime in April.
Syracuse, N. Y.: Sometime in January and April.
Tampa, Fla., 759 Federal Office Building, 500 Zack Street: By appointment.
Tucson, Ariz.: Sometime in April.
Tulsa, Okla.: January 13, April 14.
Washington, D. C., 1101 Pennsylvania Ave., N.W.: Tuesday and Friday, 9:30 A.M. and 1 P.M.
Wichita, Kansas: Sometime in March.
Williamsport, Pa.: Sometime in March and June.
Wilmington, N. C.: June 5, 9 A.M.–4:30 P.M.
Winston-Salem, N. C.: February 6 and May 1, 9 A.M.–4:30 P.M.

NOTE: Only General Class and Amateur Extra Class license examinations are given at FCC offices and examining points listed above. All examinations for Novice, Technician and Conditional Class licenses are conducted by volunteer supervisors.

MINUTES OF EXECUTIVE COMMITTEE MEETING

No. 301

November 21, 1964

Pursuant to due notice, the Executive Committee of The American Radio Relay League, Inc., met at the headquarters office of the League in Newington, Connecticut, at 9:35 A.M., November 21, 1964. Present: First Vice President W. M. Groves, in the Chair; Directors Milton E. Chaffee, Charles G. Compton, Robert W. Denniston, and Noel B. Eaton; General Manager John Huntoon; Vice President F. E. Handy; and Treasurer David H. Houghton. Also present were General Counsel R. M. Booth, Jr., and Assistant General Manager Richard L. Baldwin.

On request of Mr. Eaton, RULED, by the Chair, that the Executive Committee recess to provide opportunity for a further meeting of the Committee of Tellers in the current League elections. The Executive Committee accordingly was in recess from 9:40 A.M. to 11:30 A.M. At this point the Committee of Tellers presented its report of results in the division elections.

In view of the tie existing in the Hudson Division director election, on motion of Mr. Chaffee, after discussion, unanimously VOTED that a re-balloting be conducted in the said division between the same two director candidates, on ballots to be mailed, during the first week of December, to the division full membership of record November 20, specifying a closing date for receipt of ballots of January 20, 1965, with the result to be determined as quickly thereafter as possible.

On motion of Mr. Denniston, unanimously VOTED that Charles G. Compton, W. M. Groves and Noel B. Eaton, with F. E. Handy and David H. Houghton as alternates, are appointed a Committee of Tellers to count the aforementioned ballots.

On motion of Mr. Huntoon, unanimously VOTED to grant approval for the holding of a Michigan State Convention in Saginaw on March 19-20, 1966.

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

Ala. & Ga. Amateur Radio Club	Tuskegee, Ala.
Albert Lea Spiderweb Amateur Radio Association	Albert Lea, Minn.
The Amateur Communication Club of North Texas	Denton, Texas
Amateur Radio Club of Florida	St. Petersburg, Fla.
Catamount Radio Club	Bennington, Vt.
General Dynamics/Astronautics Recreation Assn. Amateur Radio Club	San Diego, Calif.
Glendale High School Amateur Radio Club	Glendale, Arizona
Hub City Ham Club	Hattiesburg, Miss.
N.Y. Ionosphere Busters Radio Club	New York, N.Y.
The Nichols School Radio Club	Buffalo, New York
Princeton YMCA Radio Club (Senior)	Princeton, N.J.
Six Meter Club of Chicago, Inc.	Chicago, Illinois
West Covina High School Amateur Radio Club	West Covina, Calif.

On motion of Mr. Eaton, after discussion, unanimously VOTED that to cover the cost of further modifications approved by the Committee in the rehabilitation of the Maxim Memorial Station, the General Manager is authorized to incur additional expenses in station and antenna construction but not more than $10,000.

On motion of Mr. Denniston, unanimously VOTED that the League abstain on IARU Proposal 109-A, relating to the postponement of a decision on membership acceptance of the China Radio Association.

The Committee was in recess for luncheon from 1:15 P.M. to 2:10 P.M.

On motion of Mr. Chaffee, after discussion, unanimously VOTED that the General Counsel is directed to file comment of the League in Docket 15640, supporting the FCC proposal to restrict geographical areas where residents may apply for Conditional Class amateur licenses.

On motion of Mr. Denniston, after discussion, unanimously VOTED that the Secretary is directed to contact the Jamaica Amateur Radio Association urging action with that administration to clear the lower portion of 144-146 megacycles of non-amateur operation, so as to prevent possible interference to the eventual Oscar III operation.

During the course of its meeting the Committee discussed, without formal action, election processes, privileges in 1800-2000 kc., Oscar III, radioteletype, League finances and investments, intruders in the amateur band, the commemorative stamp, and (extensively) international telecommunications regulatory matters.

There being no further business, the Committee adjourned at 8:10 P.M.

JOHN HUNTOON
Secretary

January 1940

. . . Headquarters staffers George Grammer and By Goodman joined forces on a technical article on "Wide-Band Frequency Modulation in Amateur Communication." Applications and advantages of f.m. over the more conventional a.m. communications of the day were presented, along with practical descriptions of equipment.

. . . Among other technical articles were a theoretical investigation of the possibilities of image rejection and gain through the use of regeneration in regenerative preselectors ("Regeneration in the Preselector", by G. H. Browning) and "The Triangle Antenna", by James Arnold, W6QCC, an antenna hose directivity was controlled by phasing instead of mechanical means.

. . . A challenge was presented to the u.h.f. enthusiasts: "What enterprising amateur operator using any u.h.f. bands will work most states from the beginning to the very end of 1940?" Three solid-bronze medallions were to be awarded to the lucky and proficient winners.

. . . An interesting "Switch to Safety" note reported the results of some experiments by Underwriters' Laboratories to determine the maximum current that an individual could withstand for a short time and still have voluntary control of his muscles — such that he could drop an electrode or pull away from a contact. The maximum current that any individual could withstand was 10 ma., the minimum 6 ma., the average 7.8 ma. Using pliers held in each hand as electrodes, the maximum voltage that any subject could take and still release was 40 volts a.c., the average 27.8 volts. One conclusion made by the doctor in charge: regardless of the general health of the men, anything over 12 volts was dangerous under wet conditions! QST

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

How:

We offer a modest New Year's resolution for your consideration and signature this month. Nothing drastic. Nothing like trying to be A-1 Ops or 100-per-cent QSLers.

As you know, quite a few overseas-sponsored DX contests will be on the 1965 operating activities calendar. They're promoted by amateur societies much like your ARRL. When their official announcement reaches us in time for publication (two months in advance is the safe minimum) we're pleased to pass along participation data to help you join the fun. You probably don't enter these DX parties to "win": more likely you just take test QSOs as they come along, interspersed with other contacts. But you'll perhaps agree that these affairs do offer operating incentive and stimulate DX activity.

Much time and perspiration go into the preparation, presentation and scoring of a DX contest, even "automatics," annual traditions like the VK/ZL and German WAE tests. The events, judging by ear, appear to become more popular each year. But there seems to be an over-all trend toward smaller percentage of filed log entries from some parts of the world, ours in particular. In a given test we've heard hundreds of W/K/VEs swapping serials, only to find just a dozen or less showing up in the official tabulation as having submitted summaries or check logs to the sponsoring society.

This decline could bring about contest diminution or even discontinuance, because these receipts are the only tangible yardstick for measuring contest interest. Indeed, apparent apathy in this regard among phone DX enthusiasts in recent years has caused some foreign-sponsored contests to become or remain c.w.-only competitions. Sure, conditions have been grim. You may have poked around for hours in the French Contest and come up with only two F8s. Or only one. Bands almost kaput that week end — *some* contest. Next year's may be different. But next year's test may depend upon interest recorded this year. Did you vote?

Paperwork can be a nuisance, we'll agree. Most hams are hard put to keep up with QSLing and minimal FCC logging requirements. Some of us intend to make log transcripts and file contest reports but we just never get around to it. Results often don't seem to justify the effort, anyway. Who really cares about our measly handful of QSOs?

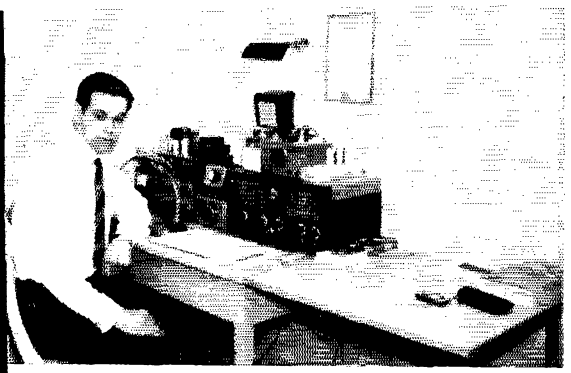
Well, OM, the sponsors care, and their concern becomes your concern. Let's try to give them a better break this year and henceforth. If not formal entries, how about check logs to give evidence of your interest? Hardly any extra effort involved. Just slip carbon paper and a second sheet behind your log page(s) covering the period of a given DX contest. When the fracas is over, slip out the carbon copies, red-pencil your test QSOs, bundle it up and ship it to the sponsoring society. Of course, if you expect to rate a chance for certificate recognition you should follow this up with the usual clear transcript and scoring summary.

How about it? Let's make it a happy and busy New Year for those overseas contest committees!

What:

Hark! There seems to be a faint bouquet of curious expectancy in the DX air as we bid 1964 adieu and welcome the new year. Our propagational toboggan ride toward steadily worsening high-frequency conditions — fewer and fewer ionosphere-producing sunspots — is just about at the end of the line! No, we're not going to wake up one morning soon and find all continents cluttering 28 Mc. But we *are* almost to the point where the only way the m.u.f. can go henceforth is up. Granting this, there are two big questions: How fast, and how far up? As 1965 unfolds we should get some inkling of the answers. Meanwhile, there's still rough sledding ahead. The "How's" gang takes this portentious situation with their usual aplomb. . . . "The bottom of the sunspot cycle is at hand. Will we get the outstanding 160-meter conditions hoped for?" — *W1BB*. . . . "Almost daily openings on 21 Mc., mainly to Africa." — *K3ZXG*. . . . "Not many useful kc. here on 80 and 40. More cross-town work on 10 and 15 would see more band openings put to use." — *DL4IO*. . . . "Went back to the Windom and things are looking up on 40 and 20." — *W6VKS*. "Eighty's been fair to good but 40 dropped into the mud for me." — *W7DJU*. . . . "Eighty and 160 are making a comeback after following a lively September with a flop in October." — *K5JVF*. . . . "Europe really rolls in on 7 Mc. beginning at 2100 GMT or so." — *WA4OYX*. . . . "Better conditions on 14 Mc. but high school homework

*7862-B West Lawrence Ave., Chicago, Ill. 60656

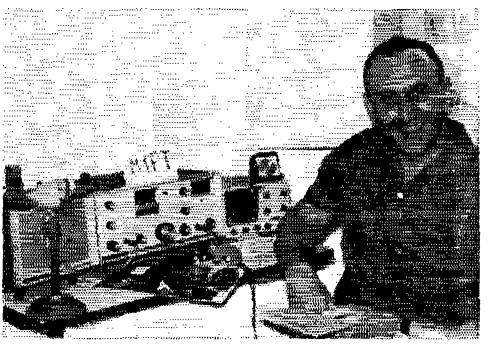


OHONF uses a cozy attic corner for his ham shack in the Aland islands. Edgar works as a radio/TV technician between frequent sessions on 14-Mc. c.w. (Photo via W3XNB)

holds me down." — *WB6ITM*. . . . "I'm now active on 7 Mc. for the first time since 1957, a fine DX outlet after 15 and 20 go out." — *W3HNK*. . . . "Africa's been peaking on 15 at 1900 GMT." — *K9JPL*. . . . "Some goodies are hitting the west coast despite generally poor conditions." — *W6HCT*. . . . "How's DX? Poor here — but interesting." — *WB8FVD*. . . . "Daily 21-Mc. openings to JA VK and ZL from my QTH." — *K6OVF*. . . . "I'm still learning when to expect openings on 15 and 20 here. It's far different from Hawaii." — *KA2TP*. . . . "The advent of autumn 21-Mc. openings made activity a little wild." — *K7QXG*. . . . "Modest power *can* get out on 20, even on Saturdays." — *WA8MAT*. . . . "DXpedition conditions were spotty but generally fair on 14 Mc." — *FL8AK*. . . . "Good to hear fall come through with long-path Africans and loud VKs in the A.M. on 20." — *W1YYM*. . . . "When I get 14 Mc. almost to myself on a week day the band is flat. Naturally, plenty of DX shows up on hot week ends when competition is fierce!" — *WA6ABG*. . . . "Remember Maxim: 'When the work's all done and the band is flat, let the cat sleep and read *QST*.' " — *W6EAY*. . . . Which means we had better get something together for your reading pleasure. What say to a look at

20 c.w. where correspondence from **Ws** 1ECH 1YYM 3HNK 3ZNB 5VSQ 6BCT 6EAY 6KG 6YKS 7DJU 8TRN 8YGR, **Ks** 1MOD 3UXY 4TWJ 7QXG 7TNY ØJPL, **WAs** 2EFN 2UJM 2UQQ 2WIJ 4JJY 4TLB 5ABG 5ESW 5HS 6VAT 8MAT 9AUM ØDGH ØJCA, **WBs** 2BAL 2CAN 2FIT 2JJK 6CUU 6HTM 6IFC 6ITM 6MOS, **HER**, **DL4IO** and **KA2TP** specifies current or recent action by **AP5s** HQ (*14,060 kc.*) *1400 GMT*, JA (52) 12, **BY1PK** (15) 12, **CEs** 8CF (55), 9AG, **CM2AV**, **CNs** 2AQ (66) 21, 8GB, **COs** 2FA (10), 2JB 2RC 2XX 6AH, **CPs** 5AB 5EM 5EZ 8AM (47) 23, **CRs** 6AI 6CA 6DA (120) 20, 6DB 6FY 6JJ 6LA (45) 21, 7CD 7CI 7IZ (4), 9AH 12-13, **CTs** 1CB (11) 23, 3AE (62), 3AM, **CX7AP** (78), **DMs** 2ACO 2AND 2ATL (31) 15, 2BJD, 2CBN (50), 2CGH (15) 21, 3XFN, **DUs** 1GF 1OR (60) 8, 1VM 5DM (18) 23, **EA6AM**, **ELs** 2AC 2AD 2AF 2AI 2AM 3D, **EP2s** AS RC (30) 19, **ET3s** BG GC (14) 21, **FB8s** WW (40) 13-14, XX (40) 4, YY (45) 4-8, **FK8AX** (18) 8, **FG7XF** (11) 2, **FO8s** AA (35) 4, AX (35) 8, BI (40) 7, CI, **FR7ZI** (81) 19, **FW8AA**, **FY7s** YF (2) 0, YJ YL, GB2SM, **GC2s** FMV (4), FZC, **GD3RFK** (70) 12, **HAs** 1ZH (14) 22, 2MJ 4YT 5DU 5KFL 6CR 6KUB, **HCs** 1LE (6), 5FN 8JU, **HI8s** IBC 20, NPI WSR (22), **HK0s** AI (20) 13, RQ, **HL9s** KA (19) 22-23, KN, **HMs** 1AP (18) 11, 1BB 3DR, **HP1s** AC BR (20) 23, 1E (9) 21, **HR2BS**, **HS2EK**, **IS1s** KGI MM VEA, ITITAI (10) 23, **JAs** 1BQI 1CFD 1CIB 1CSB 1MJ 2CM 2CMD 2DN 3AOV 3DRO 5FQ 6AA 7AD 7AKC 7ANS 7FS 7JI 7KC 7OD, **JT1s** AG (43) 13, KR, **Ks** 3SWW/**KG6** (58) 13, 9JDF/**KG6** (20) 0, **KCs** 4USK (40) 12, **6BK** 6BO (7) 12, **KGs** 1BX 4AA 4AM 6CK, **KR6s** AB BF BQ 12, **KS6BN** (20) 9, **KV4s** AA (81) 23, CI, **KW6EI**, **KX6DB**, Jan Mayen **LAs** 3IJ/p (31) 13, 4EJ/p (30) 22, 8FI/p (30), **LUs** IZC (57) 21, 6ZM (58) 22, 8ZI (50) 19, **LX3s** AB YQ (30) 19, **LZ2KSK**, **MP4s** BEK BEM BEQ (57) 16, BEX MAH QBF/T (1) 11, TBJ (67) 17, **OA4CG**, **OD5LX**, **OH0NF** (5), **OR4VN** (50) 23-0, **OX3s** AY (1), JV, **OYs** IR 2H (37) 22-23, 2Z 3SL 7ML (15) 12, **PJs** 2AA (78) 21, 2MH (65), 2MI 3CC, **PY1MCC**, **PZ1s** CM CP, RAEM of Moscow, **SL6BU**, **SU1IM** (1) 11, **SVØs** WAA (8) 21, WPP, **TFs** 2WIV (2) 21, 2WIY (12), 3AB (43) 17, **TG9VK**, **TI2s** CMF PZ RK, **TN8AF**, **TR8AD**, **TT8AM** (27) 22, **UAs** 1KED (30) 23 of F.J.L., 2BT 2GZ 2KAE 2KAG 9KEF 9KEZ 9TW 9WM (60) 10, ØBL ØCH (58) 8, ØCQ (61) 4, ØDL ØEE (19) 4, ØEQ (60) 23, ØGF ØKCA (60) 4, ØKFG ØKJA 6, ØKQB ØMM (60) 11, ØRH ØTD (19) 8, **UB5s** FG KBA KDA KNH KST LU MU QK WK ZV, **UC2s** AF BF (79) 16, KAC LM (70), TA, **UD6s** BN (10) 18-19, GW (15), KXC, **UF6s** DD FN (16), KAF KPE (65) 16, **UG6AW**, **UH8DA**, **UJ8s** AC AH (56) 17-18, KAA, **UL7s** BG KCR KDT (17) 18-19, **UM8KAA**, **UN1BN** (37) 13, **UO5s** BW KAA, **UP2s** KCA KMU KNO (80), NU (50), NY (20), PT (11), **UQ2s** AB (7) 8, HT KBE (40), **UR2s** KAE KAG NN, **UT5s** EI KIG LX NE, **UW9s** AD XA, **UY5DB**, **VEs** 1AJR/SU (125), 8BE 8RN 8TU, **VKs** 9RB (85) 10, 9TG ØFB (61) 13, **VPs** 1TA (30), 2AJ (80) 1, 2AV 2AX 2CT 2KJ (25) 13, 4TR 5SG 6BW (3) 22, 6YD 7BG 7NQ 7NY 8CW (11) 1, 8HD 8HJ (25) 23, 8HK 8HU (24) 23, 9BY, **VQs** 8AI 8BY (37) 1, 9HB (80) 18, **VRs** 1B (35) 8, 2DK (45) 13, 2EH 5AD, **VSs** 6EY (25) 13, 6FE (62) 4, 9ASP 9MG (50) 17, 9OC (5) 15, 9OL 9PGM 17, 9TT, **VU2s** GG GW (10) 14, JA (24) 15, LE (5) 15, MD XO, W5IUW/**VP9**, **XEs** 1FN 1OE 1TQ 1VT 1VW 1ZP 3AB, **XW8s** AL (20) 12, AU AX (21) 23-0, **YA3TNC**, **YNs** 1AA 3KM (100) 23, **ZC4s** GB TJ (50) 19, **ZDs** 3A now QRT, 7AC 7WR 8BB (37) 20, 8DM (30) 22-23, 8DX (33) 22, 8FP (20), 8RH (20), 9BB, **ZEs** JBO (50) 23, 4JS 8JO, **ZP9AY**, **ZSs** 3W 6AP/**KC4** (55) 23, 7M 7R (71), 9P, 4S7s AW 17, EC NE 13, WP, **4U1ITU** (80) 12, **4Wis** E (65) 21, F (63) 20, FB 13, **4X4s** AM DH FA FQ QA QE (85) 19, WF, **5As** 3TX (10) 21, 5TR, **5H3JJ**, **5R8s** AB ZD, **5T5AD**, **5W1AZ** (18), **5X5IU**, **5Z4s** GT (100) 19, IV (11), JE (15) 0, **6O6BW** (30) 22, **6W8s** AJ BF (45) 19, **6Y5s** LK (10), MJ UC XG, **7Q7s** GB GS LA, **7Xs** 2WW (39) 20, 3CT, **7Zs** 1AA 2BB 3AB (30) 22, **9G1FK** (75) 21, **9J2s** BC DT (4) 20, W (50) 20, **9L1NH**, **9M4s** AL JX (30), JW 15, LU (58) 13, MD (75) 14, ML, **9Q5s** HD (20) 21 and QR (43).

20 phone comes through for **Ws** 3ZNB 5VSQ 6BCT 8YGR, **Ks** 3UXY 4TWJ 7VMO ØJPL, **WAs** 2WIJ 4JJY ØDGH ØEMS, **WB2s** BAL CAN and observer C. Maher with logfuls of **AP2MI**, **BV1USC**, **CEs** 7JT* 8CG ØZI/mm (325) 8-9, **CN8s** AW BF* FB* GB MS* MZ*, **CO2FA***, **CP5ED**, **CX7s** BS BZ, **CRs** 6BU 6BX (254) 21, 6DA (116) 19, 6DB 7AM 7BF* 7CI 7GF (105) 19, **CTs** 1CL* (180) 23, 1FL* 22, 3AO* 3AV (290) 27, **DUs** 1AC 7SV, **EAs** 8AC* 8CR* 8DN* 8EO* (250) 16, 9DV* 9EO*, **EP2s** AC AU AZ BH NO RC (260) 19-20, **ET3USA***, **F9UC/FC** (120) 15, **FB8WW*** (160) 13, **FH8CD** (305) 18, **FY7s** YF YL (263) 22, **GB3s** BB GJ (125) 16, **GC3LXK**, **GI4RY**, **HC8FN**, **HIs** 3JR 4XEC* 8AT 8CNU 8JAN (110) 19, 8M* 8WSR (115) 18, **HK0s** AI* QA, **HL9s** AN KE KH (241) 13, KS TU US, **HM1AX**, **HP1AA**, **HS1s** BD X, **HV1CN** (273) 20, **HZ2AMS**, **IS1s** CWP 15, KGI* SZU* VAZ (250) 12, **JA1s** AEA CFN CG FFT, K1s LNV/VE8 ONV/VE8, **KAs** 2BW 2MX 5MC 8FS 9KG, **KB6s** CS EPN EPQ, **KCs** 4USK (340) 23, 4USN 6AA (250) 13, 6BK (255) 13, **KGs** 1BO 1FR 4AM (125) 18, 6AAH 6AJB (315) 11, 6IC 6SB (260) 13, 6SZ (277) 5, **KJ6CC**, **KM6BI**, **KRs** 6BD 6BF* 6KS 12, 6RG 8CA, **KW6CV**, **KX6s** CI (315) 10, DC DL, **LX1s** DC* LF*, LZ1FO, **M1AA***, **MP4s** BDP BEQ TBA*TBJ*, **OA6LL***, **OD5s** AX (298) 15, DH* LX, **OH0NI*** 9, **OX3s** JV LP 18, **OYs** 5A 5WS* (230) 11, 7ML, **PJs** 2CZ* 3CD (120) 20, **PZ1BW**, **SM1CXE**, **SPØFR** (263)



DL7FT tried his DX luck as M1FT and 3A2CU in August and September. Franz considers such DXpeditions mere tune-ups for his ultimate burning goal, a full-scale operation in Albania, still the rarest radio country in Europe. (Photo via W1WPO)

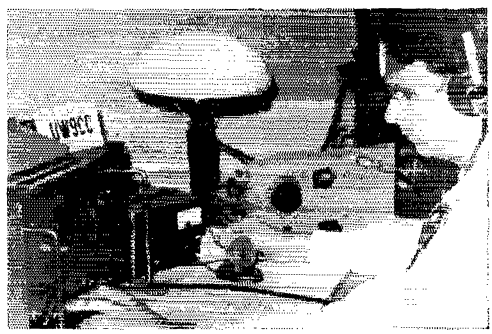
20, **SVs** 1AR ØWGG ØWPP, **TFs** 2WHY 3NA, **TGs** 5WH 9MP 9SC 9SM, **TI3AA**, **UAs** 2AO (130) 14, 2AR 9AF* 9EU* 9FD (250) 13, 9KTE* 9TE ØEH ØEK ØKIF ØKQB ØKWA (275) 13, 0SH, **UB5PW***, **UC2KAB***, **UD6BR**, **UG6s** AN (109) 19, AW (110) 15-19, **UH8BO** 13, **UI8s** AG CT, **UJ8KAA** (110) 18, **UL7s** KAA KBB*, **UM8KAA**, **UN1BC***, **UO5s** KRU* PK (256) 12, WS, **UP2s** KAF* KCA (240) 20, **UQ2s** CS (240) 12, KDJ*, **UR2KAW** (250) 12, **UT5s** GM* JK* **UWs** 1OU 1OL 3BV* 4HZ (250) 13, 9CC, **VEs** 1AJR/**SU** (125), 8AH 8BZ* ML 8RCS (120) 13-14, 8RG 8RN, **VKs** 6MK (116) 13, 9NT (298) 12, 9RH* 9TG (257) 12, **VOs** 1BR/m 1FX* 1G1* 2BW/VO1, **VPs** 2KB 2KD 2KJ 2KM 2KR 2KZ 2SY 4VP 5RG* 7CC 9FR (105) 11-12, 9VV, **VQ8s** AM (248) 13, BS* (103) 13, **VRs** 1B 2BC 2BS 4EE (310), **VS9s** AAS (110) 13, AE ASP AWR MB MG (107) 18, **VU2s** CK PP*, **Ws** 5HWR/**VP9** 7ZQX/**KG6**, WA5CKS/**KJ6** (330) 2, **XEs** 1NC 2LJ* 2LU* 3AL*, **XW8s** AL AX, **YK1AA**, **YNs** 1BN 4CF, **YSs** 1MF 1MM (334), 1O 1SRD 2MS 2SA, **YVs** 1HR* 4CI*, **ZBs** 1A (331) 22, 1CE* 1RS* 2B, **ZCs** 4AK* (257) 18, 4CZ 4GT (270) 20, 4MO* 5AM, **ZEs** 1AC 4JO, **ZP5s** CF KT (135) 21, OG, **ZSs** 2MI (256) 13, **7V***, **4S7s** IW PG* WP, **4U1s** ITU 15, SU (120) 13, **4X4s** FQ HZ JU (122) 22, NX*, **5As** 1TF 1TS 2TR* (295) 20, 3TT, **5H3s** JJ JR (258) 23, **5N2s** BRH EGL JEB (255) 21, JWC, **5T5AB**, **5X5s** FS IU RU, **5Z4s** AA AQ ERR GT (120) 18, IY RY, **6W8s** AB (125) 19, AG (115) 21, **6Y5AH**, **7G1L** (255) 19, **7Q7s** GB GN (304) 18, LA (273) 18-19, OL PBD (113) 19-20, PM (110- 19, **7Xs** 2DD 2MD* 2RW (254) 20, 2SQ* 3CT 3RT, **9A1CMF***, **9G1s** DI DV 21, EC* 22, EY 21, FC* GN KS (118) 0, **9L1s** HX JR NB* (120) 22, **9J2s** VB (100) 16, WR, **9K2s** AM AN (105) 15, AU, **9Ms** 2CP 2CR (270) 17, 2CS 2DQ (241) 13, 2GF 2LO 4JH 4JW 4LP 4MB 15, **9N1MM**, **9Q5s** AL HD (140) 19, HF* KB RG (265) 21, **9U5KU*** 21, **9X5s** GD/p GG MH (274) 23 and RZ*, the asterisks representing straight-a.m. candidates.

That should give you enough prospects to choose from until next month when we haul the Bandwagon over other scenic DX routes with the help of (15 c.w.) **Ws** 3HNK 5OLG 6BCT 8TRN 8YGR, **Ks** 1ZQC 3UXY 7QXG 9JPL, **WAs** 4JJY 6VAT 9AUM ØJCA, **WBs** 2DUI 2FIT 2LDX 6CUU 6ITM, **WNs** 1BXP 2LLK 3BFR 6IWX 6KKM, **DL4IO**, **I1ER**, **KA2TP**; (15 phone) **Ws** 3HNK 6BCT 8YGR, **Ks** 1MOD 6OVF 7VAO 7QXG 8IQB, **WA1JJY**, **WB2s** DUI FVD, **VE2ANK**, s.w.l.s, C. Maher, K. Deschere; (40 c.w.) **Ws** 2OLU 3HNK 6BCT 6KG 6YKS 7DJU, **Ks** 3UXY 4TWJ 5JVF ØJPL, **WAs** 4OYX 4TLB 5IIS 6VAT 9AUM ØJCA, **WBs** 2FIT 6CUU 6ITM 8MOS, **WN6KKM**, **DL4IO**; (40 phone) **Ks** 4TWJ ØJPL, **WA4-OYX**, **DL4IO**, C. Maher; (80 c.w.) **Ws** 6YKS 7DJU, **K5-JVF**, **WA9IXF**, **DL4IO**; (10 c.w. and phone) **WA6VAT**, **DL4IO**, **I1ER**, **K3ZXG**; (160 c.w.) **W1BB** and **K5JVF**. By the way, one-sixty is really getting a play right now. Are you grabbing your share of 1.8-Mc. kicks, DX and otherwise?

Where:

AFRICA — Think *you* have trouble with those new African prefixes? By government edict ZS7R's call was changed to VQ6R in late October. After a flock of contest QSOs the G.P.O. acknowledged that this was a mistake. So VQ6R became ZS7R again a few days later pending decision on the proper new pretix to be assigned. Looks as though ZS7R has the confusing distinction of being the only Swaziland VQ6 in history . . . . QSL aide VE4OX adds 9Q5HD to his clientele which includes CR7GF, 9G1s EO GN and 9L1HX. "9Q5HD QSLs will begin going out as soon as I can get them printed. Only those sending self-addressed envelopes and return postage will receive replies. Others hoping to be answered via bureaus will do well to QSL those stations direct." . . . . K2UTC tells W1WPO that October 24, 1964, was the date when VQ2s became the new 9J2 gang of Zambia. They're keeping their old suffixes so far as we know. Southern Rhodesia now is known as Rhodesia. What next? . . . . From W3ZBG via LID-XA's *D X Bulletin*: "I was issued the call 7G1L and operated c.w.-only from July 25 to August 3, 1964. Requests for s.a.s.b. QSLs should go to A. L. Rauschenplatt, Airport Mgr., Pan American Airways, Conakry, Republic of Guinea; or try W2GHK." W3ZBG indicates that W8BZB/7G1's operation is aboard USS *Hope* in that region.

ASIA — Relax and be confident, OMs. AC3SQ came back with a QSL to W2EQS after only eleven years. Charlie says, at that rate, BY1PK still has eight years to go . . . . . "I now have all HM1AP logs since 1961, and HM9AP logs from 1963," informs K6ZDL, gallantly taking over Cho's QSL chores from YL K6QPG who is convalescing from her cycling mishap. Norm specifies, "I'll handle all QSL requests from W/K/VE/VO/XEs, requiring self-addressed stamped envelopes from the U.S.A. and possessions." . . . . WA6TFZ, who serves as JA1CWP's Stateside QSL representative, wants to see it emphasized that few QSL managers can afford to operate without s.a.s.e. receipts. "Some of the newer DXers apparently do not realize this. They're in for a long wait." . . . . QSLs for the Cambodia and South Viet Nam to-do of W9WNV and XW8AU (K7LMU) were scheduled for dissemination commencing late November . . . . . W5VSQ writes, "Of a hundred or so 4X1DH QSLs received most were sent out in s.a.s.e., the remainder via area bureaus. Some confirmed 1962 QSOs." . . . . . Most of those new Singapore 9M4s are ex-VS1s retaining their old suffixes and addresses . . . . . Alec of RAF club station VS9OC writes W4RBZ: "Since the overseas tour on Masirah island is only twelve months quite a number of cards arrive after operators who made the QSOs have left for home. If QSLs are addressed to the club they can always be confirmed. If they are addressed to individuals, however, they may get routed all the way to England and back again, resulting in considerable delay." . . . . . MP4QBF, back in the Middle East signing various other MP4 suffixes, tells VERON's *D Xpress* that previous poor QSL returns have convinced him to QSL henceforth only on receipt . . . . . YA4EK (DJ4EK/YA) logs came into the hands of QSL aide DL3RK in November.



UW9CC has 200 watts of single-sideband available in Sverdlovsk. Leo's cubical quad does a consistent 14-Mc. job out our way. (Photo via K9RNQ)

OCEANIA — KG6AAY's former custodian, K6SDR, advises, "Before I left Guam we were some 2000 QSLs behind. They will be answered but it will be some time before all are cleared. I have logs of contest QSOs made before October, 1964, and can confirm these contacts from my home QTH." . . . . "I am now QSL manager for VR2ES," declares WB6GFJ. Ross collects and relays cards to George in bulk . . . . . WGDXC has it that K2HWL intended to do his own paperwork upon returning from FO8JL in November.

EUROPE — It's obvious to DL4IO (W7VCB) that "Many DX-working W/Ks do not keep envelopes on file with their local QSL managers of the ARRL Bureau. They must be reminded to do so." Ken designates DL4/DL5 QSL Bureau, MARS Radio Stn. HHD, 12th Sig. Gp., APO 46, New York, N. Y., as the quickest and surest route for QSLs to Yanks in Germany . . . . . SVØWG (W4-EMP) assures us, The SV gang, both SV1s and SVØs, are eager to answer all calls, DX and otherwise, and QSL promptly." SV1AT has the popular task of sorting and distributing cards received through the RAAG bureau at Box 564, Athens . . . . . UW1-4 and UY5 are new prefixes coming out of the U.S.S.R. lately. Same as UA1-4 and UB5-UT5, DXCC-wise.

HEREABOUTS — WA2EFN of the W2GHK team gives us a rundown on the QSLs stable of Hammarlund DXpedition, Box 7388, GPO, New York, N.Y.: F9RY/FC (July 2-20, 1963), F9UC/FC (July 2-21, 1963), G3AWZ, HZ2AMS, HZ2AMS/8Z4/8Z5, I1RB/IS1, K8ITH/4/8 (August '63), MP4s MAP MAP/HZ TAX, OH2s AH/Ø YV/Ø, VK9s BH DR MD XI, VPs 7NY 8HF/8, VQ8AM, WA1MIV/4 (August '64), YVs 8AJ 9AA ØAA ØAA/mm, ZD6s I PBD, 6Y5LK/VP5 Caymans, 7G1L, 7QDI, 7Q7PBD and, if logs ever come through, CR5SP . . . . . "I'm giving up duties as QSL manager for 6Y5AH," announces K4UFE. "My company has me on the road and I will be spending a great deal of time away from home." . . . . . "My Central America QSL response is almost 100 per cent!" DXclaims K7QXG. "Now if Europe were only as good." . . . . . VO2NA's three-week N.W.T. assignment in January stretched into a ten-month exile. "You should have seen the pile of mail waiting for me in Goose Bay when I returned in October. So far since then I have checked and forwarded all outstanding WAG applications and answered all QSLs. Please pass this along via *QST* as an explanation for my long silence." . . . . . K0GZN, writing for XYL KØGZO as well, states, "We have answered and are answering requests for QSLs as they come in for our operation as PJ5s CG CH SA and SB. All have been taken care of that have been received. However, one batch relayed to us by the Aruba QSL bureau was evidently

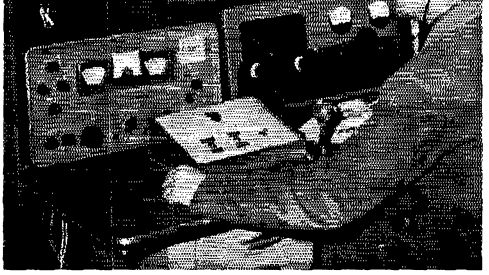
lost in the mails, so if anyone sent us a card and has not received confirmation we will be happy to take care of the situation." . . . . . Our listing of "QSLers of the Month" this month salutes especially swift confirmational work by DU5DM, EL3D, F2SY, FO8AA, FP8s CK CX, HIs 4ARM 8WSR, HRB/IS1, JA6HW/1, KC4s USW USK, KG6-AAY, KL7s BGZ ERD, KP4BPG, KX6DC, OH0NF, ON4GU, TG9JT, UH8BO, UI8LB, UJ8AC, VK9TG, VP1TA, VS9MG, VU2s GW LE, WA5CKS/KJ6, XE2-GGL, YN1s DT SL, YS1HUKE, YV5BIG, ZB1RS, ZD3A, 4S7WP, 4U1ITU, 5X5IU and 7Q7PBD, plus QSL agents Ws 2CTN 2GHK 2JXH 3NNC 4ANE 5VA and WA2-WUV, all nominated in "How's" dispatches by correspondents Ws 3ZNB 4DVT 8GMK 8TRN 8YGR, Ks 6GIL 7VMO 7QXG 0JPL, WAs 4JJY 6VAT, WB2FVD, VE2-ANK and KA2TP. Any fast QSLers we missed? . . . . . *Help!* The following hungry "How's" helpers plead for hints on how to pry pasteboards from reluctant holdouts specified: *W7OSP*, KS6AC '57; *W1DMD*, CR5AR, 9U5DM both '61; *K1MOD*, FR7ZD, JT1CA, PX1s HK OX, XT2Z, YK7KS; *WA2EFN*, VP2VA '61, VS1KZ '62, XZ2BH '59, ZC4WD '61, 6O1WF '63, 6W8AE '63; *W3ZNB*, HL9TY; *W4AAC*, VK4JQ of Willis; *W4DVT*, F9VN/FC, VR3E, 5T5AD; *W4WRG*, LU5ZR '62, VP2LD '62, 6O6BW; *WA5-IIS*, 6W8AJ; *K7QXG*, FB8XX, ZK1BW, 9Q5HZ '63; *W8GIU*, HZ4YN; *VE2ANK*, EP2BU '62, VP2GAJ '62 and 9U5TR '62. This is a new high for our agony section. Remember that the objectives must be reasonably overdue and reasonably rare . . . . . WB2LDX volunteers his services as Stateside QSL aide for DX stations in true need of such assistance . . . . . WGDXC learns that W2YTH will do QSL honors for the fall QSO output of VP2s KA KI and VI . . . . . And so we come to our customary roster of specific postal recommendations, cautioning all customers that the listings are, as always, necessarily neither "official" nor accurate:

CE0AC (via CE3HL)
CP1DN/6, W. Ortner, Box 670, La Paz, Bolivia
CR4BB, P.O. Box 61, Praia, Cape Verde
CR6BU, M. de C. Pinheiro, Box 5494, Luanda, Angola
CR6FW (via W8GHU)
CR6WP (via DL3BK)
CT3AO, H. dos Santos, Shell Aviation, Funchal Airport, Madeira
DJs 6RN/M1 9LH0M1 (via DL1CF)
DL5GO, Lt. D. Fox (K1CJV), USAF Auditor General, APO 109, New York, N.Y.
DM2ALJ, R. Strauss, Hohenleuben/Thuoingin, Breitscheidplatz 7, E. Germany
ex-EL2PN, P. Esten, DJ0PN, RFE, 1 Englischer Garten, Muenchen, W. Germany
FL8AK (via ET3USA)
FQ8JL (to K2HWL)
FY7YL, Box 267, Cayenne, Fr. Guinea
HB9s AFM AFU, Box 113, Zurich 47, Switzerland
HMs 1AP 9AP (via K6ZDL)
HP1IE (via W2CTN)
HR2ABC, A. Candell, P.O. Box 565, San Pedro Sula, Honduras
JA1CWP (via WA6TFZ)
KC4USA (via W2CTN)
KG6AAY, Coral Isle A.R.C., Box 110, Navy 926, FPO, San Francisco, Calif. (See preceding text.)
ex-KL7CYS, R. Hunsucker, 350 S. 39th, Boulder, Colo., 80302
KR6BQ (via W2CTN)
KX6DL, Box 181, APO 555, San Francisco, Calif.
MP4s BFD DAL MAU QBF TBJ, D. Aveling, Box 300, Abu Dhabi, Trucial Oman, Persian Gulf
OA4FW (via RCP)
OK1YD, P.O. Box 30, Podebrady, Czecholsovakia
ON5LV, L. Vervoort, Dampoorstr. 64, St. Kruis-Bruges, Belgium
ex-PJ3AO, L. Volney, VE1CJ, 24 Muriel Av., Champlain Hts., St. Johns, N. B., Canada
TF2WIA, D. Stephens, Box 119, 932nd AC&W Sqdn., Navy 568, FPO, New York, N. Y.
TG9JT (via CRAG)
TI0RC (via RCCR)
ex-VK4JQ, J. Copley, VK2AVU, Flat 3, Queenscliff, N.S.W., Australia
VP9FT (via RSB)
VQ6R (to ZS7R)
VR2ES (via WB6GFJ)
VS9s AMD ASP (via RSGB)
VS9MG, c/o R. Milton, 9M4LX, Box 777, Singapore
WA1ANO/mm, E. Pickard, Submarine USS *Piper* (SS-409), c/o FPO, New York, N. Y.
WA4JXV/VO2 (to WA4JXV)
WA4UEJ/mm, USS *Hyades* (AF-28), c/o FPO, New York, N. Y.
WA8GCW/KG6, A. Hubbert, WA8GCW/4, ADC 4756th Air Base Gp., Tyndall AFB, Fla.
XE0REO, P.O. Box 50, Tehuacan, Puebla, Mexico
YN1DT, D. Truett, Box 992, Managua, Nicaragua
ZE4JS (via W3HNK)
ZM7OL, P.O. Box 215, Cosmaria, Tokelaus Islands
ZS2MI (to ZS1CZ)
ZS6AP/KC4 (via SARL)
4W1FB (to HB9XU)
4W1G (to HB9NL)
5A3TX (via W3HNK)
5H3KC (via DL3BK)
6Y5AH (See preceding text.)
7Q7HF (via DL3BK)
9J2VB, Box 38, Mongu, Zambia
9L1NH (to G3RFW)
9M4LU (to G3JPQ)
9M8EB, E. Brogden, BLDC, Simanggang, Sarawak
9Q5HD (via VE4OX)
9Q5PN, Box 75, Jadotville, R.C.
9X5RZ, P.O. Box 49, Ruhengeri, Rwanda

Donors of the preceding data are **Ws** 1WPO 32 AFW 4DVT 6BCT 6KG 6YKS 7UVR 8YGR, **Ks** 1QHP 3SLP 3UXY 5JVF 6GIL 6QPG 7QXG 7VMO 8IQB **0**JPL, **WAs** 2EFN 4JJY 4TLB 5HS 6VAT 9KWN **0**JCA, **WB2**FIT, **SV0**WG, YV5PBG, D. Clemons, DARC's *DX-MB* (DLs 3RK 9PF), DX Club of Puerto Rico *D Xer* (KP4RK), Florida DX Club *DX Report* (W4HKJ), International Short Wave League *Monitor* (12 Gladwell Rd., London N.8, England), Japan DX Radio Club *Bulletin* (JA1DM), Long Island DX Association *DX Bulletin* (W2FGD), Milwaukee Amateur Radio Club *Hamateur Chatter* (W9ONY), Newark News Radio Club *Bulletin* (L.Waite, 39 Hannum St., Ballston Spa, N.Y.), North Eastern DX Association *DX Bulletin* (W1BPW), Puerto Rico Amateur Radio Club *Ground Wave* (KP4DV), VERON's *DXpress* (PA0s FX LOU VDV WWP) and West Gulf DX Club *DX Bulletin* (W5IGJ). Keep it coming through '65, men!

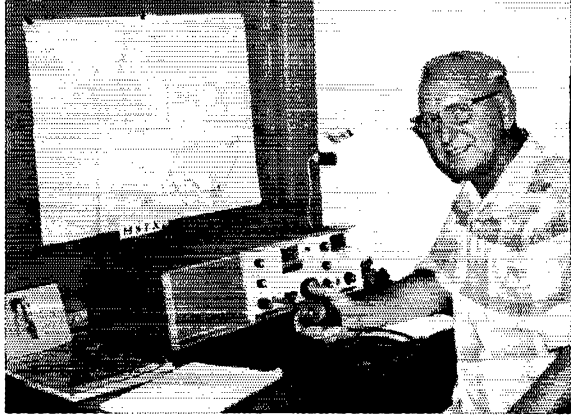
Whence:

EUROPE — The 1965 French Contest, occurring this month and next, marks the 40th anniversary of REF, so let's help the lads celebrate. Amateurs world wide are invited to trade the usual RS(T)001, RS(T)002, etc., serials with F stations on c.w. from 1400 GMT, January 30th, to 2100 the 31st, and on phone February 27th–28th, same hours. French stations will indicate their departments (states) after their calls. You earn 3 points per contact, and final score is obtained by multiplying total QSO points by the number of band-departments accumulated. Logs go to REF, B.P. 42-01, Paris R.P., France. There's no deadline specified but don't dilly-dally. In the 1964 French DX Test we find Ws 1BPW 2HPV 4ZYQ 5KC 7BTH 8KPL 9ZB, VEs 2AFC (phone) and 3EVK the winners in U. S. A. call areas reporting. WIs HOS SHX, WA4QPV and VE2DDR submitted the only other U. S. and Canadian scores . . . . . HB9ZY of Switzerland's USKA fills us in on the outcome of the 1964 H-22 DX Contest. Call area leaders for our side are Ws 1WY 2HTI 3ADO 4SNU 5WZQ 6ISQ 8RQ 9QM **0**GNX, VEs 1TG 2IL and 3BWY. Ws 1CKA 3MCG 3MSR 4HKJ 4HOS 4KJL, K8NMG, WA2DIG and VE3EVK also filed entries. Continental kingpins are OH2BH, CR6DX, 4X4FU, VK3TL, YV5AFH and W2HTI. HB9s PF/p ACX/p and IV/p ran 1-2-3 on the



CR7BS, headquarters station of Mozambique's LREM, is now very active at its new location in Lourenco Marques. CR7s AB, shown here, and GQ are staff operators. (Photo via K1FLG)

HS1X (W1FAX) will complete a four-year Thailand tour in June. During much of this time, as at present, HS-land has suffered status as a member of the International Telecommunications Union's ban list. That is to say, Thailand has put itself on record as forbidding QSOs between its amateurs and those of other countries. Our country, as an ITU signatory in good faith, must go along with this, so FCC-licensed amateurs risk serious citation by working or attempting to work Thailand. HSs have banded together in efforts to change this situation. Perhaps before Andy's return to W1FAX this summer we'll have another chance to heed his KWM-2 and Sterba curtain on 40-, 20-and 15-meter c.w. and s.s.b. The QSL route is via his son, W1WTE, contributor of this photo.



home front . _ . _ . _ "We meet with our SV1 colleagues every Wednesday night at a fine outdoor restaurant in downtown Athens," writes SVØWG (W4EMP). "The Greece society has thrown open its doors to SVØs and I wish more of the latter would attend RAAG meetings to get to know these fine Greek amateurs. The demand for SVØ calls continues great and the waiting list is long." . _ . _ . _ DL4IO (W7VCB, ex-EL4A) says, "We're making plans to get off to a rarer spot again by next year. Since operating from here with 40 watts and a piece of wire I've noticed that few signal reports are below RST 579. I feel it's the mark of a good operator to give out a few 'low' reports once in a while when deserved." Some current projects at DL4IO include the promotion of 10 and 15 meters for local work, systematic accumulation and use of propagation data and forecasts, a study of tape-recorder techniques for the ham shack, and teaching the XYL to send c.w. left-handed for greater contest operating efficiency . _ . _ . _ K4IIF reports an enjoyable London visit with G2BVN, DX scribe for RSGB's *Bulletin* . _ . _ . _ DL7FT of recent MI1FT-3A2CU renown will leave no stone unturned in efforts to activate ZA-land this summer. DL5GO (K1CJV) has similar DXpeditionary intentions . _ . _ . _ K4TWJ finds IT1AGA a 7005-kc. 0130-GMT reliable who never seems to tire of the W/K/VE clamor . _ . _ . _ W4BPD and XYL frolicked on the Continent before heading eastward.

ASIA — W9WNV and XW8AU, doing autumn teamwork as W9WNV/XU and K7LMU/3W8, poured out 7200 Cambodia QSOs and 8200 South Viet Nam contacts on 7-, 14-, 21- and 28-Mc. c.w. and s.s.b. using Hallicrafters, Collins and Hy-Gain apparatus. Chuck and Don report, "Aided by dupe sheets, frequent reminders to repeaters, and announcements that we would not QSL those who repeatedly come back for additional QSOs on any band/mode, we kept the total number of W/Ks who did this down to 250, 197 of them making the error only once. This is creditable in view of 15,000-plus QSOs. We felt this was necessary because our goal was to work the 'little guys' as well as the 'muscle-flexers' in the limited time available. Thanks to all the gang for excellent understanding and cooperation." Three outstanding QSOs were a 10-meter job with W6AM, a 7-Mc. c.w. long-path hookup with W8FGX, and a 7-Mc. s.s.b. long-way contact with W8JIN. You may have worked XW8AU (K7LMU) previously as F7DD and 5A1FF . _ . _ . _ According to W5VSQ, after 1453 W/K contacts 4S7WP still needs Alaska, Utah and Wyoming. Shanti haunts 14,020 kc. at 0100-0200 and 1200-1400 GMT, planning on a quad and early s.s.b. . _ . _ . _ "Allocation of grants and funds is a slow business," VS9OC's Alec writes W4RBZ, referring to the RAF club's efforts to join the single-sideband set . _ . _ . _ Observations spotted in recent literature from the clubs and groups: W9WNV may follow up his Cambodia and South Viet Nam triumphs with other DXpeditionary ventures depending on availability of the necessary wherewithal. . . . Six KA4US operators set forth to break Kobi's eight-year KA ham silence in November. . . . There's a southeast Asia net on 14,320 kc. at 1200 GMT with enough rare checkers-in to set your drooler drippin' . . . . ZC4s AK CL CZ GT GY HK KW MP PC RA SS TJ and TX take up on Cyprus where the 5B4s left off, remaining active from such spots as Akrotiri, Famagusta, Episcopi, Hekelia, Heraklos and Pergamos. ZC4s CZ and GT are the chief s.s.b. proponents.

AFRICA — 5Z4JD, awards manager of Radio Society of East Africa, writes of problems encountered in keeping up with fast-moving geopolitical events over his way. Regarding the RSEA Award, for contacts made "From the 24th of October, 0001 GMT, until 12th December, 2400 GMT, 1964, Zambia's Independence Day and Kenya's Republic Day respectively, all points listed for each country will be doubled, *i.e.*, a card from Kenya will be 2 points, Mauritius 8 points, etc. Zambia is the sixth 'ex-VQ' area to achieve independence and change of prefix in recent years. It has therefore been decided to produce an award designed to replace our 'Worked All VQ' which has become almost impossible to obtain in view of the reductions of activity from certain parts of East Africa. Details of this new award will be issued immediately it is finalised, but it is intended to continue processing applications for WAVQ for some time to come to enable operators who have almost obtained sufficient confirmations the opportunity to qualify." . _ . _ . _ W3HNK reports 5A3TX ready to burn up the airways with his newly completed Marauder . _ . _ . _ CR6s 8SP 7GF 9AI, CT1FL, ZS1VD and PY7AII were leading regional scorers in LREMI's July Presidential DX test out of Mozambique. W7TDK, WA2EPO and W7WLL are listed in that scoring order for the U. S. A. . _ . _ . _ W3KJ says FR7ZD is cutting back on W/K contacts until he hooks the Dakotas to complete WAS . _ . _ . _ W8CIU reports AR-22s enroute CR6s EC and FW who are both going quad . _ . _ . _ Africa additives courtesy the clubs press: W8BZB/mm keeps USS *Hope* radio-active near 21,440 kc., 1500-1700 GMT . . . . ZS6AP/Antarctica finishes his year in Queen Maud's Land next month. Meanwhile he looks for DX clients after concluding ZS schedules on 20 or 40 c.w. at 1700-1730 GMT. . . . W1WWA, a marine radiop on Atlantic runs, is licensed for possible TU2 and 9G1 action. He favors 21-Mc. s.s.b. . . . Ex-VP5RH-VP7BP contributes to the Ascension uproar with his DX-60 and 2B as ZD8RH.

OCEANIA — W6OFF writes a salty story: "I sailed on 90-foot ketch *Novia Del Mar* as radio man for the Transpacific Yacht Club race to Tahiti this year. W6ATI was communications officer for the club, and I was able to relay positions and communications from the fleet every day of the race. At the Los Angeles end W6ATI was aided by several hams, principally WA6FJE and WB6BOK, while our Tahiti contact was FO8AQ. Later we sailed to Bora Bora, Rarotonga, the Tonga islands, Western and American Samoa. We found that ZK1AA has formed a Rarotonga radio club and has a lot of fellows working on their ham tickets. The club station is used by the government for broadcasting purposes while Stuart completes their commercial installation." . _ . _ . _ WA6SLU reminds us that VK3TL will put VK9TL on 15 through 80 meters, c.w. and s.s.b., from Norfolk isle much of this month . _ . _ . _ While working VK2NS in August, W9GDW went to his QSL file and hauled out Evans's QSL for a 1930 QSO with VK2NS on 40 c.w. Time, indeed, doth fly . _ . _ . _ Wise heads are gobbling up VR6TC on 21,060 kc. after 2000 GMT without much competition, according to W5OLG via W1WPO . _ . _ . _ KG6AAY's K6SDR writes, "I'll be back on the air from home by the first of the year, looking forward to battling the Sixes again for my DX." Terry had reached 170/155 before the Navy nailed him . _ . _ . _ Free and continuous diathermy treatments are available on Johnston isle, judging by WA5CKS/KJ6's remarks to K7VMO: "There are five stations with kilowatts there, all operating within a mile of each other." Another Los Angeles suburb? . _ . _ . _ Club journals supply more Pacific patter: 9M8s AJ EB LE and LX get lively 20-meter response in Sarawak. . . . K6s LNG and OOL are said to have become VKs 2AC and 5OL permanently. . . . VK4TE of Willis may be getting his DX feet damp at any time now. . . . New Guinea is ably represented on c.w. and sideband by VK9s BW CJ GC BM NY and TG on 7 and 14 Mc. . . . Lone Macquarie entry VKØPK keeps QRL with homeland traffic. Same with VKØGS of Wilkes. . . . VR1S is a fresh Funafuti possibility on 20 c.w.

HEREABOUTS — It's on! Long Island DX Association's first annual DXCC Contest will run from the first to the last GMT minute of 1965. "Any mode and band may be used but just one confirmation from each country will count. The Contest will be based on ARRL DXCC rules, and the ARRL Countries List will be followed." Check

(*Continued on page 142*)

CONDUCTED BY JEAN PEACOR,* K1IJV

ARL 60

On this, the 13th anniversary of the YL Column in *QST*, once again the time seems appropriate to try and count the number of YLs who are now avid amateur radio operators. 1965 begins the 26th year since Ethel Smith, K4LMB, first asked the now famous question of all YLs who would read her letter in *QST* which requested YLs to stand up and be counted. The response by twelve YLs was the start of the Young Ladies' Radio League. YLRL membership has since

40- or 15- meter c.w. everybody?
That's where you may be fortunate enough to meet Nair Rodriguez, WP4CLG, a new Novice and the 12-year-old daughter of Paul, WP4CLH, a proud dad. They both operate a T-150 A. transmitter, R-100 A receiver with a doublet antenna.

grown to nearly 1000. Various ways and means have since been considered in trying to determine just how many YL radio amateurs the world now holds. We can only guess that in very round figures they would number at least 10,000.

YLs have had an increasing effect on amateur radio and proven more than once that they are not just basking in feminine glory. Rather, they take this privilege quite seriously. Civilian Defense work and all emergency situations during the past year found the YLs right on hand. Two YLs are now SCMs in the U.S.A., a YL holds the record for amounts of traffic handled and increased numbers of YLs now share BPL honors. These YLs have stood up and been counted in the eyes of all amateurs.

The many YLs who have aided with the organization of YL nets and clubs throughout the world and thereby furthered the good will of our fraternity haven't gone unnoticed, nor have the convention goers and workers whose interest and enthusiasm increases with each convention attended. Many different area YL clubs now provide opportunities for YLs in most parts of the world to get together, exchange ideas and get to know the gals. The YL net listings in November *QST* provide further chances to meet other YLs. All of these clubs and nets welcome newcomers and visitors and they are all growing.

An active YL in 1965 is offered innumerable ways in which she can greatly add to our fine YL count. Never before in the league's history have there been so many ways in which this can be done. The newly published ARRL Net Directory (available upon request) lists 788 different nets from which you're sure to find one in your section who would welcome your assistance and interest with traffic handling.

Participation in the many different contests enables you to not only prove your capabilities as an operator but to improve upon them. *QST* lists many contests in which YLs can take an active part and YLs are fortunate to have two contests sponsored by YLRL solely for their benefit. The YLAP, usually held in October and November, is exclusively for YLs. The YL/OM contest in February and March certainly requires the feminine touch to be successful. YL/OM rules will be printed next month and your participation in this event can make this a record year in our YL count department.

Whichever you chose: rag chewing, DXing, traffic, contests, or a combination of all, 1965 generously offers an opportunity to boost our YL count higher than ever before!

K1IIF (I Iron Forever), Ruth Barber, of Bloomfield, Conn. is the newly elected Wrone President for 1965. She is also President of the Bloomfield Amateur Radio Club. Ruth and her OM, Jack, W1PRT, recently authored an article on Virgin Islands Camping published in the Jan. 1965 *Camping Guide* magazine. Congratulations to another very active YL.

* YL Editor, *QST*. Please send all news notes to K1IJV'S home address: 139 Cooley St., Springfield, Mass.

Oregon's Portland Roses attending their October meeting were: (back row—l. to r.) Lil, W7GRC; Violet, K7YCQ; Bettie, K7BED; Bev, W7HPT; Cecil, K7VFC; Bea, W7HHH. (front row—l. to r.) Pat, W7NOK; Phyllis, W7ZMN; Beth, W7NJS; Edith, K7PEE. K7VFC is the new President of the Portland Roses and Pat Zeigler, W7NOK, is the newly appointed V. Pres. and Treas., a change made when Pres.-elect, W7HPT, resumed teaching at Seaside.

WA2RYE — Ran for the Money

Rick, WB2KDD, sent along the following news item about another very versatile YL in the amateur radio ranks. Judy Rawcliffe, WA2RYE, of Verona, N. J., headlined a recent newspaper article in connection with the fall Olympic activities.

The U. S. Jaycees sponsored a project to raise money for the U. S. Olympic team training and travelling expenses for the Tokyo Olympic meet in October. "Run for the Money" is a cross-country run from New York to Los Angeles with a lighted torch, carried non-stop, by Jaycee members and sponsored competitors.

Mayor Wagner started the run on New York City Hall steps with Jesse Owens, immortal 1936 Olympic star, running the first leg.

The Verona Jaycees were honored by having Judy Rawcliffe run one of the legs through New Jersey. A graduate of Verona High School last year, Judy had the distinction of being one of the few women participating in this national event. The Verona Jaycees had one of the most qualified competitors in this event as Judy participated in the Olympic team final tryouts in August at Randalls Island and placed sixth in the Broad Jump and seventh in the Pentathlon. Judy won the 1964 senior women's national indoor low hurdles championship at Akron in April. She also holds the New Jersey 1961 indoor and outdoor 220-yard records and championships. The *Philadelphia Enquirer* Classic 220-yard track record and championship held in February is another title held by Judy. Sports enthusiasts will be listening for Judy's CQs, as will we all.

The Ever Popular YL Certificates

Count your YL contacts! Perhaps you are now eligible for some of the following popular YL awards.

Worked all States YL — issued for a contact with a duly licensed YL in each of the 50 states. District of Columbia may be substituted for Maryland. ARRL "single community" rule applies. No time or band limitations. Send QSLs and alphabetically-by-state list, showing call, date, band and whether A1 or A3. Include postage for return of cards by 1st-class mail. Custodian — Grace Ryden, W9GME, 2054 N. Lincoln Ave., Chicago 14, Ill.

Worked all Continents YL — issued for a contact with a duly licensed YL on each of the six continents. All contacts must be made from within a 25-mile radius of original location. Send QSLs and list to Miriam Blackburn, W3UUG, Box 2, Ingomar, Pa.

YL Century Certificate — issued for contact with 100 different YLs. All contacts must be made within 25-mile radius of original location. Send list in alphabetical order by operator's last name, showing operator's full name, call letters and date of contact. Enclose postage for return of cards by 1st-class mail. Endorsement given for each additional 50 YLs. Applications for stickers to be in same form as application for original certificate. This award is for working different YLs — same YL worked under different calls counts only once. Send applications and QSLs to Katherine Johnson, W4SGD, Box 666, Fuquay Springs, North Carolina.

DX YL — available to YLs only. Work 25 duly licensed YLs outside your own country as defined in the ARRL DXCC countries list. All contacts must date after April 1, 1958. Send log extracts showing date, time, station, band, mode, RST report and own QTH, name, and call. QSLs not required. No charge but return postage appreciated. (Note: work 25 different DX YLs, not necessarily in different countries.) Custodian is Maxine Willis, W6UHA, 6502 Wynkoop St., Los Angeles 24, Calif.

These awards are all sponsored by YLRL. In addition, many of the YL clubs also sponsor club certificates.

YL Club and Net News

To Nov. Net Listing

GMT

Add — Tuesday 1700 on 3885 kc. Laylrc — Ironing Board Net

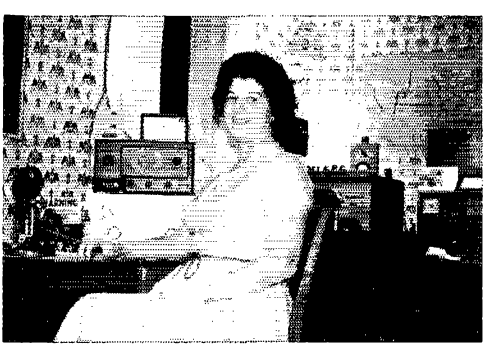
Correct —

Thursday — Georgia Peaches — no longer active

1965 WRONE officers announced at the Nov. Wrone luncheon are as follows: Pres., Ruth Barber, K1IIF; V. Pres., Mary McLam, K1ICW; Sec.-Treas., Alice Lavigne, K1TOP; Hosp., Norma Gilbert, K1WXF; Net and Membership, Meg Terrien, W1CML.

Newly elected Waylarc officers are announced as follows: Pres., Betty Whitaker, W3UXU; V. Pres., Liz Zandonini, W3CDQ; Secy., Vi Davy, K4EAM; Treas., Meg Caulfield, W3UTR; Cert. Custodian, Brooke Brown, Wn4VLI, Rte. 4 — Box 205, Vienna, Va.

YL CHC Chapter 4 announces their officers for 1965 are as follows: Pres., Shirley Rex, K8MZT; V. Pres., Mike Stine, W4ZDK; Sec./Pub. Off., Mable Field, W6YZV; Treas., Mem. Off., Estelle Hanfelt, WØESD; Council Member, Betty Kuegman, K6UTO; Royal Huntress, Leona Peacor, W1YPH; Royal Wolf, Barry Goldwater, K7UGA. QST



K1ICW, Mary McLam, from Southbridge, Mass. is the newly elected V. Pres. of Wrone. This is the fifth consecutive year that Mary has been a Wrone officer.

Hints and Kinks For the Experimenter

MORE ON V.H.F. COAXIAL TANKS

THE information in *QST* for October, 1964, on v.h.f. coaxial tanks has been getting plenty of use, judging from mail recently received. Several correspondents have said that the 2-meter version cleaned up sundry neighbor troubles they've been having with simple rigs like the Twoer, and though the giant 6-meter tank is a classic example of the tail wagging the dog, it has been doing a job for some Sixer owners, in preventing radiation of unwanted frequencies.

A/1C Joseph Pontek, Andrews AFB, who didn't mention his call, contributes an idea for builders of the fruit-juice-can models. An easy way to keep the inner conductor lined up is to cut a hole in the center of a plastic cover from one of the new-style coffee cans. He says that the cover is just the right size to slip into the can, yet it slides down only until it hits the ridges that are formed into the can sides.

— *W1HDQ*

CONTROLLING MODULATION OF THE SCREEN IN 4CX250B A.M. TRANSMITTERS

FULL modulation of a.m. transmitters is important if good readability is to be achieved at low signal levels. This is particularly true in v.h.f. work, where much of the communication is at signal levels close to the noise. One source of trouble with modulation of tetrodes is getting the right amount of audio on the screen. Many v.h.f. rigs with tubes of the 4X150-4CX250 series tubes suffer on this account.

The accompanying circuit, Fig. 1, shows a cathode follower arrangement that permits the operator to adjust the audio level on the screen of an amplifier. As used at W8WNX, the system works with a plate voltage of 750. For higher plate voltages it would be well to make the 6S4 plate connection to an adjustable bleeder across the high-voltage supply, with the arm bypassed for audio.

The control R_1 sets the level of the audio on the amplifier screen. The d.c. screen voltage is controlled by R_2. Both controls should be mounted on good insulating material, and operated by means of adequately-insulated extension shafts. Tests show that approximately 55 percent modulation of the screen gives best plate modulation characteristics with the 4CX250B.

— *Lawrence P. Kurtinitis, W8WNX*

CABLE LACING MATERIAL

THE vinyl jacket covering on popular types of coaxial cable can be used for cable lacing. Strip the covering off the coax by cutting a long, straight line down the length of the cable. Open the tube and snap it over the wire or cable you wish to cover.

— *Gary Guenther, KØPQW*

SAVE BURNED-OUT TRANSFORMER

A POWER transformer with an open primary winding can still prove useful. Connect the 6-volt winding of the defective transformer to the 6-volt winding of another transformer and the defective transformer will supply high voltage as before. Of course, this scheme should be employed only as an emergency or breadboard method. Be sure not to exceed the power ratings of the transformers.

— *Robert B. Hazelton, K3RBH*

TRANSFORMER SAW

I TRIED using fine pitch coping saw blades to cut through the windings on some transformers. However, the blades broke easily and would bind up in the small wires. I found that the Tyler Spiral blades available at most hardware stores do the job with ease. These blades will not catch on the wires or cut your fingers, and one hand can be left free so that you can hold the material adjacent to the blade.

— *Gene Fry, K2CW*

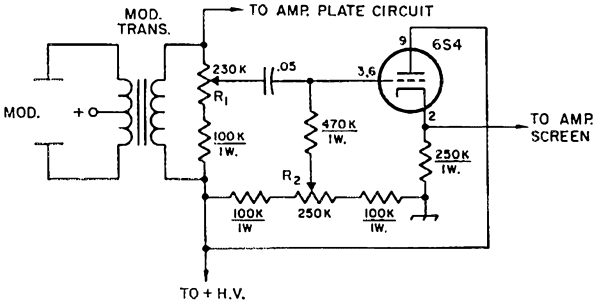


Fig. 1—The 6S4 cathode follower permits adjustment of the audio level on the screen of a tetrode amplifier. A separate heater supply should be used for the 6S4.

Operating News

F. E. HANDY, W1BDI, Communications Mgr.
GEORGE HART, W1NJM, Natl. Emerg. Coordinator
ROBERT L. WHITE, W1WPO, DXCC Awards
LILLIAN M. SALTER, W1ZJE, Administrative Aide
ELLEN WHITE, W1YYM, Ass't. Comm. Mgr.

Another Year. With a few weeks still to go, we think 1964 can be put down as one of the best in amateur operating. Besides lots of healthy operating fun in all the specialties within amateur radio, this undiminished by those making much of "politics", there was fresh focus placed on the real capabilities we amateurs possess. Reports and letters show much club and personal interest in improving our operating as well as technical know-how, also support for the Amateur Radio Public Service Corps.

We hope *you* enjoyed a vital part in the '64 work. With '65 now ahead why not make your amateur results still greater and build that good image of Amateur Radio too by taking more advantage of the ARRL incentives and patterns. This month we have some examples of recent "organizing news" to show the changed and progressive steps. We want to suggest to any readers still on the sidelines that you will want, in '65, to make yourself part of this operating picture. This for the benefits to you and for the force your part adds to the overall posture. You can seek an official station appointment of your SCM or earn ARRL recognition through awards. Belong to a net and see that it has a tie in with the National Traffic System. Many have discovered that you get more out of amateur radio as you put something in and demonstrate our skills helpfully for friends and communities. Our "doing" makes us ever more efficient and a stronger group helping justify our frequencies and regulations to do the job. Awards and contests too also may be a means to increased enjoyment and QSO results. Some have found them a road to increased personal proficiency. Thanks to all who helped make '64 such a good year; may we invite every reader to take part in such portions of the League's operating program as will advance his own skills, our Public Service capabilities and good operating principles (through your example) this coming year.

This month we report as the best news of the month three or four creditable leadership patterns from an Emergency Coordinator, an RM and an SEC. Readers who desire to be more familiar with the overall implications of AREC and NTS should re-read the series of monthly articles by George Hart (June through October *QST*) and the booklet *Operating an Amateur Radio Station*. The following methodology is applicable to planning and implementing, subject to modification for local requirements.

An AREC Alerting System. Got One? G. S. VanDyke Jr., W3ELI, Emergency Coordinator for Philadelphia County, has set up a plan for alerting his 30 member 6-meter net. Tests are run to see how it works out! Our point is that in event of unexpected disaster or call for radio communications there must be a way to get each group in operation quickly. The best deployment plan is useless, if not manned when needed. W3ELI's alerting system goes like this. An alerting roster is established. (1) The EC himself alerts *two* "ready" operators. (2) They use telephone or alternate means to alert two additional netters. (3) These four operators each notify two others designated as their responsibility . . . and so on down the list. In case of failure to contact the assigned party, a report back and alternate system is established to make the call-up complete. The roster and set up of course *must* be kept up to date by all concerned and used in an alerting test every so often.

For Group Planning in AREC. Besides the above W3ELI meets with a designated small planning group at intervals. The agenda each time guides discussions. While never the same, a look at the points for a typical meeting gives some idea what needs doing in all similar groups. (1) Next exercise, detailed plan. (2) 6-meter net publicity. (3) Message training. (4) RACES interplay with AREC. (5) Red Cross team members. (6) Eighty meter band plans. (7) Sample message (form for distribution), included are 14 pointers on radio handling. (8) Write-up of ARPSC and operational principles. These points,

Last October, QST promised a photo of top-scoring CD'er W1JYH for January (IF Rog topped the pile). That he did and here he is flashing a genuine victory smile. (Photo by K1WJD!)

formulation of check lists for each leader, control station and operator can help put any unit on the track. A planning committee can help any ARRL leader aiming at top performance chart a progressive ARPSC course for the betterment of his group, and for public service.

Operation Match Up. Hugh Pettis, W3QCW, Route Manager for MDD recently achieved adoption by seven major NTS nets of his "winter operating proposal." This came out of a study of traffic QRM as a function of net practices. All the nets concerned are following an agreed plan, results to be assessed at the end of March '65. The move came as a challenge to every participating operator to go through the rough winter conditions in store for the nets with competence, patience and (through system) displaying improved operating skills. The *MDD Flyer* (Nov.) states these basic criteria: (a) two kc. minimum separation between net primary frequencies, (b) each net with one exclusive channel which others agree to respect (c) shared or common frequencies set up with the factors of time and geography in mind and not more than three frequencies used in all. Points to guide netters:

1. The station to receive traffic calls first, unless otherwise directed by the NCS.

2. If stations report back to NCS their inability to pass traffic, they are sent to the other traffic-clearing (QNY) channel or authorized to handle it on the primary frequency.

3. Strict adherence to operating time and frequencies is expected at each station, and made a matter of personal pride with the operators.

MDD has established a crystal-bank to permit netters to use "crystal insurance" individually where possible to assist in close conformance to the frequency pattern. The plan is an excellent example of what can be done by close collaboration in organized patterns to improve the smoothness and efficiency of traffic operations. An operating chart was prepared by W3QCW and shows the plan for each NCS and net at a glance. This move to better organized use of frequencies reflects credit on MDD, NTS, the ARPSC and Amateur Radio as a service.

AREC Staff Meetings. The SEC of Los Angeles, Frank Merritt, K6YCX scheduled a staff meeting at the beginning of the current season. ECs in the SEC's territory received a card to fill out and return. Data were compiled to distribute to all the ECs with vital information about each other's operation. Six ECs were each given leadership responsibility for exercises covering half-month periods of the next three months. Features decided: (1) One drill to be held every other week in some part of the section. (2) Special message blanks were prepared for breaking down the text of messages for *easy word count.* (3) It was established that in tests all data sent must be traffic in the form of formal messages. (4) Available surplus equipment for six and two meters was discussed. (5) Decision was made to emphasize 2-meter operations for the EC nets, with equipment provisions to be added by all to make it possible to zero-beat the NCS. If space permitted we could present even more fine examples of what the initiative of leaders is doing throughout the League's field organization.

The VHF Sweepstakes. A number of items of interest will be found in the Activities Calendar. If convenient set aside the weekend of January 9–10 for our first major activity of the year. Novices, Technicians and all classes of amateur licensees can use *both* six and two meters. A cordial invitation to all to take part. Look for some new states and give your v.h.f. equipment your best.

ARRL's 31st International DX Competition. February and March dates are set for this annual DX highlight. The contest, as usual, has four separate weekends to level out QRM and get insurance against propagation conditions going spotty for a given operating session. We'll hope for good conditions throughout. Air mail has been used to invite other societies and to stir up stations to be on from rare spots during the contest. Good hunting! See the full announcement in this issue.

Organizationally we can use more field meetings and planning sessions at points in other U.S. and Canadian sections. The good results that flow from many such can make 1965 even better than '64. Individually the important thing in the New Year may be not to lose sight of the dreams and objectives! Contact your SCM to

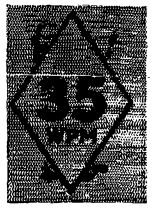
RESULTS, SEPTEMBER FREQUENCY MEASURING TEST

The September 10, 1964 FMT, open to all amateurs, brought entries from 233 participants who made a total of 809 measurements. Of these, 108 ARRL Official Observers submitted 330, and 125 Non-OOs made 479 readings. All taking part have received individual reports of their readings: The standings accredited to the more precise in each group appear below; all listed show ability of the highest order in Frequency Measurement.

Following is a report of the standings of the FMT leaders in this test. In consideration of the minimum possible error, due to 'doppler' and unavoidable factors, we accredit as of equal merit all reports where computations show 4/10ths parts per million or higher accuracy. Our direct comparisons with the umpire's readings otherwise establish this order of listing.

February *QST* will announce details on the next ARRL FMT.

Observers	*Parts/ Million*	*Non-Observers*	*Parts/ Million*
W1OSQ W2AIQ W5FMO WØVBK	(0 to .4)	W1PLJ W2RIJ W4HER W5QHK W9ECV/2 W9TZN KØHLC WØICC	(0. to .4)
W3BFF	.6		
W5DYJ	.6		
W2PZI	1.1	K8ILR	1.3
K5RWB	1.1	K5HQZ	1.5
W4NTO	1.7	K8GHJ	1.9
W6GQA	2.0	KØZPG	2.3
W5ARV	2.7	W6CDF	2.6
K6MZN	2.8	W5VDG	3.1
K6EC	3.7	WØWZR	3.4
K5RBL	4.3	K9AAJ	3.4
K9GSC	4.9	W7NPV	4.7



Have you qualified at 35 w.p.m.? If you haven't reached that goal as yet perhaps you'll want to start on the way up and make the grade in '65. Full details appear under Code Proficiency Program each issue, Operating News.

ask about nets and an appointment. Progress can be only as good as we make it. There is no failure except the failure to keep on trying. Too many operators we fear get their entertainment vicariously or very casually in amateur radio . . . while they ought to be participating in nets, AREC, station appointment.

Creative activity is a necessary stimulus and each part of accomplishment one step at a time. That's why we give objective to amateur radio by having contests such as the VHF, SS, DX Contest, Field Day and Sweepstakes, also the "why" for awards. There are code runs for certificates, FMTs (one coming in February) for higher precision frequency measuring, CD Parties for station testing and fraternalism. But you the member have to pick favored objectives along the lines of your own interest or it's no show. One runs up station records or increases skill *only* as he takes part.

We suggest making use of all the ARRL sponsored patterns and activities in '65. Whatever mode you operate why not go after some of the things you haven't done in the past. Can you extend your code speed to a higher level through the W1AW program? Are you an RCC member, your station WAS or DXCC? BPL, OES, OPS, or ORS? —*F.E.H.*

OCTOBER CD PARTIES

Conditions in general made for great October CD Parties in '64 with fine scores the rule, higher than the similar '63 period. In fact, last year 27 reported over the minimum c.w. figure while 34 did it this time and 35 topped the 5-K phone figure compared to 27 the year before. On the whole, section multipliers seemed harder to come by but the usual fraternal enthusiasm was more than apparent. The January bulletin will detail scores and soapbox but K3QDD's comment is too good to hold — "This time I decided to do it KFC style, *working just hard enough to break 100-K.* As a matter of fact, there's practically no difference between Vic and me, except about 8 hours of time logged!"

The following *high-claimed* CD Party scores show claimed score, number of QSO's and sections. Final results will appear in the January '65 *CD Bulletin*.

— *W1YYM*

C.W.

W1JYH	211,680-865-63	W6NKR	116,205-374-61
W9EWC[1]	197,780-638-62	K1ZHS	113,680-400-56
K8HLR	193,295-570-67	W4LK	113,680-392-58
K1WJD	186,050-603-61	K6BHM	112,810-382-58
W9RQM	184,200-607-60	W5PSB	112,545-362-61
K4VFY	171,560-527-64	K8JJC	110,780-376-58
K2EIU/5	154,800-510-60	WA2YLL	108,870-378-57
K5OCX	147,560-470-62	W1BGD	107,970-359-59
WA9AUM	140,420-470-59	W4YAU	106,975-384-55
K9WIE	132,675-431-61	K1MEM	106,940-340-62
W6ASH	131,520-401-64	W9LNQ	104,400-355-58
WB2ALF	124,110-388-63	K1EWL	103,680-377-54
W6TYM	123,310-413-59	WA5ABG	103,170-359-57
W4WHK	121,500-400-60	W2ZVW	102,785-330-61
W4KFC	120,065-400-59	K3QDD	102,315-353-57
WA2WLN	117,160-397-58	W3MSR	102,070-338-59
W4DVT	116,700-382-60	W1YYM	100,240-351-56

PHONE

K2QDT	36,960-168-44	WA2RMP	12,180- 80-28
W4PFC[2]	29,190-135-42	K1ZHS	11,610- 80-27
K5MDX	25,510-114-43	W8WUO	10,585- 73-29
K2EIU/5	23,200-110-40	W4BGP/4	10,050- 67-30
WA4AWG	21,525-105-41	W8AEB	9750- 60-30
W4MXU	18,375- 98-35	W4WQZ	9620- 71-26
WA9BWY	17,640- 95-36	W4UF	8710- 62-26
W2ZVW	16,320- 89-34	W4LK	7080- 59-24
K3RFH	16,170- 98-33	W1PYM/6	6760- 47-26
K4IXG	15,640- 87-34	W3HC	6600- 50-24
W1JYH	14,645- 94-29	W4ZM	5830- 46-22
W9NLJ	14,350- 76-35	W1ECH	5520- 41-23
W9NPC	14,040- 72-36	K8RDE	5170- 41-22
K1WJD	13,200- 81-30	K2PHF/6	5060- 37-23
W3NOH	13,090- 77-34	W4JUJ	5060- 37-23
WA2WLN	12,800- 73-32	WB2DEP	5040- 53-18
K9IVG	*12,600- 82-30*	K3QDD	5040- 42-21
WB2FJF	12,320- 74-32		

[1] KØRCF, opr. [2] K8JPA, opr.

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for October Traffic:

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
KØONK	145	6189	5180	115	11629
K6BPI	94	2360	2182	178	4814
W3CUL	192	2211	1926	271	4600
W1PEX	72	999	956	41	2068
WØLGG	142	935	878	47	2002
WØBDR	61	656	639	12	1368
W6GYH	134	534	524	6	1198
WA9CCP	90	494	448	13	1045
W7BA	12	513	476	35	1036
K2TXP	8	503	494	8	1013
WA4LCH	38	451	444	59	992
W6RSY	39	427	361	120	947
WA6WTK	4	465	416	34	919
K9KZB	28	421	405	16	870
WA2GPT	102	379	331	46	858
WØOHJ	21	418	400	18	857
W3EML	89	458	268	5	820
WB6JUH	45	388	331	56	820
K7JHA	15	422	375	4	816
WA5HUN	—	406	394	4	804
W3VR	40	371	358	7	776
W5PPE	77	347	330	17	771
K9IVG	11	385	344	10	750
WB2ALF	40	346	341	4	731
W5CEZ	36	344	287	6	673
WB6BBO	66	340	229	31	666
W7DZX	9	354	293	4	660
WA9BWY	48	330	213	42	633
WA5GPO	5	319	291	5	620
WA2RUF	56	292	227	28	603
W2EW	119	235	100	138	592
W1BGD	18	281	72	195	566
W9CXY	19	258	249	9	535
W9DYG	55	267	208	5	535
WA8CXY	15	254	253	1	523
K1BQB	8	258	252	5	523
W3NEM	16	251	208	34	509
WA4BMC	227	141	94	46	508
WØZWL	—	379	1	124	504
K1WKK	14	245	237	7	503
WA5AVO	51	253	191	5	500
Late Report:					
W6GYH (Sept.)	101	370	361	4	836
WB6BBO (Sept.)	51	284	253	2	590
WA6WTK (Sept.)	3	279	261	10	553
K6MDD (Sept.)	4	274	200	74	552

More-Than-One-Operator Stations

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
W6IAB	1364	1764	1153	611	4892
W6YDK	1739	672	629	43	3083
W4LEV	15	651	624	27	1317
K5VFR	650	164	152	55	1021
W4PFC	40	354	340	14	748
WA4PDS	65	237	218	17	537

BPL for 100 or more *originations-plus-deliveries*

W7NPL 385	K5GKQ 121	K4FTR 103	
W1LES 359	K4CDZ 115	W8DAE 102	
K5DLP 181	K6GZ 113	VE2BEZ 102	
W7APS 175	W3ZRQ 111	WA9ECX 101	
WA2TQT 170	W5DTR 111	W9NZZ 100	
K9UMR 142	K8JJC 109	Late Reports:	
W4RHA 132	K5PIA 105	WA6VFM 300 (Sept.)	
WA9GNV 132	WA8DDJ 104	WA9ECX 217 (Sept.)	
K8GOU 125	WAØFLL 103	W1UYY 173 (sept.)	

More-Than-One Operator

KØLIR 191

BPL medallions (see Aug. 1954, p. 64) have been awarded to the following amateurs since last month's listing: WB6GZY, W6QAE, K8HLR.

The BPL is open to all amateurs in the United States, Canada, and U.S. Possessions who report to their SCM a message total of 500 or a sum of 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.

A.R.R.L. ACTIVITIES CALENDAR

(Dates shown are in GMT)

Jan. 8: CP Qualifying Run — W6OWP
Jan. 9–10: V.H.F. Sweepstakes
Jan. 16–17: CD Party (c.w.)
Jan. 19: CP Qualifying Run — W1AW
Jan. 23–24: CD Party (phone)
Feb. 4: CP Qualifying Run — W6OWP
Feb. 6–21: Novice Roundup
Feb. 12: Frequency Measuring Test
Feb. 13–14: DX Competition (phone)
Feb. 17: CP Qualifying Run — W1AW
Feb. 27–28: DX Competition (c.w.)
Mar. 13–14: DX Competition (phone)
Mar. 27–28: DX Competition (c.w.)
June 12–13: V.H.F. QSO Party
June 26–27: Field Day

OTHER ACTIVITIES

The following lists date, name, sponsor, and page reference of *QST* issue in which more details appear.

Jan. 23–24, 30–31: Eleventh Annual VE1 Contest, New Brunswick Amateur Radio Assn. (p. 134 this issue).

Jan. 30–31, Feb. 27–28: The French Contest, REF (p. 80, this issue).

Feb. 7: Tennessee QSO Party, Radio Amateur Transmitting Society (p. 100, this issue).

CODE PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from W1AW will be made Jan. 19 at 0230 GMT. Identical tests will be sent simultaneously by transmitters on 3555, 7080 and 14,100 kc. The next qualifying run from W6OWP only will be transmitted Jan. 8 at 0500 Greenwich Mean Time on 3590 and 7129 kc. *CAUTION!* Note that since the dates are given per Greenwich Mean Time, Code Proficiency Qualifying Runs in the United States and Canada actually fall on the evening previous to the date given. *Example:* In converting, 0230 GMT Jan. 19 becomes 2130 EST Jan. 18.

Any person can apply. Neither ARRL 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 through 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.

Daily tape-sent code practice transmissions are available on an expanded basis this season. These start at 0030 and 0230 GMT and are sent simultaneously on all c.w.-listed W1AW frequencies, with about 10 minutes practice given at each speed: 5, 7½, 10 and 13 w.p.m. on Sun. Mon. Wed. Fri. (GMT date) from 0230–0320; 15, 20, 25, 30, 35 w.p.m. on Tues. Thurs. Sat. (days in GMT) from 0230–0320, 10, 13 and 15 w.p.m. daily from 0030–0100 GMT.

To make the practice more beneficial the order of words in each line of the text is sometimes sent reversed. The 0230–0320 GMT runs are omitted four times each year, on designated nights when Frequency Measuring Tests are made in this period. To permit improving your list by sending *in step with* W1AW and to allow checking strict accuracy of your copy on certain tapes note the GMT dates and texts to be sent in the 0230–0320 GMT practice on those dates:

Date	Subject of Practice Text from Nov. *QST*.
Jan. 4:	*It Seems to Us*, p. 9
Jan. 7:	*Balanced Modulators . . . for Sideband*, p. 11
Jan. 12:	*A Featherweight Portable . . .*, p. 24
Jan. 14:	*Some Fine Points in Message Handling*, p. 32
Jan. 22:	*Do It and Rue It*, p. 44
Date	Subject of Practice Text from *Understanding Amateur Radio*, First Edition
Jan. 25:	*Parallel Impedance*, p. 26
Jan. 27:	*Bandwidth*, p. 26

W1AW SCHEDULES

Operating Hours

Daily: 2330 to 0530 GMT.

While the reconstruction program is in progress, there is *no* provision made for visiting of the station. Visitors to the ARRL headquarters building, located on the same premises, are of course welcomed during regular office hours from 8:15 A.M. to 4:30 P.M. EST Mon. through Fri. The station will be closed January 1, 1965, New Years' Day.

Operating Frequencies

C.W.: 3555 7080 14,100 **Voice:** 3945 7255 14,280

Frequencies may vary slightly from round figures given; they are to assist in finding the W1AW signal, not for exact calibrating purposes.

Official Bulletins

Bulletins containing latest information on matters of general amateur interest are transmitted on the above frequencies according to the following schedule in GMT:
C.W.: Mon. through Sat., 0100; Tues. through Sun.0500.
Voice: Mon. through Sat., 0200; Tues. through Sun.,0430.

Caution: Note that in the U.S. and Canada bulletin hours usually fall on the evening of the previous day by local time.

SUGGESTED OPERATING FREQUENCIES

RTTY 3620, 7040, 14,090, 21,090 kc.
WIDE-BAND F.M. 52.525 146.94 Mc.

GMT CONVERSION

To convert to local times subtract the following hours:

ADST −3, AST −4, EDST −4, EST −5, CDST −5, CST −6, MDST −6, MST −7, PDST −7, PST −8, Hawaiian −10, Central Alaska −10.

Briefs

K7DQM is the leading Northwestern Division and Washington (not Utah) DX phone scorer. This places K7OXB in top position for the Utah certificate award. WB6CUU's 5643 point c.w. score for San Diego was among the missing and Andy may yet prove rough competition for his dad, WA6FPG. In the June VHF QSO Party, reported in September *QST*, the high single-operator score in San Diego was posted by K6RCK while WA2ZOW's score was inadvertently shown as WA2LOW.

W1AW NOTE

Changes are in progress and operating continues from the temporary location in the basement as we write. Full bulletin and code practice schedules continue to be sent on our 20-, 40- and 80-meter frequencies. Note elsewhere on this page the frequencies and times for bulletins and for the two daily sessions of tape-sent code practice so as to make full use of these services. With power restored to the operating room operations soon will be transferred upstairs. Resuming our schedule from new operating positions will then have priority. The use of additional operating bands will be reinstituted as rapidly as new equipment under construction and procurement becomes available and is installed.

DX CENTURY CLUB AWARDS

Honor Roll

The DXCC Honor Roll consists of the top ten numerical totals in the DXCC. Position in the Honor Roll is determined by the first number shown. The first number represents the participant's total countries less any credits given for deleted countries. The second number shown represents the total DXCC credits given, including deleted countries. Positions in cases of ties are determined by date and time of receipt. All totals shown represent submissions received through October 31, 1964.

W1FH....311/337	W8MPW....310/328	W7GBW....308/332	W2AYJ....306/325	W3GAU....304/327
CX2CO....311/332	W8BF.....310/331	W4TM.....308/330	W2WZ.....305/328	W3RNQ....304/322
W9RBI....311/336	W2LV.....310/329	WØAIW....308/331	WØSYK....305/323	W5ASG....303/327
W6CUQ....311/336	W9YFV....310/334	W6EBG....308/333	W1ZW.....305/322	W2SAW....303/320
W8BRA....311/334	W1ME.....310/333	W8LKH....308/328	K6ENX....305/322	W9KOK....303/327
W8JIN....311/336	W4QCW....310/327	W4AIT....308/331	W4LYV....305/325	W8IRN....303/321
W4GD.....311/332	W6AM.....310/335	W4ML.....308/328	W3ECR....305/322	PAØFX....303/323
G4CP.....311/335	W1BIH....309/333	K2DCA....308/325	5Z4AQ....305/323	IIAMU....303/322
G3AAM....311/335	W9LNM....309/332	VE7ZM....308/332	W2LAX....305/322	W3WGH....303/318
W2AGW....311/335	WØQVZ....309/330	LU6DJX...308/332	W4GXB....305/326	W2FZY....303/316
W4DQH....311/335	G3FKM....309/326	W6GPB....308/329	W4VPD....305/322	G3FXB....303/321
W8UAS....311/332	W3JNN....309/333	W5KC.....308/331	WØNTA....305/325	W4PLL....303/318
W8PQO....311/328	DJ1BZ.....309/327	W5ABY....307/324	W1MV.....305/322	HB9MO....303/320
W2TQC....311/330	W9HUZ....309/329	W2ZGB....307/323	W4OPM....305/320	W7WVE....303/320
4X4DK....311/329	W8EWS....309/333	WØBFB....307/325	K6EVR....305/322	K2LWR....303/316
W7GUV....311/334	W5MMK....309/330	OE1ER....307/329	K2GFQ....304/325	K4RID....303/317
W3GHD....311/335	K3UPG....309/333	K2BZT....307/324	W5ADZ....304/326	WØPGI....303/318
W1GKK....311/336	W8JBI.....309/328	WØELA....307/330	W6CYV....304/322	W8NGO....303/320
W2LPE.....311/332	DL3LL.....309/325	W3JTC....307/330	W4MR.....304/324	K4AIM....303/317
G2PL.....311/334	WØDU.....309/331	WØQDF....307/324	W9AMU....304/321	W4OM.....302/324
KV4AA....310/334	CE3AG....309/333	W2UVE....307/325	W2GUM....304/326	W5OLG....302/323
PY2CK....310/333	W3KT.....309/333	W5CKY....307/326	W7AC.....304/328	W9GIL....302/319
W9NDA....310/334	W2BOK....309/326	G8KS.....307/325	W1HZ.....304/322	WØQGI....302/318
W2JT.....310/329	W2ZX.....309/328	W8DAW....307/330	G3YF.....304/326	W6WWQ....302/319
W8KIA....310/334	HB9J.....309/333	W8HGW....306/331	W5AFX....304/329	W2OHH....302/323
W3LMA....310/332	W8KML....309/320	W7ENW....306/330	W2HMJ....304/324	HB9TL....302/318
W2BXA....310/334	W6YY.....309/329	W2OKM....306/324	W8PUD....304/321	ON4DM....302/321
W2DEC....310/326	W1CLX....309/332	W2FXN....306/320	K2OEA....304/320	W4BYU....302/320
W8DMD....310/332	W2SUC....309/326	K4LNM....306/320	DJ2BW....304/321	W2HTI....302/317
W7PHO....310/328	W1JYH....308/331	W2TVR....306/324	W5UX.....304/319	W2YTH....302/320

Radiotelephone

CX2CO....311/332	W7PHO....310/328	W4DQH....309/331	W3JNN ...307/328	W6AM.....305/329
W9RBI....311/334	4X4DK....310/328	5Z4ERR....309/331	W2JT.....307/321	WØAIW....304/325
PY2CK....310/333	W8BF.....310/331	W8PQO....308/325	PY4TK....307/324	W4QCW....303/316
W3RIS....310/335	W1FH.....309/330	W8KML....308/329	W2BXA....306/328	W8HGW....302/324
W8GZ.....310/333	W2ZX 309/328	W6YY.....308/328	W9JJF.....306/323	IIAMU....302/321

New Members

From October 1, through October 31, 1964, DXCC Certificates and Endorsements based on contacts with 100- or-more countries have been issued by the ARRL Communications Department to the Amateurs listed below.

K9ZEL.....208	DJ4KF.....105	WØN8Y.....103	K9BPV.....102	DJ7BM.....101	K8ETM.....100
VP7NY.....140	HB9ABN....105	OR4TX.....103	K9ZSE.....102	F3MR.....101	W8TN.....100
LA7H.....138	OZ1TL.....105	SM6ARH....103	HA5AT.....102	HA9OS.....101	K9SPO.....100
9M4LP.....121	K1PBW.....104	SP8RW.....103	OK3UL.....102	W1RFW.....100	DL4BV.....100
DL1PN.....116	W3FLY.....104	W1BU.....102	W8CZN.....101	WA4FDR....100	HB9ADP....100
DL3WP.....106	DL8AJ.....104	WB6BSJ....102	VE3CZC....101	K8EOP.....100	YU2NEG....100
YV5BPG....106							4X4NJ.....100

Radiotelephone

OA4CV.....197	9Q5HF.....124	W9CPD.....107	8M7CAB....106	W1EJE.....103	ZS3LW.....102
IIANE.....125	W5VBE.....111	VE3EUU....106	W4YHW.....104	YV5BPG....103	K2HOE.....101
							VE3NN.....100

Endorsements

W6UOV....310	DL1JW.....262	KØMNO....230	K7ADL.....191	K3MNJ.....160	WA2SNY....134
W6KSM.....304	F8PI.....260	OK1ZL.....230	WB2FMK..190	K4RZK.....160	VE6ABP....133
W4KFC.....301	OZ7GC.....260	W2CDP.....228	K9QIE.....190	G3LP.....160	K1AQI.....131
W4CKB.....300	W5RDA.....257	EA1GZ.....228	9Q5AB.....190	VE4MP.....157	K2YFE.....131
W4MCM....300	LA6U.....253	SP9TA.....224	OH4NS.....189	K1GAX.....153	W9IGW.....130
W6DQH....293	SP8CK.....251	W2VJN.....223	WA6GFY...183	PJ3AO.....152	IIZBS.....130
W4MS.....291	W3WPG....250	VK5QR.....221	ZL1ARY....183	W1LBA.....151	K2YLM....129
W6WX.....291	HB9MX.....250	W2FVI.....221	W2FVI.....180	W6FET.....151	HB9P.....125
W9RCJ.....287	SM3AGD...250	ZS6LW.....217	IIZQ.....180	KITUQ.....150	LA4LE.....125
W4PAA.....283	K6OHJ.....246	W6JKJ.....215	W6NUQ....175	WA2RUB....150	OE1HGW...124
EA1BC.....283	W8ILG.....246	K9WTS.....214	G3OZH....175	K7UCH.....150	W2JSX.....123
W5PWW....282	W9TQL.....245	SP6FZ.....210	K4GRD....172	W9GNX.....150	G3RFE.....123
W1JNV.....281	W4PRP.....244	DL3JV.....208	VE6AAV....172	EA3KL.....147	WA6TQK...120
DL3ZL.....281	HB9KB.....242	W1KXP.....207	W1ECH....171	SM3BNV....143	WØRJF....120
W1YDO....276	DL7HU.....241	DL9NA.....203	WB2CKS...171	G3JBR.....142	SV9WAA...120
G3KZI.....273	W1JTD.....235	W2ZTV.....201	W9YZA.....171	SP8MJ.....141	WA2RMP..113
K2GUN.....271	WØGUV.....232	ZS2U.....201	K4SHB.....167	K3LJZ.....140	K3AICO....111
W1FQA.....264	W1QV.....230	W7IYW.....200	HB9OA.....164	KØTYO.....140	W2RSO.....110
W3VKD....263	W4JBQ.....230	WA2JBV....194	W4VMS....161	WA4LYQ...138	W5FPN.....110
							W9ALP.....110

Radiotelephone

G2PL.....320	F8PI.....260	EA1GH.....211	OA4PD.....199	OA4KY.....170	PAØLOU....141
W2PTF.....301	IIRIF.....260	ZS6LW.....211	W4PRP.....197	W6WX.....167	YV5AMW...141
W3MAC.....301	W2PTM.....250	W5PWW....210	F8XP.....190	VK5QR.....168	WA4JOS....131
GI3IVJ.....291	K2CNX.....242	F2MO.....210	DL1JW.....189	K6OHJ.....161	VE3BCK....130
W1CLX.....290	W2SUC.....230	IIAIM.....208	W2ZTV.....186	YV5B1G....160	IIZQ.....122
W1YDO....272	DL7HU.....228	ZS6BBP....202	K5YYI.....180	CR7CR.....143	W2JSX.....127
W4SSU.....271	W4SHP.....214	W1WQC....200	DJ5LA.....180	W4PL.....141	WA4LYQ...120
		ZS6YQ.....212		W9WIO....170			IIZBS.....119

Station Activities

• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

DELAWARE—SCM, M. F. Nelson, K3GKF—PAM: K3LEC. RM: W3EEB. DEPN meets Sat. on 3905 kc. at 1830 local time. DSMN meets Tue. on 50.4 Mc. at 2100 local time. Renewals: W3EJU as OO; W3CFA as OPS; W3EEB as ORS. The First State ARC held its Annual Club Dinner in November. Kent ARC held its as a Christmas Party in December. DSMN continues to lead the way in the First State with an average QNI of 20. Many appointees were active during the 1964 SET and DEPN handled the intercounty traffic. The two youngest appointees, K3YHR and K3YZF, continue to do good jobs as ORS. K3YZF is now the top traffic man in the section. K3YHR finished his WAS recently. *Delaware amateurs only*: Multi-color QSLs again are being furnished by the State of Delaware to First State amateurs. To get 50 cards, send 15¢ in stamps to K3GKF, 505 Milltown Road, Marshallton, Del. Traffic: K3YZF 115, K3OWS 12, K3YHR 10, W3EEB 2, W3HKS 2.

EASTERN PENNSYLVANIA—SCM, Allen R. Breiner, W3ZRQ—SEC: W3ELI. RMs: W3EML, K3MVO, K3YVG. PAMs: W3SGI, W3SAO. E.P.A. C.W. Net meets on 3610 kc. and had QNI of 330 and QTC of 396. PTTN Training Net had QNI of 208 with QTC of 87. K3PWM is now an ORS. K3PIE transfers his ORS to our section from Western Penna. K3WEU is a new OBS and is chairman of Central Philadelphia branch of the American Red Cross Disaster Committee. W3LXN made DXCC. The Milton ARC, K3FLT, is now in operation. K3ZZL is now General Class and K3RTX is Extra Class. Philadelphia area operators are welcomed to join traffic training classes under the leadership of W3ELI. More information can be obtained on 50.2 Mc. every Mon. evening. Training aids will be sent free to those entering the class. K3GAS raised a tower and found it really does help signals a whole lot. WN3BFR is tackling WAS and in the meantime got HC1JQ and RCC. Pennsylvania drivers, as well as those in many other states, will be issued new auto tags this year. K3HNP will appreciate it if you discard your old ones in his direction. Shipping charges will be reimbursed. K3PBU, Susquehanna County EC, is working on the engineering staff of WDFM. K3QAX is on 432 Mc.-TV, and would like words or QSOs with others experimenting on same. Among this SCM's travels recently were the Mt. Airy V.H.F. Club meeting, the Mobile Sixer's Annual Banquet, our usual quarterly informal meeting with S.N.J.'s SCM, K2BG, at Hotel WA2KAP, the Susquehanna Chapter QCWA Dinner at Lancaster. We were honored to be guests of K3UN during United Nations Week at Gimbels-Cheltenham Oct. 17-23. A total of 712 QSOs were logged in 21 different countries. The group was saddened when its chairman, W3AYG, joined Silent Keys on Oct. 22. Acting chairman W3UMK finalized the week's activities. For your copy of the Pennsylvania Phone Net bulletin contact W3IVS. Your comments will be gratefully accepted at this office regarding its contents. A happy and prosperous '65 to all. Traffic: W3CUL 4600, W3EML 820, W3VR 776, K3MVO 384, K3MYS 271, K3YQJ 226, W3ZRQ 226, K3HNP 203, K3FHR 199, W3ELI 165, W3RV 131, K3OMP 107, K3PIE 94, W3QDW 69, K3YVG 68, K3KTH 65, K3WEU 64, W3AHZ 61, K3RUA 57, W3JKX 56, W3OY 52, K3PWM 52, K3MNT 44, K3HHY 38, W3AXA 28, K3RZE 27, W3VAP 25, K3MHD 24, W3ID 20, W3BUR 19, K3HKW 19, W3PDJ 10, K3HTZ 9, W3BFF 8, K3SFP 8, W3LXN 7, W3EU 2.

MARYLAND-DISTRICT OF COLUMBIA—SCM, Andrew H. Abraham, W3JZY—SEC: W3CVE. RMs: W3QCW, K3JYZ, W3ZNW, W3MCG. PAM: W3RKK. The MDD Net meets daily on 3649 kc. at 0000Z; the MDDS (slow) Net daily at 0130Z on 28.1 Mc.; the MEPN on M-W-F at 2300Z and Sat. and Sun. at 1800Z on 3820 kc. Your new SCM for the Md.-D.C. section is Bruce Boyd, W3QA, 415 Wickham Rd., Baltimore, Md. 21229. I want to congratulate W3QCW on his excellent plan for the SET and those who helped put it into effect on the MDD and MEPN. K3AKK took time out to send in a very nice report. Dick is in Viet Nam flying C-47s. W3ATQ reports the Antietam Radio Club has a new slate of officers with K3ULH as president. The club furnished communications for the Halloween Parade. W3BFY, ex-K4EZL, has his W3 call now and is busy on the traffic nets. W3CDQ took part in the YLAP Contest. K3CEZ, club station at Greenbelt, was busy handling traffic during the SET. W3EOV has his equipment ready for winter. K3GUR is a newcomer from Vermont. K3GZK is operating on 2 meters. K3JYZ made a fine score in the CD Party. K3LLR is busy with traffic. K3LLV does not have much time for traffic. W3MCG spent his vacation in Hawaii. W3MSR reports a long list of stations that have harmonics outside the amateur bands. K3NCM missed out on the CD Party. K3OAE is back on the traffic nets. K3PRN is attending the U. of Md. W3QCW is the MDD net manager and asks all stations that check into the MDD to listen for and follow the instructions from the NCS and QSY exactly to avoid QRM to stations from other nets operating near the MDD. W3RKK is trying to get a 6-meter traffic net started. K3URZ is operating with full break-in now. W3YZI has a 40-meter aluminum dipole that works fine for that band. W3ZNW has put up a new Hornet beam and hopes to get out better on the 28.1 Mc. MDDS Net. K3ZYP is a new station reporting with a nice traffic list; he also works DX on the 40-meter band. WØIPL (ex-W4GVQ) may be found on the 15-meter band or on 10 when that band is open. Traffic: (Oct.) K3CEZ 140, W3PQ 115, K3TJE 109, W3QCW 105, K3VHS 100, K3OAE 48, K3LLV 46, K3QDD 46, K3URZ 45, K3GZK 40, K3ZYP 36, W3ATQ 35, W3MCG 31, W3BFY/K4EZL/3 26, W3EOV 22, W3ZNW 13, K3NCM 10, W3YZI 10, K3LLR 8, W3RKK 6. (Sept.) K3JYZ 77.

SOUTHERN NEW JERSEY—SCM, Herbert C. Brooks, K2BG—SEC: K2ARY. PAM: W2ZI. RMs: WA2BLV and WA2VAT. We regret the passing of W2-KHW, Maple Shade. He was trustee of W2MX, the c.d. station in Maple Shade. WN2NOH, Bellmawr, has worked 14 states with 7 watts on 40 and 80 meters. N.J. Emergency Phone & Tfc. Net totals for Oct. 31 sessions, QNI 606, traffic 291. Net Mgr. W2ZI is vacationing on the West Coast and in KH6-Land. W2GIW, Vineland, has kept an 80-meter sked with W1ORF since Feb. 1952 at 8 A.M. W3BEL, Audubon, reports DXCC totals as 131 c.w. and 108 phone. The final report on the SJRA's Hamfest reveals that over 1000 attended. K3JXC was chairman. Two SJRA members, W2BLV and WA2EMB, made a first by working RTTY on 432 Mc. Gloucester County AREC did an FB job in the SET with 17 AREC members and 8 mobile units handling the steady flow of traffic. The local AREC Net meets Fri. evening on 50.9 Mc. K2JKA is Gloucester County EC and also editor of the club's paper *Crosstalk*. WB2JRU is a member of Air Force MARS. WA2WKB and WA2WGB have new beams on 50 Mc. The Southern Counties ARC has plans started for the 1965 Hamfest. WA2OZQ is editor of the club paper, *SCARA News*. The club meets at Storck Reserve Training Center, Northfield. SJRA's Christmas party and installation of officers was held Dec. 17 in the Cherry Hill High School. A reminder to Atlantic County AREC members: WB2PHV, Northfield, is the new EC for that county. We suggest that ECs appoint Asst. ECs to coordinate the available facilities in their respective county. Kindly send me a list of newly-elected officers in clubs of this section for publication in this column. Traffic: (Oct.) WA2WLN 337, W2ZVW 199, W2RG 175, WA2KIP 112, WB2GUK 54, K2RXB 47, W2MMD 38, W2ZI 18, K2GIO 13, W2GIW 6, W2IU 6, W2BEI 4, WA2-KAP 3, W2BZJ 2. (Sept.) WA2BLV 313.

WESTERN NEW YORK—SCM, Charles T. Hansen, K2HUK—SEC: W2ICZ. RMs: W2RUF, W2EZB and W2FEB. PAM: W2PVI. NYS C.W. meets on 3670 kc. at 1900; ESS on 3590 kc. at 1800; NYSPTEN on 3925 kc. at 1800; NYS C.D. on 3510.5 kc. and 3993 kc. (s.s.b.) at

0900 Sun. and 3510.5 kc. at 1930 Wed.; TCPN 2nd call area on 3970 kc. at 1900; *1PN* on 3980 kc. at 1600; *2RN* on 3690 kc. at 0045 and 2345 GMT; NYSCN on 3510 Sun. at 1000 and 3670 kc. at 2000 Mon. Happy New Year! I hope the holidays resulted in some fine new gear. Let's all resolve to make 1965 the year when we all improve our operating habits and join the local emergency net as an active member. Your SCM attended the Syracuse V.H.F. Roundup and as usual it lived up to all expectations, with 500-plus attending from all over to hear many excellent topics and meet the rest of the gang on v.h.f. The RAWNY invites all amateurs in the Buffalo area to attend its club meetings. Meetings are held the 2nd Tue. of each month at Niagara Mohawk Center, 928 Broadway, at 2030. This is the oldest club in W.N.Y. Sorry to report that W2PTP has joined Silent Keys. Congratulations to K2HXE on winning a *QST* Cover Award. WA2BPQ is now on 6 meters with a homebrew 2E26. W2EUP and K2GUG gave a talk on 2-meter f.m. and repeater operation to the GRAMS. Welcome to the following new hams: WB2GVG, the XYL of WB2GVF, WB2OKH, WN2PNK and WB2PVS. Chemung County AREC furnished communications to the MG Road Rally. Those participating were WA2s FJJ, STG, TCZ and ZBD, WA2HFL, WA2URX and K2DNN. W1DDF/2 has moved to a new QTH with his 6-meter gallon. K2UOV is building a 5-watt exciter for 6-meter s.s.b. Traffic: (Oct.) WA2KQG 449, W2GVH 440, W2RUF 266, W2OE 246, WB2GAL 211, W2FEB 137, W2HYM 131, K2RTQ 113, W2MTA 106, K2KQC 96, K2JBX 86, WB2IJF 62, K2RYH 57, WA2TVI 45, K2KTK 44, K2OFV 39, K2IMI 31, W2FCG 30, K2DNN 28, W2RQF 28, WA2DPR 18, WB2DPR 18, K2BWK 9, WA2FUJ 6, WB2FKY 4, K2-MPP 4, WB2ODU 3, WA2GLA 2, WB2FPG 1, WB2PTA 1. (Sept.) WA2ANE 25, K2KQC 22, WB2FKY 16.

WESTERN PENNSYLVANIA—SCM, John F. Wojtkiewicz, W3GJY—SEC: K3OTS. PAM: W3TOC. RMs: W3KUN, W3UHN, K3OOU. Traffic nets: WPA, 3585 kc. 0000 GMT Mon. through Sun. KSSN, 3585 kc. 2330 GMT Mon through Fri. With deep regret this column records the death of W3NUG, former RM and ORS and ardent amateur. K9WBF, formerly W3ETF, is stationed at the Granite City Illinois Army Depot. K3WFZ, newly-appointed EC for Westmoreland county, is looking for c.w. operators who are interested in forming an emergency net in the county. Kaiser Aluminum at Erie boasts 4 hams: K3GSJ, W3FVH, WA3BBV and W3KPJ. K3-QAY is alternate NCS on the Tri State Net. K3AXS and K3PBS operate on 6 meters. K3ENW is back at his home QTH. W3KPJ sends code practice Sun. on 50.52 Mc. K3WTZ runs 65 watts mobile. W3LEZ uses a Heathkit HW-12 mobile on 80. WA3AIR is the proud owner of a new Mini-Beam. W3RIH joined the Flying Hams Club. K3FFJ is very active down Chambersburg way. K3QQN has moved to Md. K3HTR has a new vertical. WN3BHV and WN3APR are newly-licensed. K3PLY and K3JCC are in the Air Force in Texas. Newly-elected officers of the Etna Radio club are K3GWX, pres.; W3KFH, vice-pres.; W3OVM, secy.; K3LKP, treas.; W3TVW, act. mgr. K3NQX handled traffic on 20-meter s.s.b. K3BLK and K3BLJ are an OM and XYL team in Erie. Attending schools of higher education are K3PYS and K3NZB, Carnegie Tech.; K3SSO, Penn State; W3BPB, Case; K3PBR, Tri State College; K3JFB, Univ. of Mich. K3-ZOP works 20-meter s.s.b. WN3AW and WA3BBV are boosting their code speed. K3ZGI operates 20-meter s.s.b. with an HW-32. WA3ANA is back on 6 meters with a homebrew rig. A new ham up Erie way is WA3-BZG, offspring of K3UIK. K3AKR has gone to RTTY on 50 Mc. Condolences to K3GGK, whose XYL passed away. W3SMV runs KSSN while K3OOU is busy with work. K3EXE battles with a course in spherical astronomy. K3SJD and son, K3OFB, have a new HQ-170. K3HSE uses an SR-160 mobile. W3KSI has a new TR-3. K3PLN and K3RKW are mobile with HE-50s. New appointees: W3RUL as ORS, K3ZGI is OES. Endorsements: K3OWN EC and ORS, K3CFA as OES, K3SMB as OBS. Happy New Year to all with much prosperity and good health. Traffic: (Oct.) W3NEM 509, W3KUN 174, K3TEZ 118, K3PYS 113, W3GJY 69, W3LOS 56, W3-SMV 50, W3MFB 44, K3SOH 28, W3IYI 23, K3ZMH 15, W3KWO 13, W3OEO 11, W6TOC 10, K3SMB 7, W3YA 6, W3LOD 2, W3RUL 2 (Sept.) W3NEM 285, W3KPJ 33, K3EXE 1.

CENTRAL DIVISION

ILLINOIS—SCM, Edmond A. Metzger, W9PRN—Asst. SCM: Grace V. Ryden, W9GME. SEC: W9RYU. RM: W9USR. PAM: W9VWJ. Cook County EC: W9-HPG. Section net: ILN, 3515 kc. Mon. through Sat. at 1900 CST. W9ISG is recovering from a serious mishap. He was struck by a moving auto a few feet from his home. W9RSV is the new net control of the Evergreen Park CD Net which meets on 50.46 Mc. at 7 P.M. WA9-AHZ has a new 61-ft. tower with an eight-element beam to bring in the hard ones on 6 meters. A new General heard is WA9JFM. W9ZND is now operating on 432 Mc. and would like some schedules. This column extends sympathy to the husband, family and friends of Mrs. Blanche Edwards, W9QLH, who recently passed away. Our sympathy goes also to the wife and friends of Ben Ruyle, W9BLL, who lost his life when his Cessna .30 crashed into a New Mexico mountain killing not only himself but two other friends. New officers of the Kishwaukee (Rockford) Radio Club are W9DNV, K9BUI, K9CZX and K9HHK. W9WTF has a new Ameco on 2 meters. Ex-W9OEV, of DeKalb, lately WA0DZH, is back in 9-Land at Freeport with 52 elements on 432 Mc. New calls in the DeKalb area are WN9LTU and WN9-NDB. WN9MHY is a new Novice in Rochelle. W9HJS displayed recent equipment from AES at a meeting of the North Shore Amateur Radio Club. K9KIP will operate from FO8AA, where he will be a guest in December. W9NWK has been elected manager of the Interstate Single Sideband Net. Tom G. Seese, Sr., for many years W9LZ, is now K4FH and his new QTH is Route 6, Box 265-1, Bradley Point, Savannah, Ga. New officers of the Six Meter Club of Chicago, Inc., are K9ZWU, W9FVB, W9AFA, K9ZWV, K9RVG, W9AVB, K9ARA and W9-CEJ. W9WYB, W9KEZ, W9BNW/9, WA9AXX, K9AAJ, W9IMN, W9ING, W9JUV/K9OSO, W9NPC, K9VVL, W9TZN, K9RNQ, W9REC, K9WMP, W9VOX and K9-UQE participated in the recent ARRL Frequency Measuring Test. W9IPH is the Radio Officer of the Villa Park Civil Defense station WA9KQP, which is operating on 50.54 Mc. with monthly meetings. The Ninth Regional Net had a traffic total of 600 messages for October and the North Central Phone Net reported a total of 600 messages for October and the North Central Phone Net reported a total of 601 for the same period. K9DRS reports that the Bogan High Radio Club's station, WA9-EGA, is now on the air with a Drake 1A and T-60. W9SXL, K9IKR, K9GMY, WA9BKC, K9UCD, WN9-KFF, WA9LEF, WA9BKG, WN9MFP, W9LMJ, K9-HKF, WA9LSG, WA9GCG, K9IKG and WA9GCE participated with the Bloomington Police Dept in patroling the city on Halloween and reporting any act of vandalism. K9UAR has been appointed OO, OPS and ORS while WA9DXA is a new OBS. WA9CCP, K9KZB and WA9CNV are BPL certificate recipients. Traffic: (Oct.) WA9CCP 1045, K9KZB 870, WA9CNV 264, WA9AJF 126, K9FBB 74, K9RHU/8 65, W9JXV 64, K9BTE 55, K9HSK 46, W9HPG 41, K9-CYZ 23, W9PRN 12, K9RAS 12, W9LNQ 4, W9SKR 4, WA9FIH 2. (Sept.) K9CYZ 148, K9WUA 66, W9JXV 37.

INDIANA—SCM, Ernest L. Nichols, W9YYX—Asst. SCM: Donald Holt, W9FWH. SEC: K9WET. RMs: W9TT, W9DGA. PAMs: K9CRS, K9GLL, K9IVG. Net skeds in GMT: IFN 1330 daily and 2300 M-F on 3910 kc.; ISN 0000 daily on 3920 kc. and M-Sat. at 2130 on 3915 kc.; QIN daily at 0000 and RFN at 1200 Sun. on 3656 kc. New appointments: W9EVH as EC of Clinton Co.; WA9EYL as EC of Pike Co., K9VZQ as EC of Clay Co. and OO; WA9FDQ as OPS. BPL certificate winners: K9IVG, WA8BWY, WA9ECX and W9NZZ. QIN honor roll: K9HYV, K9VHY, W9TT, K9DHC and W9QLW. W6QEG/9 (ex-W3QOO) is now at Notre Dame. Michigan City ARC officers: K9IDE, pres.; K9SGZ, vice-pres.; ex-WN9CLA, secy.; W9TWU, treas. Gibson Co. ARC mobiles worked a Halloween Spook Patrol. The Harrison High School ARC of Evansville is building for 420-Mc. ATV. Tri State ARS officers: K9PNJ, pres.; W9BKQ, vice-pres.; W9LGO, secy.; W9DGA, treas. WA9CJR installed a new f.m. 52.525-Mc. mobile rig. Michiana ARC ham classes have had enthusiastic response. The Clay Co. ARC has started a code and theory class. *Amateur radio exists because of the service it renders.* Oct. net traffic: ISN 849, IFN 253, QIN 129, RFN 21, Hoosier V.H.F. 36, 9RN 600, with Indiana represented 100%. Traffic: (Oct.) K9IVG 750, WA9BWY 633, WA9AUM 448, W9MIM 290, W9QLW 278, W9ZYK 240, WA9FDQ 173, WA9ECX 172, K9HYV 164, W9NZZ 163, WA9IZR 98, W9VAY 82, W9TT 79, K9CRS 76, WA9CJR 73, K9VHY 67, K9RWQ 51, K9EFY 47, K9WET 40, W9-YYX 37, W9DGA 36, W9CC 33, W9FZW 32, W9FWH 27, K9QVT 22, W9BUQ 21, W9RTH 20, W9SNQ 20, W9CLY 17, W9BZI 15, W9EJW 15, K9DHN 10, W9DZC 8, K9FHQ 6, K9HMC 5, K9ILK 5, K9UEO 5, WA9GKF 4. (Sept.) WA9ECX 255, W9JSV 4.

WISCONSIN—SCM, Kenneth A. Ebneter, K9GSC—SEC: W9BCC. RM: W9IQW. PAMs: W9NRP, W9NGT, K9IMR. V.H.F. PAM: WA9EZT. Nets: WIN on 3535 kc. daily at 0045Z, BEN on 3950 kc. daily at 2400Z, WSBN on 3985 kc. daily at 2315Z and SWRN on 50.4 Mc. Mon. through Sat. at 0300Z. New appointments: WA9EZT as V.H.F. PAM, W9QQQ as EC for Monroe County, W9-YQH as OBS on RTTY. Renewed appointments: W9-NRP as OBS, WA9EOO as OES and K9WIE as ORS.

W9DYG moved into a new QTH in Milwaukee. K9IMR received W99W Award No. 10 from the Racine Megacycle Club. WSBN set a new net record for percentage of traffic cleared. K9DBR and W9HWQ are working on 432-Mc. gear. WA9FUH is looking for someone to try his 1296-Mc. gear on. W9FNT got his TV camera working. W9IQW had a perfect attendance record on the WIN for Oct. W9BCL and W9IQW assisted in handling area county election returns. FMT results: K9GSC 4.9 p.p.m., W9GFL 12.4, K9DSZ 20.7, W9DKE 35.5 and W9UER 37.0 p.p.m. BPL certificates for Oct. traffic went to W9-CXY, W9DYG and K9IMR. K9GSC received the WAWC award from the Waupaca Amateur Radio Club. This award is available to all amateurs for working 40 or more Wisconsin counties. A new certificate went to WAØFSW for WSBN. Net reports: WSBN 764 offered and 708 cleared; BEN, 97 and 74; WIN 86 and 65. Traffic: (Oct.) W9CXY 535, W9DYG 535, K9IMR 357, W9-GOC 107, W9NRP 58, W9IQW 46, K9GSC 44, K9HJS 38, W9YT 35, W9HWQ 30, W9SAA 28, W9OTT 23, K9QKU 12, WA9EDZ 9, W9ONI 9, W9FNT 7, K9DJY 6, K9LGU 6, W9VAJ 6, K9DBR 4, W9UEB 3. (Sept.) W9EFX/9 12, K9DBR 3.

DAKOTA DIVISION

MINNESOTA—SCM, Mrs. Helen Meidrich, WØOPX—Asst. SCM: Herman Kopischke, WØTCK. SEC: WAØBZG. RMs: KØJFJ, WAØEPX. PAMs: KØFLT, KØVPJ. MSSB PAM: WØHEN. V.H.F. PAM: WAØ-CQG. The V.H.F. 6-Meter Net meets Sun.-Fri. at 10:30 P.M., Sat. at 8:00 P.M. on 50.4 Mc. Appointments issued are WAØCQA, WAØFUR, WAØACI, WAØGOS as ECs; WAØEDN is Asst. EC. OO WØWAS qualified as Class I OO in the recent FMT. Duncan is working to improve his calibrating dial in preparation for the next test. OO WØTIV cited four violations. Jim reports observing increased "out-of-band" operation. RTTY OBS WØFLK is revamping his RTTY setup for more efficient operation. EC/MSPN member WØLIG is using a Viking II and an SX-100. EC KØEMQ is installing a base for the Spaulding tower to support his Mosley 33 Jr. beam. OES/ORS KØRCF was awarded DXCC (7 Mc.). KØ-AUK, an old faithful MSPN member, has been transferred to a new QTH at St. Cloud. ORS WØGRW is building a 9 transistor keyer that he hopes to have working soon. OPS WAØEDN and family visited VE3-ECU at Port Arthur/Fort Francis and while there had an opportunity to operate the Lakehead ARC station. PAM/OBS WAØCQG is receiving good reports using a new 124 ft. long-wire antenna for 75 meters. KØFQJ/Ø and visiting hams who operated an amateur radio station at the Minn. State Fair reported it a huge success with contacts made to VE3 and all ten call districts on 2-80 meters. WAØIIJ and KØJFB received their General Class licenses. Congrats! Traffic: (Oct.) WØYC 175, WØGRW 168, WØRA 116, KØVPJ 64, WAØEPX 56, KØFLT 47, WØHEN 45, WAØBZG 44, KØMIA 42, WØ-ATO 39, WØKJZ 37, WØOPX 31, KØIJU 30, KØZRD 24, WAØEDN 23, KØERQ 22, WAØFCJ 21, WØUMX 20, WAØIEF 17, WAØCQG 16, KØJFJ 16, WAØAAM 15, WAØDFT 12, WAØCQA 11, KØRCF 10, KØZKK 9, KØIKU 8, WØLIG 8, WØMXC 8, KØSRK 7, WAØ-EZQ 6, KØIGZ 6, KØEGE 5, WØFKC 5, WAØIIJ 5, WØGCR 4, KØSXQ 4, KØSXP 3. (Sept.) KØJFJ 31.

NORTH DAKOTA—Harold A. Wengel, WØHVA—SEC: WØCAQ. PAM: KØTYY. There is nothing but the net reports this month so will pass them along. The North Dakota 75-Meter Phone Net reports for the month of Oct. 19 sessions with a total of 242 check-ins, max. 17, min. 9, and handled 13 formals and 13 informals with 3 relays. The following stations participated as net control stations: WØAQR, WØBHT, WØHVA, KØPZK, KØTYY. The Sept. report, too late for print, was as follows: 20 sessions with a total of 241 check-ins, 19 max., 4 min., and handled 10 formal and 25 informal pieces of traffic with 3 relays. Traffic: (Oct.) KØITP 97, WØBHT 2. (Sept.) KØITP 88, KØTYY 6.

SOUTH DAKOTA—SCM, J. W. Sikorski, WØRRN—Asst. SCM: Jene H. Melton, WAØDEM. SEC: WØ-SCT. RM: KØGSY. WØZWL resumed operation of the Weather Net Oct. 1, and reports an average QNI of 19 for the month. She made BPL in October. KØRPK has purchased an HQ-170AC. KØGSY has a new duplicating machine and has printed SD C.W. and TEN rosters. Traffic: WØZWL 504, KØGSY 208, WAØAOY 183, WØ-SCT 106, KØVYY 80, WAØCIJ 76, WAØARZ 74, KØ-BMQ 58, KØAIE 46, WØDVB 39, KØFRE 27, WØHOJ 27, WAØBWJ 24, KØTXW 17, KØYGZ 17, KØCXL 10, KØZBJ 10, WAØCVZ 7, WØDIY 7, KØBSW 6, WØIGG 6, KØYJF 4, WØZLS 4, WAØFJG 3, WAØFUZ 3, WAØ-CKH 2, KØKOY 2, K1CAU/Ø 1, WAØFPR 1, KØ-FQH 1.

DELTA DIVISION

ARKANSAS—SCM, Curtis B. Williams, W5DTR—SEC: W5NPM. RM: K5TWY. PAM: WA5GPO. NMs: WA5AVO and K5IPS. Now is a good time to reevaluate your contributions to public service and to make an additional effort to support our nets and other organized activities. The AREC needs your support. Can you spare a few minutes a week to help? Oct. net reports:

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QTC*	*QNI*	*Ave. Tfc.*
OZK	3790	0100Z	Daily	34	215	255	6.3
QAN	3695	0400Z	Daily	25	67	95	2.7
APN	3885	1200Z	Mon.-Sat.				
RN SB	3815	0001Z	Daily	33	268	335	8.1

The Arkansas Single Sideband Net RN meets half an hour earlier now because of long skip. Congratulations to WA5GPO, WA5AVO and K5GKQ on making BPL for the first time. K5GKQ did it with the help of the Faulkner County ARC. RN certificates are being issued to WA5IEQ, K5ZFL and K5PRL for excellent net activity. Three months of regular activity on a section net is required before a certificate is issued. Traffic: (Oct.) WA5GPO 620, WA5AVO 500, W5DTR 413, WA5HNN 383, WA5CBL 302, W5YM 149, K5GKQ 147, K5TYW 86, W9-IDA/5 67, K5ALU 38, K7RWI/5 21, WA5CAG 9, K5TCK 8, W5CAM 6, KØTPM/5 1. (Sept.) K5NCN 1, KØ-TPM/5 1.

LOUISIANA—SCM, J. Allen Swanson, Jr., W5PM—SEC: W5BUK. RM: W5CEZ. PAM: W5TAV. Over 484 amateurs were logged during Hurricane Hilda, each doing something in the public interest, convenience and necessity. Here are our state nets:

LAN C.W.	Daily	2330Z	3615 kc.
Gulf Coast Hurricane	Daily	0015Z	3845 kc.
Delta S.S.B. Net	Daily	0000Z	3905 kc.
Delta 75 S.S.B.	Sun.	1330Z	3900 kc.

Under the able leadership of W5ZBC Bossier City High School Amateur Radio Club scored 593 points in the Pasadena College School QSO Party. K5WOD, Webster Parish EC, has organized his AREC group which meets Mon. nights on 2 meters. WA5ITW, a 14-year-old student and new ORS, is one of the hot c.w. gang on LAN. K5BIB is pushing to greater heights with his Orleans Parish emergency crew. W5IQH, one of the outstanding performers in "Hilda," received a very beautiful commendation from the St. Mary Parish Policy Jury. WA5JAY is busy as an OO on 6 meters. WA5EID finds Tulane studies eating into his operating time. W5TAV reports band conditions erratic this time of the year on 75. Ted is striving to get all s.s.b. stations to use standard procedure on traffic. K5KQG has a nicely-working wire beam on 40 meters. W5CEZ makes the BPL for the second month in a row. W5PXV, a staunch LAN member, spends most of his time with MARS. WA5HRD sports new ORS and LAN certificates! W5GHP, one of our c.w. anchor men on LAN, checks into the Miss. Net twice a week as well as RN4 frequently. K5OVR says CENLA has a good Novice class going. K5OKR, WA5-BLO, W5MXQ, WA5FNB, W5IQH, K5FYI, W5ZBC, W5SEV and WA5EID are old regulars on LAN. K5FYI was thrown off the air by a falling tree during "Hilda." W5RV, W5CEW, W5BMM, K5RDL, W5SWS and W5-DHE keep 3900 "hot" each morning of the week. W5GKT, NCS on the Delta S.S.B. Net, reports traffic outlets cover most of Louisiana. WA5IEV has the new QTH complete with 60-ft tower, TH-4 and S/Line. W5FMO soon will be off to school. We regret to report the passing of W5AEH of New Orleans. W5EA is resting from his three-week vacation. Traffic: (Oct.) W5CEZ 673, W5GHP 254, WA5BLO 248, WA5FNB 208, K5KQG 61, W5FMO 54, W5PM 40, W5ZBC 30, W5MXQ 29, WA5HRD 23, K5OUR 20, W5EA 18, WA5EID 16, K5OKR 14, W5-PXV 12, W5TAV 12, K5FYI 8. (Sept.) W5IQH 110.

MISSISSIPPI—SCM, S. H. Hairston, W5EMM—SEC: W5JDF. Certainly enjoyed the Gulf Coast Sideband Dinner in honor of W5JHS, net control since the net first started. W5RY recounted the history of the net. Among the 120 present were K5RIX, W5EPT and K5SYG. W5EPT, with a Swan 400, has the best mobile signal I have heard lately, especially when W5RY is on the mike. W5LWS is proud of his Drake TR-3, as is W5EMM of his SR-160 mobile and W5KHB, who is sporting a Spitfire linear. Congratulations to K5LYC on the Amateur Extra Class license. WA5IMU really is working hard on 80-meter c.w. W5NRM is very active now and has a fine signal. W5CQJ, W5SHX, W5ESC and others keep 3925 kc. hot every day. WA5GHF is now on s.s.b. and W5LEE is active on 3950 kc. Send in your sta-

(*Continued on page 100*)

WHAT WILL be new from National in 1965? For almost a year now, we've had part of our Advanced Development Team concentrating on VHF equipment. *SSB* VHF equipment, with the same performance levels as the "DC" band gear we've introduced in the last year or so — the NCX-3 Tri-Band transceiver . . . the NCL-2000 two KW tabletop amplifier . . . the NCX-5 five-band transceiver . . . and the HRO-500 synthesized solid state receiver (well . . . maybe not *quite* the same level of performance as the HRO, which is pretty fancy, but you get what I mean).

THERE ARE two distinct groups we want to reach. One is the "right now" enthusiast who is already operating VHF, and the other is the low band operator who would get a heck of a bang out of VHF if somebody (preferably us) made it easy for him to start right off with reasonably priced, high performance equipment similar in concept to what he is now using on 80 through 10.

WHAT KIND of products? No five watt AM transceivers, but SSB transceivers, amplifiers, and "transverters" for the popular VHF bands. Priced as competitively as our other equipment, and just as feature-packed.

NO DETAILS for a few months yet, but we'll probably unveil prototypes at the amateur conventions in late spring.

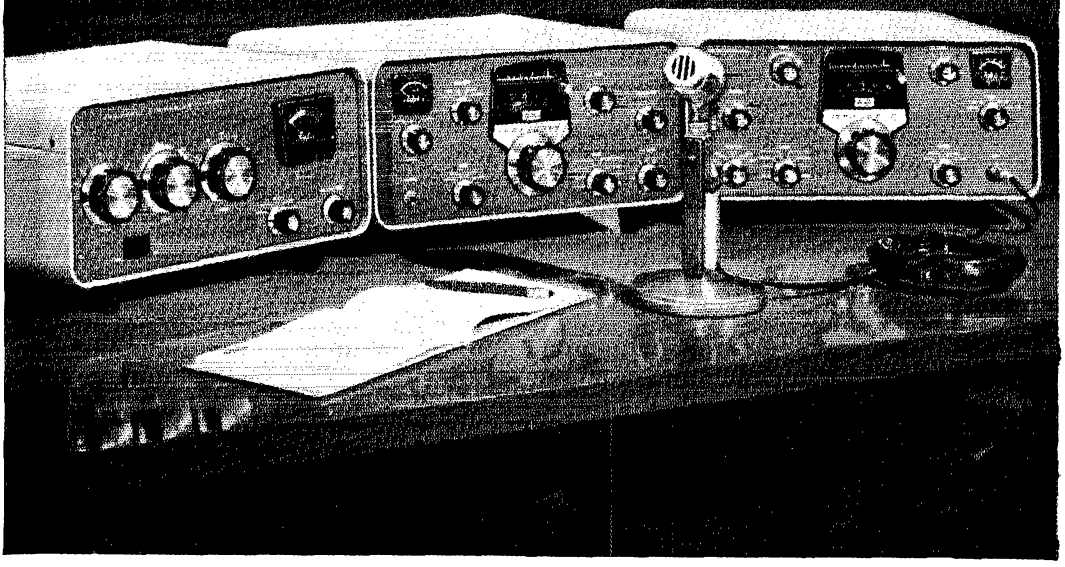
A VERY HAPPY New Year from everyone at National!

MIKE FERBER, W1GKX

National Radio Company, Inc.

ADVERTISEMENT

3 Resolutions You Should Make For The New Year!



1 Deluxe HEATHKIT® SB-200 KW Linear Amplifier!

• 1200 watts P.E.P. input SSB—1000 watts CW • 80 through 10 meter band coverage • Built-in SWR meter—Antenna relay—Solid-state power supply • Automatic Level Control (ALC) • Shielded, fan-cooled amplifier compartment • Pre-tuned cathode input circuit for maximum efficiency & low distortion • Circuit-breaker power supply protection—no fuses • Designed for 120/240 volt operation. Neat, compact and transportable (only 35 lbs.). The sturdy, yet lightweight construction of the SB-200 is achieved through the use of a heavy-gauge one-piece aluminum chassis that is partitioned for extra strength and isolation of circuits. Easy assembly is assured with clean, open circuit layout and high quality, well-rated components. The modern low-profile styling of the SB-200 makes it a neat, compact desk-top linear that is ideal for use anywhere!

Kit SB-200, 42 lbs.....$200.00

Note: Unit suitable for overseas operation.

SB-200 SPECIFICATIONS—Band coverage: 80, 40 20, 15 & 10 meters. **Maximum power input:** 1200 watts P.E.P. SSB, 1000 watts CW. **Driving power required:** 100 watts. **Duty cycle:** SSB, continuous voice modulation; CW, 50% (key down time not to exceed 5 min.). **Third order distortion:** 30 db or better at 1000 watts P.E.P. **Output impedance:** 50 to 75 ohm unbalanced; variable pi-output circuit. SWR not to exceed 2:1. **Input impedance:** 52 ohm unbalanced; broad-band pre-tuned input circuit requires no tuning. **Meter functions:** 0-100 ma grid current, 0-1000 ma plate current; 0-1000 relative power, 1:1 to 3:1 SWR, 1500 to 3000 volts high voltage. **Front panel controls:** Load; Tune; Band; Relative Power Sensitivity; Meter Switch, Grid-Plate-Rel. Power-SWR-HV; and Power Switch, on/off. **Tube complement:** Two 572B/T-160-L (in parallel). **Power requirements:** 120 volts AC @ 16 amperes (max.), 240 volts AC @ 8 amperes (max.). **Cabinet size:** 14⅞" W x 6⅞" H x 13⅜" D. **Net weight:** 35 lbs.

2 Deluxe HEATHKIT® SB-300 Receiver!

• Complete coverage of 80 through 10 meter amateur bands • All crystals included, plus provision for VHF converters • Hermetically sealed 2.1 kc crystal bandpass filter • Built-in 100 kc crystal calibrator • Smooth, non-backlash vernier dial mechanism • 100 cps stability after initial warmup • 1 kc dial calibrations—100 kc per dial revolution (provides bandspread equal to 10 feet per megacycle) • Provision for transceive operation with SB-400 Transmitter • Prebuilt linear master oscillator (LMO), wiring harness and two heavy-duty circuit boards for fast, easy assembly.

Kit SB-300, less speaker...22 lbs.....$265.00

SBA-300-1 Optional AM Crystal Filter (3.75 kc) 1 lb.....$19.95

SBA-300-2 Optional CW Crystal Filter (400 cps) 1 lb.....$19.95

SBA-300-3 6 meter converter, 2 lbs.....$19.95

SBA-300-4 2 meter converter, 2 lbs.....$19.95

Export model available for 115/230 VAC, 50-60 cps; write for prices.

SB-300 SPECIFICATIONS—**Frequency range (megacycles):** 3.5 to 4.0, 7.0 to 7.5, 14.0 to 14.5, 21.0 to 21.5, 28.0 to 28.5, 28.5 to 29.0, 29.0 to 29.5, 29.5 to 30. **Intermediate frequency:** 3.395 megacycles. **Frequency stability:** 100 cps after warmup. **Visual dial accuracy:** Within 200 cps on all bands. **Electrical dial accuracy:** Within 400 cps on all bands. **Backlash:** No more than 50 cps. **Sensitivity:** Less than 1 microvolt for 15 db signal plus noise-to-noise ratio for SSB operation. **Modes of Operation:** Switch selected: LSB, USB, CW, AM. **Selectivity:** SSB: 2.1 kc at 6 db down, 5.0 kc at 60 db down (crystal filter supplied). AM: 3.75 kc at 6 db down, 10 kc at 60 db down (crystal filter available as accessory). CW: 400 cps at 6 db down, 2.5 kc at 60 db down (crystal filter available as accessory). **Spurious response:** Image and IF rejection better than 50 db. Internal spurious signals below equivalent antenna input of 1 microvolt. **Power requirements:** 120 volts AC, 50/60 cps, 50 watts. **Dimensions:** 14⅞"W x 6⅞"H x 13⅜" D.

3 Deluxe HEATHKIT® SB-400 Transmitter!

• Built-in power supply • Complete transceive capability with SB-300 Receiver • Linear Master Oscillator frequency control • Built-in antenna change-over relay • All crystals supplied for complete 80-10 meter coverage • Automatic level control for higher talk power, minimum distortion • 180 watts P.E.P. SSB, 170 watts CW • Crystal filter type SSB generation • Operates SSB (upper or lower sideband) & CW • VOX & PTT control in SSB operation, VOX operated CW break-in • Crystal controlled heterodyne oscillators • 1 kc dial calibration—100 kc per dial revolution • Dial bandspread equal to 10 feet per megacycle • 500 kc coverage per bandswitch position • Switched 120 V AC for external antenna relay • Sturdy, lightweight, heavy-gauge aluminum construction throughout • Neat, modern "Low-Boy" styling! • Variable loading!

Kit SB-400, 33 lbs.....$325.00

Export model available for 115/230 VAC, 50-60 cps; write for prices.

HDP-21, Special SSB Mike, 4 lbs.....$29.40

SB-400 SPECIFICATIONS—Emission: SSB (upper or lower sideband) and CW. **Power Input:** 170 watts CW, 180 watts P.E.P. SSB. **Power output:** 100 watts (80-15 meters), 80 watts (10 meters). **Output impedance:** 50 to 75 ohms—less than 2:1 SWR. **Frequency range:** (mc) 3.5-4.0; 7.0-7.5; 14.0-14.5; 21.0-21.5; 28.0-28.5; 28.5-29.0; 29.0-29.5; 29.5-30.0. **Frequency stability:** Less than 100 cps per hr. after 20 min. warmup. **Carrier suppression:** 50 db below peak output. **Unwanted sideband suppression:** 55 db @ 1 kc. **Intermodulation distortion:** 30 db below peak output (two-tone test). **Keying characteristics:** Break-in CW provided by operating VOX from a keyed tone (Grid block keying). **ALC characteristics:** 10 db nominal @ 0.2 ma final grid current. **Noise level:** 40 db down from single tone output. **Visual dial accuracy:** Within 200 cps (all bands). **Electrical dial accuracy:** Within 400 cps (all bands). **Audio input:** 600 ohms or high impedance microphone **Audio frequency response:** 350 to 2450 cps at 6 db. **Power requirements:** 80 watts STBY, 260 watts key down @ 120 V AC line. **Dimensions:** 14⅞" W x 6⅝" H x 13⅜" D.

HEATHKIT®

FREE 1965 HEATHKIT CATALOG

See the wide array of Heathkit Amateur Radio Equipment available at tremendous do-it-yourself savings! Everything you need in "mobile" or "fixed" station gear with full descriptions and specifications . . . Send for Free copy!

HEATH COMPANY, Benton Harbor, Michigan 49023
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☐ Enclosed is $_____, plus shipping.

Please send model (s)_____

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Address_____

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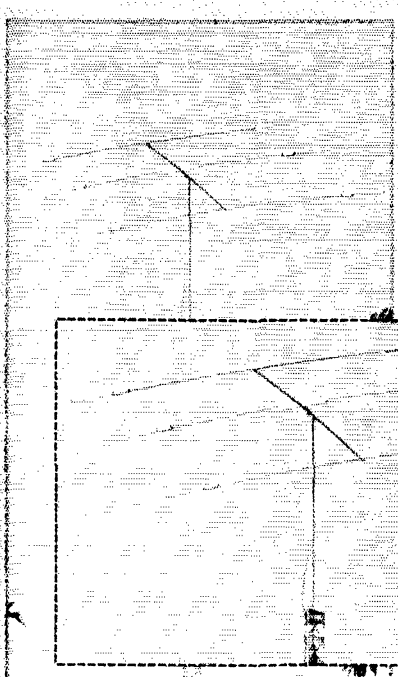
Prices & specifications subject to change without notice. AM-151R

IS THIS THE ANTENNA FOR YOU?

It is if you want Results!

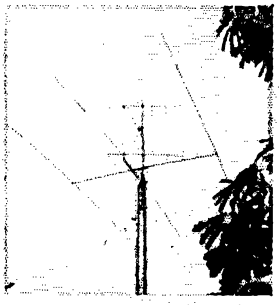
Your Letters are PROOF.

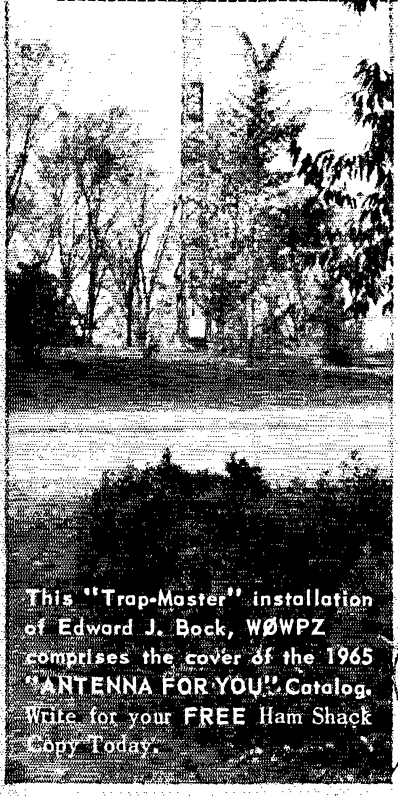


Dear Sir:
I came on the air April 11, 1963 using the TA-33 Sr. beam. By Sept. 2, 1963 I had worked WAS, WAC and 58 countries including 5-8 from Saudi Arabia and 5-9 from Ethiopia. I am convinced the TA-33 is the reason for my success. Thank you for a wonderful beam.

Sincerely,
James A. Ogden - W9FFS
Caseyville, Ill.

Dear Mr. Mosley:
I'm inclosing a snapshot of a TA-33 Jr. which just went through the eye of Hurricane Clea. Cranked down to 20 ft. the beam withstood the 120 m.p.h. winds With No Damage. You are to be congratulated on a fine product.
73,
Jim Wilson - WA4RXG
Ft. Lauderdale, Fla.





This "Trap-Master" installation of Edward J. Bock, WØWPZ comprises the cover of the 1965 "ANTENNA FOR YOU" Catalog. Write for your FREE Ham Shack Copy Today.

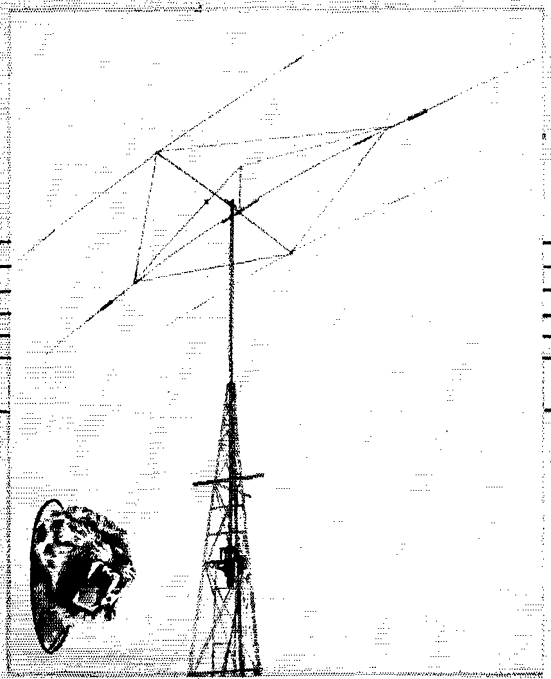
ISN'T THIS THE RUGGED CONSTRUCTION & PERFORMANCE YOU WANT FROM . . .
. . . "THE ANTENNA FOR YOU?"

Mosley Electronics Inc.
Originator of the All Metal Enclosed Traps
4610 N. Lindbergh Blvd. • Bridgeton, Mo. 63044

Export Division, 64-14 Woodside Ave., Woodside, N. Y., 11377

HOOK A TIGER TO YOUR TANK CIRCUIT

With NEW "Tig-Array"



A familiar signal on the bands is that of Carl Mosley, WØFQY, better known, perhaps, as The Old Man Himself. Those of you who have worked Carl recently have been curious about The Mystery Antenna he has been using . . . . HERE IT IS . . . . THE ALL NEW MP-33 "Tig-Array" modified for operation on 40 meters. Every Mosley antenna is installed on this forty foot tower and extensively "On The Air" tested before the antenna is approved for production. Be sure your antenna is NOT JUST TESTED but MOSLEY QUALITY TESTED!

SPECIFICATION & PERFORMANCE DATA, BELOW, ARE FOR A BASIC MP-33 "TIG-ARRAY" ONLY.

- MAX. ELEMENT - 25 ft.
- BOOM LENGTH - 12 ft.
- WIND LOAD - 96 lbs.
- TURNING RADIUS - 15 ft.
- VSWR - 1.5/1 or better.
- FEED POINT - 50 ohm.
- SWR and FRONT TO BACK essentially equal to the World Famous TA-36, Six Element Beam.

"Tig-Array", a direct descendant of the World Famous TA-33 Trap-Master and features top three band performance on 10, 15 and 20 meters, rugged Trap-Master construction and power rated to 750 watts AM and CW, 2000 watts P.E.P. on SSB (input to final amplifier).

"Tig-Array" utilizes the All Metal Enclosed Trap pioneered and developed by Mosley for the most dependable multi-band operation. Here is the perfect antenna for the radio amateur operating medium power.

MODEL MP-33

"TIG-ARRAY" BOOSTS POWER RATING OF TA-33Jr ANTENNAS

JUST $24.72

If you own one of the famous TA-33 Juniors . . HERE IS GOOD NEWS . . a version of "Tig-Array's" radiating element is available as a modification kit to . . BOOST THE POWER RATING TO EQUAL THAT OF NEW "TIG-ARRAY" yet will not effect the function of your TA-33Jr.

MODEL MPK-3

"TIG-ARRAY" IS EASILY MODIFIED FOR 40 METERS

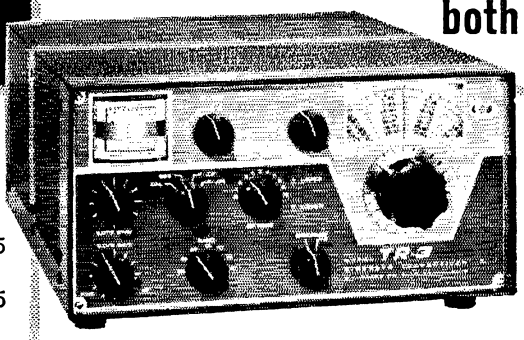
"Tig-Array" is easily modified for operation on 40 without effecting the operation of MP-33 on 10, 15 or 20. When installed, MOSLEY TA-40KR will enable "Tig-Array's" radiating element to operate as a rotatable dipole. Power rated to 1000 watts AM or CW and 2000 watts P.E.P. on SSB (input to final amplifier).

MODEL TA-40KR

Mosley Electronics Inc. 4610 NORTH LINDBERGH BLVD. - BRIDGETON, MISSOURI, 63044

DRAKE TR-3

The complete Sideband Transceiver with FULL BAND COVERAGE on both sidebands



TR-3 ACCESSORIES

REMOTE VFO
Model RV-3 $79.95

MATCHING SPEAKER
Model MS-3 $19.95

MOBILE MOUNTING KIT
Model MMK-3 $6.95

POWER SUPPLIES

AC Power Supply
Model AC-3 $79.95

DC Power Supply
Model DC-3 $129.95

Model TR-3 Transceiver
$550.00
Amateur Net

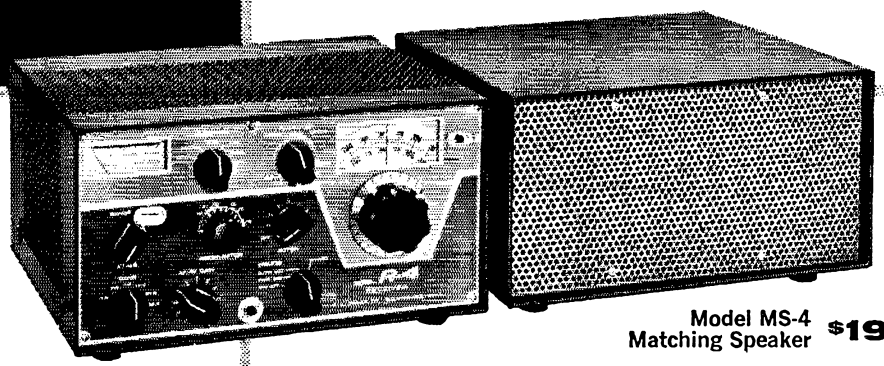
SSB Transceiver, upper and lower sidebands on all Ham bands 10 thru 80 meters. AM and CW also. 300 watts P.E.P. on SSB, 260 watts CW. Linear Permeability Tuned VFO. Compact size, ideal for fixed or mobile use.

Write for FREE Brochure

R. L. DRAKE COMPANY • Miamisburg, Ohio

DRAKE R-4

The Ham-Band Receiver with the MOST!...



Model MS-4 Matching Speaker **$19.95**

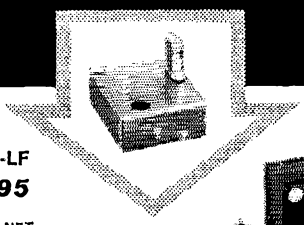
Model R-4 Receiver
$379.95
Amateur Net

Outstanding Plus-Features of R-4: Linear Permeability Tuned VFO. Will transceive with matching T-4 and T-4X transmitters. Improved overload and cross modulation performance. Built-in noise blanker. 10 accessory crystal positions for other frequencies in 1.5 to 30 Mc range.

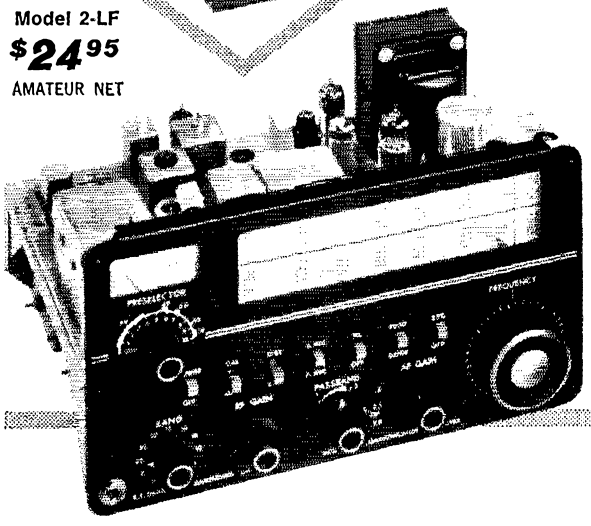
Write for detailed literature.

R. L. DRAKE COMPANY • Miamisburg, Ohio

NEW... Low Frequency Converter for Drake 2-B Receiver



Model 2-LF
$24.95
AMATEUR NET



The new **Model 2-LF Low Frequency Converter** plugs into the Calibrator Socket of the Drake 2-B Receiver. It converts low frequencies into 10 Meter ranges. Extends the range of the 2-B to include Broadcast, 160 Meters, Marine, Mars, etc. **Covers .1 to 3.5 Mc** in two ranges. Crystal for .1 to 1.8 Mc is furnished. Accessory crystal is available for 1.8 to 3.5 Mc.

FEATURES:

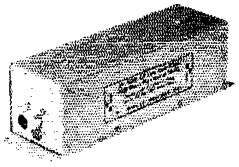
- All solid-state circuitry
- Diode ring mixer
- Transistor crystal oscillator
- Sensitivity less than 2 micro-volts for 10 db S/N
- I.F. rejection better than 50 db
- Conversion oscillator attenuation 40 db
- RF input impedance 50-500 ohms, unbalanced

R. L. DRAKE COMPANY
MIAMISBURG, OHIO

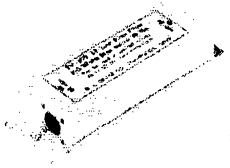
TVI CAN BE ELIMINATED WITH DRAKE FILTERS

The Drake Amateur Low Pass Filters

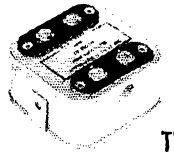
have four Pi Sections designed for sharp cut-off between 6 meters and channel 2 and to attenuate all transmitter harmonics falling in any TV channel and the FM band. 52-ohm impedance. Low insertion loss.



TV-1000-LP rated 1000 watts input, 200 watts on 6 meters. SO-239 connectors built-in.
$16.95 amateur net



TV-100-LP rated 100 watts input, 20 watts on 6. Solder it in or use your own SO-239 connectors.
$5.95 amateur net

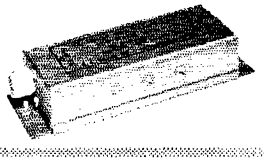


THE DRAKE TV-300-HP

. . . peer of high pass filters, provides more than 40 db attenuation at 52 MC and lower. Protects the TV set from all amateur transmitters 6 thru 160 meters. Three models—TV-300-HP 300-ohm, TV-72-HP 72-ohm, TV-300-HP(RCA) 300-ohm plug-in for RCA sets.
Any model $3.97 amateur net

The Drake TV-CB-LP Citizen Band Low Pass

is a four section filter designed with 43.2 MC cut-off and extremely high attenuation in all TV channels for citizen band and other transmitters 30 MC and lower. Rated 100 watts input. SO-239 connectors built-in.
$6.95 amateur net



$2.55 amateur net

TV-300-FMT 88 to 108 MC Band Rejection Filter.

FM broadcast transmitters are responsible for considerable TV interference being blamed on radio amateurs. The problem has become quite serious due to recent increase in the number and the power of FM broadcast stations. Overload problems and beats between FM and TV stations in TV front ends cause breakup in color pixs and wavy lines in black and white. The Drake TV-300-FMT installed in TV antenna lead and adjusted to frequency of interfering FM station will clear up pix.

SEE YOUR DISTRIBUTOR FOR DRAKE FILTERS

For details about TVI, write for free brochure
R. L. DRAKE COMPANY • Miamisburg, Ohio

SQUALO

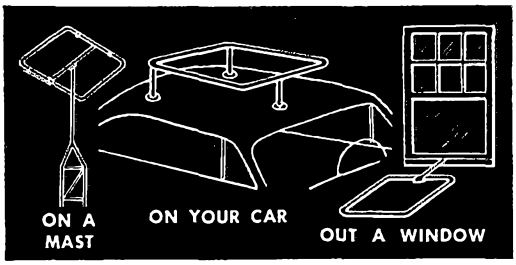
ANOTHER

CUSHCRAFT

FIRST!

SQUALO is a full half wave, horizontally polarized, omni-directional antenna. Outstanding all around performance is achieved through a 360° pattern with no deep nulls. The square shape allows full electrical length in compact dimensions. Direct 52 ohm Reddi Match feed provides ease of tuning and broad band coverage.

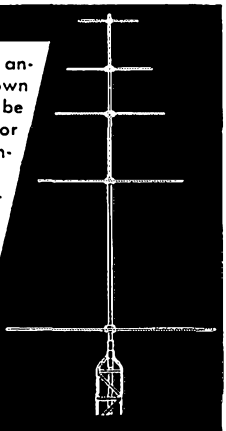
The 6 meter Squalos are completely universal for mounting anywhere. They are packaged with rubber suction cups for car top mounting and a horizontal center support for mast or tower mounting. The 10—15—20 and 40 meter Squalos are designed for mast or tower mounting. Squalo is ideal for net control, monitoring, or general coverage.



MODEL NUMBER	DESCRIPTION	NET PRICE
ASQ-6	6 Meter 30" square	$12.50
ASQ-10	10 Meter 50" square	19.50
CSQ-11	11 Meter 50" square	19.50
ASQ-15	15 Meter 65" square	23.50
ASQ-20	20 Meter 100" square	29.50
ASQ-40	40 Meter 192" square	66.50

SQUALO TREE

Design a complete multi band antenna system to meet your own requirements. Squalos can be mounted one above the other or above existing beams on a single mast. The Squalo tree is a horizontally polarized, omnidirectional system in any combination of the 6 through 40 meter amateur bands. The Squalo tree takes a minimum amount of space, and does not require extra radials, ground wires, or rotators common to most multi band systems.



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OR WRITE FOR FREE CATALOG

#65

Cush Craft

621 HAYWARD ST. MANCHESTER N. H.

(*Continued from page 92*)

tion activity reports each month and notify me if you have formed a new club. Several appointments are open. Traffic: W5JDF 253, WA5GHF 96, W5WZ 56, WA5IMU 53, W5EMM 7, K5RUO 6.

TENNESSEE—SCM, William Scott, W4UVP—SEC: W4RRV. PAMs: K4WWQ, WA4AIS, W4RMJ. RM: W4MXF. W4ZJY reports a visit from 9RN Mgr. W9QLW. W4MXF is trying QSOs with K4AMC, now DL5FL. The Memphis gang is working to make the Delta Division Convention to be held Mar. 26-28 better than ever. The RATS is looking forward to the 2nd Tenn. QSO Party Fe. 7. Sorry to learn that W4FWS is a Silent Key. W4TUO is recovering from a heart attack. SET traffic was handled on 50 Mc. by the Kingsport EC. WA4PRC reports that 28.9-29 Mc. activity is high in Union County. WA4GQM now is permanently in Memphis. The TN was active in the SET and during Hurricane Hilda. Volunteers are needed for liaison between the phone nets and TN and TN to RN-5.

Net	Freq.	Time	Days	Sess.	QTC	QNI	Ave. QNI	Ave. QR
TN	3635kc	1900C	Mon.-Sat.	28	150	217	7.7	7.8
ETPN	3980kc	0640E	Mon.-Fri.	22	48	474	21.5	2.2
TSSN	3980	1830C	Mon.-Sat.	26	56	947	36.4	2.2
TPN	3980	0645C	Mon.-Sat.	31	202	965	31.1	6.5
	3980	0800	Sun.					

Traffic: (Oct.) W4OGG 375, W4ZJY 302, WA4GQM 238, K4SXD 158, W4MXF 157, W4PQP 143, W4YAU 103, K4OUK 60, W4KAT 48, W4UVP 48, K4WWQ 47, W4CAT 31, W4WBK 29, K4NRZ 24, WA4MCC 23, W4CVG 22, W4TYV 22, W4TZJ 19, WA4UCI 18, K4UMW 18, W4VNU 18, WA4GLS 17, WA4NUJ 17, K4RCT 17, W4RMJ 17, W4VJW 16, W4WQZ 16, WA4EQA 14, W4LLJ 13, WA4IUM 11, WA4HGQ 10, WA4PFD 10, WA4EWW 8, WA4BXH 3, WA4LAX 3, W4UEO 3. (Sept.) WA4IUM 144.

TENNESSEE QSO PARTY

February 7, 1965

All amateurs are invited to participate in the Second Annual Tennessee QSO Party, sponsored by the Radio Amateur Transmitting Society. Tennessee stations are urged to work as many out of state stations as possible to permit others to earn credit for the "King Cotton Chattanooga Choo Choo" "Metro Nashville" and "USA-CA" awards.

Rules: 1) Contacts may be made during the 24 hour period starting at 0000 GMT and ending 2400 GMT February 7. 2) No power or time limitations. 3) The same station may be worked on different bands and modes. 4) The general call is CQ Tenn. C.W. and phone will be considered separate contests, requiring separate logs. 5) Exchange QSO number, report and county (Tennessee stations) or state, province or country (non-Tennessee stations). 6) Tennessee stations count one point for each complete contact, multiplied by the number of states, provinces, countries and Tennessee counties for final score. Out of state stations multiply QSO points by the number of different Tennessee counties worked. 7) Certificate awards for the first three places per state, province or country and for the first five places within Tennessee. All amateurs contacting 10 separate Tennessee stations during the contest will be awarded a "Certificate of Achievement." 8) Suggested frequencies: 3530 3900 7030 7250 14070 14275 21050 21325 28300 28900. 9) Any station disrupting a working Tennessee traffic net for the purpose of contest contacts will be automatically disqualified for any award.

Logs showing date, times, stations contacted, bands, modes, locations and computed final scores must be received no later than March 6, 1965. Send logs to the club station WA4NZE, 612 Hogan Road, Nashville 4, Tennessee 37220.

GREAT LAKES DIVISION

KENTUCKY—SCM, Mrs. Patricia C. Schafer, K4QIO—SEC: K4URX. PAMs: W4BEJ, W4SZB, K4YZU. V.H.F. PAM: WA4IUW. RM: WA4LCH. Appointments for Sept.: K4YZU as PAM for the KTN; WA4AGH as OPS. Sept. net reports:

NOW

DIRECT CRYSTAL CONTROL TO 160 mc
With AOC Plug-In Transistor Oscillators

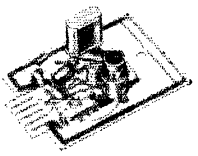
- Portable Signal Standards
- Signal Generators For Receiver Alignment
- Band Edge Markers
- Frequency Markers For Oscilloscopes
- Quick-Change Plug-In Oscillators
- Accessory Cases

HIGH FREQUENCY (20 mc – 160 mc)

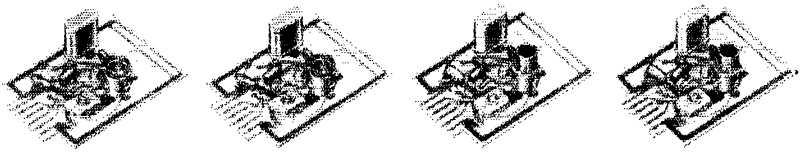
Five transistor oscillators covering 20 mc - 160 mc. Standard 77°F calibration tolerance ±.0025%. The frequency tolerance is ±.0035%. Oscillator output is .2 volts (min) across 51 ohms. Power requirement: 9 vdc @ 10 ma. max.

OSCILLATOR TYPE	OSCILLATOR RANGE	CRYSTAL TYPE	TEMPERATURE TOL. —40°F to 150°F	OSCILLATOR (LESS CRYSTAL) PRICE
OT-24	20-40 mc	CY-7T	±.0035%	$ 9.10
OT-46	40-60 mc	CY-7T	±.0035%	9.10
OT-61	60-100 mc	CY-7T	±.0035%	15.00
OT-140	100-140 mc	CY-7T	±.0035%	15.00
OT-160	125-160 mc	CY-7T	±.0035%	15.00

CRYSTAL FREQUENCY	CRYSTAL PRICE
20-60 mc	$ 6.90
60-100 mc	12.00
101-140 mc	15.00
141-160 mc	18.00



Order direct from International Crystal Mfg. Co.

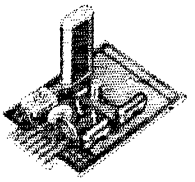


LOW FREQUENCY (70 kc – 20,000 kc)

Four transistor oscillators covering 70 kc - 20,000 kc. Trimmer capacitor for zeroing crystal. When oscillator is ordered with crystal the standard will be ±.0025%. Oscillator output is 1 volt (min) across 470 ohms. Power requirement: 9 vdc @ 10 ma. max.

OSCILLATOR TYPE	OSCILLATOR RANGE	CRYSTAL TYPE	TEMPERATURE TOL. —40°F TO + 150°F	OSCILLATOR (LESS CRYSTAL) PRICE
OT-1	70-200 kc	CY-13T	±.015%	$7.00
OT-2	200-5,000 kc	CY-6T	200-600kc ±.01% 600-5,000kc ±.0035%	7.00 7.00
OT-3	2,000-12,000 kc	CY-6T	±.0035%	7.00
OT-4	10,000-20,000 kc	CY-6T	±.0035%	7.00

CRYSTAL FREQUENCY	CRYSTAL PRICE
70-99 kc	$22.50
100-200 kc	15.00
200-499 kc	12.50
500-849 kc	22.50
850-999 kc	15.00
1,000-1,499 kc	9.80
1,500-2,999 kc	6.90
3,000-10,999 kc	4.90
11,000-20,000 kc	6.90

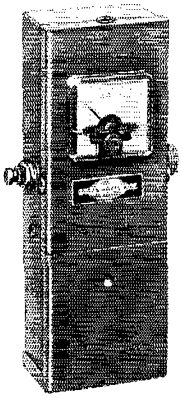


INTERNATIONAL CRYSTAL MFG. CO., INC.

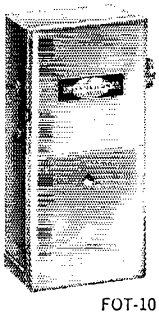
18 NORTH LEE OKLAHOMA CITY, OKLA.

AOC OSCILLATOR CASES

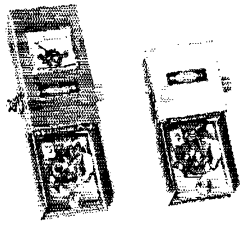
Small portable cases for use with the OT series of plug-in oscillators. Prices do not include oscillators. (When oscillator and crystal are ordered with FOT-10 case a 77° F tolerance of ±.001% may be obtained at $2.00 extra per oscillator/crystal unit. When oscillator/crystal units are ordered with FOT-20 case, a single unit can be supplied with temperature calibration over a range of 40° F to 120° F. Correction to ±.0005%. Add $25.00 to the price of FOT-20 and oscillator/crystal unit.)



FOT-20



FOT-10



FOT-20 For high accuracy calibration requirements. Includes battery and output jack, output meter circuit and battery check, as well as thermistor temperature measuring circuit. **$87.50**

FOT-10 Basic case with battery and output jack for general wider tolerance applications. **$14.50**

MT-1 Oscillator board mounting kit. **$4.95**

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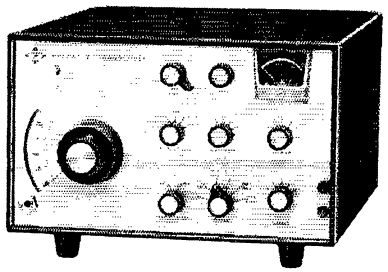
300 WATT SSB/CW TRANSCEIVERS
LESS THAN 1 CUBIC FOOT IN SIZE!!



Deluxe GALAXY V

Extremely compact, conservatively rated 300 watts PEP/SSB/CW — packs a real wallop!

Covers 80-40-20-15-10 meters, with a choice of either sideband on all bands!

Designed for either FIXED or MOBILE OPERATION. 6 crystal filter provides the "hottest" RECEIVER ANYWHERE! Has exclusive — VFO SIDE VIEW DIAL — for better mobiling. Compatable with a full line of Galaxy accessories, including DX remote VFO, deluxe accessory console including SPKR, 24 hr. clock, SWR bridge.

Only **$469.95**

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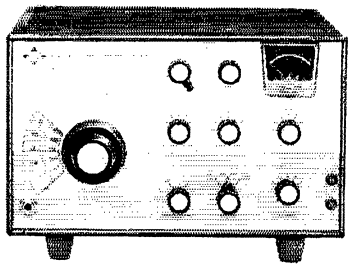

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Your NEW pacesetter in amateur design.

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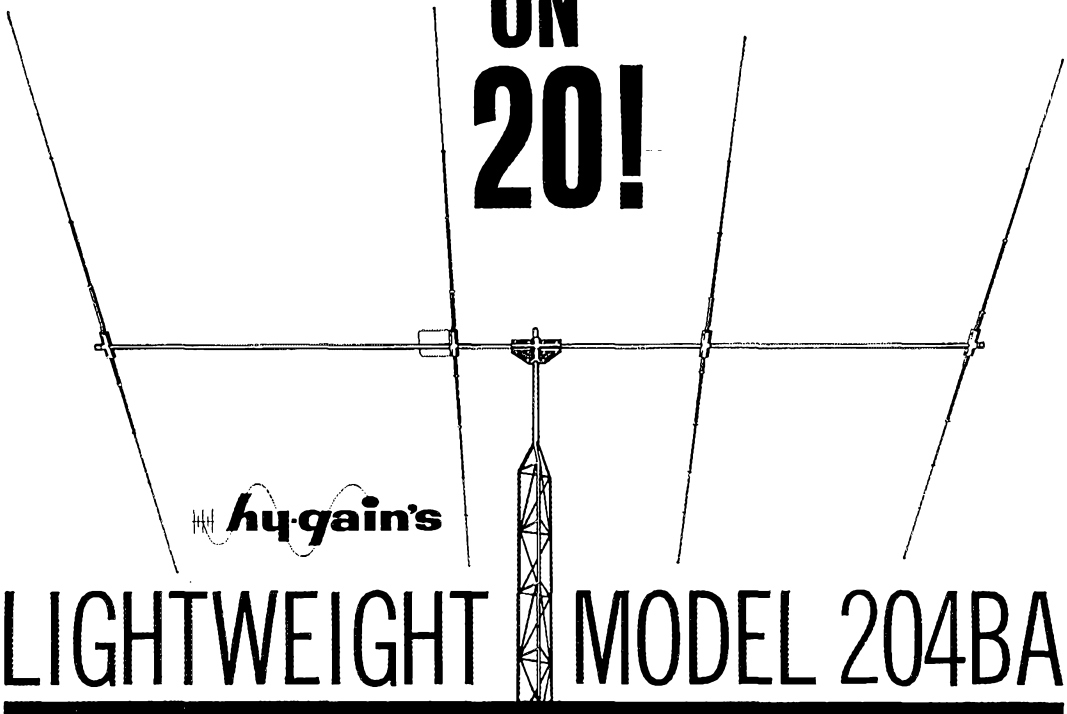
Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*
EMKPN	3960	0630E	M-F	23	51	174
MKPN	3960	0830E	Daily	30	594	86
KYN	3600	0900&1900	Daily	62	535	453
KTN	3960	1830E	M-F	22		
LATN	21,150	2000E	M-F	13	29	11

The KPN has changed its name to KTN, Kentucky Traffic Net. The Owensboro Amateur Radio Club elected K4URX, pres.; W4VJV, vice-pres.; WA4KFO, secy-treas.; W4OYI, activities. K4GEZ is at home recuperating from heart illness. It's nice to hear W4CNE on the MKPN since his retirement. K4YZU has been DXing on 75 meters. He has a new NCX-3 and High-Gain all-band vertical. The Sea Scout ship 186 now has a station on board the *Zachary Taylor II*. It is located at the Louisville Boat Harbor with the call WA4VRC. Kentucky was represented 100% on 9RN in October. K4DZM, WA4LCH, K4QCQ and W4RHZ did the honors. WN4UMN has an NC-300 and worked a VE with it. W4BAZ is building a new home. To put fun in your life, try a little c.w. on KYN. Traffic: (Oct.) WA4LCH 992, WA4BSC 131, WA4DYL 118, K4DZM 106, W4BAZ 111, K4YZU 56, WA4MEX 51, K4QIO 35, W4CDA 31, W4BTA 30, WA3ELK 28, WA4GMA 22, W4QCD 20, K4KIS 17, W4KJP 15, K4VDO 14, WN4RVP 10, WA4PVY 8, W4SZB 8, W4JRA 7, K4LOA 5, W4ZJR 5, W4PLN 4, WN4UMN 3, WA4HLW 1. (Sept.) W4QCD 38, WN4UMN 21, K4WJI 7.

MICHIGAN—SCM, Ralph P. Thetreau, W8FX—SEC: K8GOU. RMs: W8EGI, K8QLL, W8ELW. K8KMQ. PAMs: W8CQU, K8LQA, K8JED. VHF PAM: W8PT. Appointments: WA8EZB and WA8FSM as ECs, K8BYX, WA8CPH, W8ELW, W8EU and W8PBO as ORSs. New officers: Van Buren ARC—WA8DEX, pres.; WA8AMA, treas.; K8JTQ, secy. Motor City RC—K8NZI, pres.; WA8DHP, vice-pres.; W8HKL, secy.; K8OVJ, treas.; W8MRM, W8SS, trustee. The following made good scores in the Sept. FMT: K8LLR 1.3, W8TBZ 2.3, W8JLI 7.1, W8AYY 14.1, K8RDE 21.7, W8NRE 26.9, W8VPC 27.1. K8NKB has a new 50-ft. Rohn tower and a TA-33 Tri-bander. The Muskegon ARRL Convention will be held Feb. 20, 1965. The Saginaw Valley ARC now uses 3900 and 3580 as monitoring frequencies. The Michigan Six Meter Club again handled holiday traffic from the VA Hospital using K8LUY/8. The Metropolitan Ragchewers Club held its Annual Christmas Party. WA8NAX and K8PSH make General. K8VFR makes CP-30. The MCRR 6-Meter Net meets at 0200 Wed. and the 2-Meter Net meets at 0200 Tue. nights on 50.3 and 145.35 Mc. Next OTs Nite will be held at the Henry Ford Museum, May 8, 1965. The Van Buren ARC has a nice club and AREC group going. The Genesee County AREC Nets meet Wed. nights on 145.260 Mc. at 0030Z and on 29480 Mc. at 0100Z. W8IWF is using a Cliff Dweller antenna. K8TDJ wants to start a 1200% 8RN net! K9RHU/8 now is in Ann Arbor and has a new SB-200. W8DVB says 528 eyes have been transferred as a result of the work of the Eye Bank Net. W8SWF has a new 60-ft. crank-up tower with a Tri-band beam. W8DSW has a new HO-13 Ham-Scan working. K8LNE's July traffic report was mailed 8/3/64 and not received until 11/5/64—held up 3 months by POD. He had a total of 270 with received 135 and relayed 135. K8JJC lost his 80-meter antenna, as a result of a Halloween prank. He also has squirrels eating his catalogs. Traffic: (Oct.) K8GOU 319, K8JJC 290, W8ELW 256, K8KMQ 238, K8TDJ 205, K8LNE 169, K8BYX 148, WA8DDI 140, W8EU 100, W8EJR 91, WA8KXO 75, W8BEZ 74, K8QLL 70, K9RHU/8 65, K8VCB 63, K8JED 53, W8FWQ 52, K8PKU 52, WA8LGE 50, W8RTN 49, W8FX 48, WA8DZP 44, W8HKT 39, K8MFO 30, W8ZHB 30, K8VDA 29, W8AUD 26, W8TBP 23, W8WVL 18, W8YAN 18, WA8HGE 17, W8IBB 17, K8ZXB 14, W8DSE 10, K3DCB/8 8, W8FDO 7, W8AHV 4, W8NWW 4, K8GJD 2, K8LOS 2. (Sept.) W8SH 104, W8UUS 100, W8RTN 39, K8TFE 24, K8MFO 20, W8IUC 18, K8LQA 11, W8IWF 1.

OHIO—SCM, Wilson E. Weckel, W8AL—Asst. SCM: J. C. Erickson, W8DAE. SEC: W8UNP. RMs: W8BZN, W8DAE, K8LGB. PAMs: W8VZ, K8BAP, K8UBK. Your SCM has been in the Cleveland VA Hospital for the past three months. W8DAE has written the column for me and I want to say thanks for a job well done! Toledo's *Ham Shack Gossip* tells us the Oregon City Radio Club held a pot-luck dinner. Tusco Radio Club's *Beam* states the club held its annual picnic and also toured the Snyder Mfg. Co. K8EEB moved to Dover. Six Meter Nomad's *The Amateur Extra* says the club held a pot-luck dinner. The Lancaster and Fairfield Amateur Radio Club's *The Rag Chewer* states that WA8CUF and WA8IDM went on a fishing trip to Michigan, and K3FGV moved to Lancaster. Correction to the August column—It is W8VYU, Ballinger, who is president of the Massillon Radio Club. WA8HXR has a new TA-33 Jr.

A NEW TIGER ON 20!



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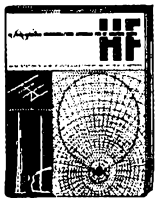
Send for your copy of Hy-Gain's new HF Catalog No. 200...16 pages of pictures and descriptions of Hy-Gain high performance Base Station and Mobile Antennas and Accessories...it's FREE!



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"World's Largest EXCLUSIVE Manufacturer of Towers; designers, engineers, and installers of complete communication tower systems."

Warren Amateur Radio Assn.'s *Q-Match* informs us that K8JUZ became a Silent Key. I had a six-day leave and came back Nov. 3 for a further check-up. Those waiting for appointments and applications for appointments, please bear with me until I get back home again. My stay there then will be longer, I hope! W8BZX and K8LGA-LGB have 2-meter rigs and hope to move traffic on short hauls from the BN-8RN. That of K8LGB also is mobile. W8TA passed away recently at the Cleveland VA Hospital. He lived in Cleveland. I met him there during my first stay. W8POH was elected president of the Seneca Radio Club at Tiffin, and WA8JSL is secretary. Plans are under way for the local AREC. W8-DAE spent two days visiting in Ithaca, N.Y., with his son and family and got a "quick virus." He got over it over night. W8QUN got married on Oct. 10. K8LVC visited W8DAE and W8RO. W8ELW, from Michigan, visited W8DAE and W8RO. It was the second time for him here, and both visits were on Halloween. Hi. WA8CXY and W8DAE made the BPL in October. Traffic: (Oct.) WA8CXY 523, W8UPH 467, K8VBG 391, W8CHT 376, W8DAE 350, K8DHF 332, K8VBH 329, K8PBE 192, W8TV 178, K8UBK 107, K8LGA 88, K8YDR 87, K8-LBU 85, K8ZCZ 52, W8MGA 50, WA8KKE 44, W8PZS 34, W8CXM 21, W8IEP 21, K8LGB 17, W8OUU 17, WA8AJZ 13, K8BNL 13, WA8EIF 9, K8ONQ 7, W8LZE 6, K8RXD 5, K8PJH 4, WA8AWH 3, K8OCL 1. (Sept.) WA8JXM 110, K8DIU 69, WA8JXT 21, K8BAP 16, K8-BNL 6, WA8MHR 2.

HUDSON DIVISION

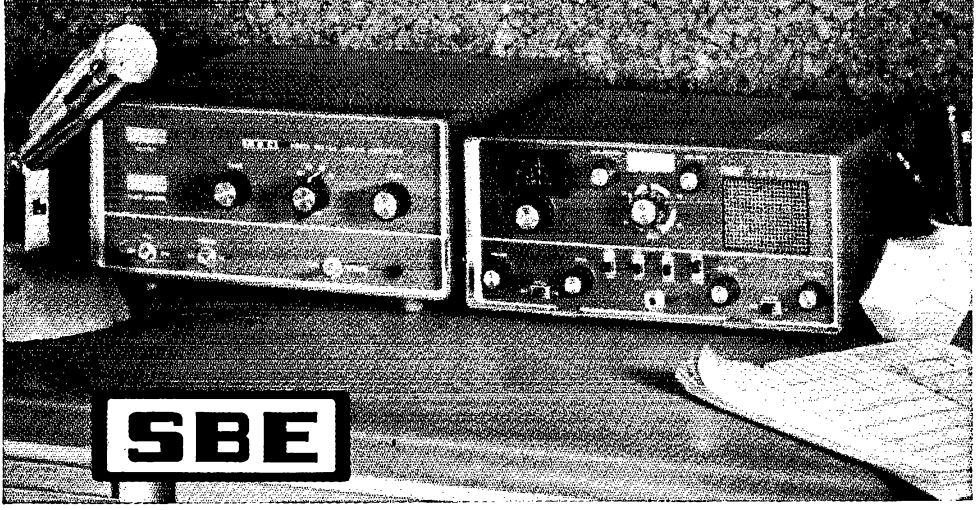
EASTERN NEW YORK—SCM, George W. Tracy, W2EFU—SEC: W2KGC. RMs: W2PHX and WA2VYS. PAM: W2IJG. Section nets: NYS on 3670 kc. nightly at 2400 GMT; NYSPTEN on 3925 kc. nightly at 2300 GMT; ESS on 3590 kc. nightly at 2300 GMT; Emergency Coordinators on 146,550 kc. Fri. at 0130 GMT. Appointments: W2ANV as ORS; WA2VYK and WB2-HZY as OBS. Endorsements: W2AWF and K2SJN as EC; K2RDS as OBS and K2SJN as OPS. Congratulations to K2TXP on making the BPL in October. W2-QFR, K2DEM and K2UTC did well during the September Frequency Measuring Test. The October program at the Westchester Club was a talk on filters by an engineer from Burnell Co. At the Albany Club W1-UDT, of Sprague, spoke on "decibels." Vacuum Tubes and Solid State Devices was the topic by Amperex at the New Rochelle Club. In Schenectady ARRL General Manager WILVQ spoke on incentive licensing. New Generals are WB2HZS and WN2LSX. Among those sporting new gear in the shacks are K2YRZ, K2SJN/K2RRZ and WB2GMN. WB2HZY is on 40 meters holding down a new bug. A new member of Army MARS is WB2FXB. NYSPTEN member WB2FVD has a new tri-band beam with rotator. ESS Manager WA2VYS reports the net handled 157 messages in October and its membership is increasing steadily. Both the Schenectady and Westchester County AREC groups reported substantial gains in scores during the SET. K2TXP represents the Sight Conservation Society of Northeastern New York on the North American Eye Bank Net on 20 meters daily. This group located over 500 eyes during the past two years for persons needing corneal transplants. Our congratulations. Traffic: K2TXP 1013, WA2VYS 304, WA2UZK 279, K2SJN 127, W2OGH 119, W2EFU 117, WB2FVD 107, WB2FXB 106, WB2CPU 84, WA2LJM 83, WA2OOO 57, WA2JWL 53, W2ANV 44, WB2NKN 42, W2URP 30, WB2HYA 19, WA2VYT 15, WA2WGS 7, K2HOH 6, WB2FYP 4, WB2HZY 4, K2DEM 1.

NEW YORK CITY AND LONG ISLAND—SCM, Blaine S. Johnson, K2IDB—SEC: K2OVN. Section nets:

NLI	3630 kc.	1915 Nightly	WA2EXP—RM
VHF Net	145.8 Mc.	2000 TWTh	W2EW —PAM
VHF Net	146.25 Mc.	1900 FSSnM	W2EW —PAM
NYCLIPN	3932 kc.	1600 Ex Sun.	WA2QJU—PAM
NLS (Slo)	3630 kc.	1845 Nightly	WA2RUE—RM

NYC-LI AREC nets: *See Dec. 1964 column.*

BPL certificates were awarded to WA2GPT, WA2RUE, W2EW and WA2TQT. WA2YGC, WA2NHU and WB2-CFU did the beam raisin' atop the Memorial H.S. of Valley Stream. WN2NWL, a new YL in these parts, already is working DX with an Eico and an HQ-110. WN2PRE is checking into the Hempstead AREC Net. Hey, WA2PWS has a new Pawnee and when he turns it loose the receiver at WA2GPT walks right off the table! Those Indians are rascals, aren't they? WB2HWB is checking into the Mike Farad Net nowadays which is on 3610 kc. daily at 0500Z. WA2RUE was elected pres. of the Newfield HSRC, whose club call is WB2BLH. W2-EW received an Alaskan Public Service Award, too! WB2IQG did grab a KH6 for WAS (pumped it up to a kw. though with four 811s). WB2LUK is homebrew-



a KW ssb station

only 64½ cents per watt

The brilliant new **SB-34**, SSB 4-band transceiver serves as your receiver and exciter... the new matching **SB2-LA** Linear furnishes the big bang! This advanced design power combo costs you only 664.50, unquestionably the lowest cost per watt obtainable! But this is only part of the value story. **SB-34** has a **built-in power supply,** 117V AC **and 12V DC**... needs no separate inverter... connects directly to the 12V car battery when you want the added pleasure of 4-band mobile transceiver operation. **There's just no comparable value!**

SB2-LA LINEAR AMPLIFIER . . 249.50

Husky, heavy-duty, with 1KW p.e.p. input capability on 80-40-20 meters. 750 watts on 15 meters, this exceptionally compact amplifier matches SB-34 in general size and appearance. Designed to operate with SB-34, it will also boost the output of **any** SSB exciter to a full KW. All-solid-state 117V AC power supply is built-in. Heavy gage steel cabinet is finished in dull black. Panel is black with satin aluminum trim. Black knobs have nickel inserts.

- 4-bands, 80-40-20-15. Pi network. Band switching.
- Passive grid input for resistive load to exciter. Drive: 60W or more depending upon the linear amplifier power output.
- Low plate voltage (800V)/high plate current. Easier on capacitors, rectifiers, power transformers. Safer under environmental extremes.
- High filter capacity for dynamic regulation.
- Built in antenna relays (2). Int. blocking bias.
- HI/LO power and TUNE/OPERATE switches. Panel meters for output and plate current.
- Uses six, parallel-connected 6JE6's.
- Size: 5¼"H, 11¾"W, 11⅝"D. 35# approx.

SB-34 TRANSCEIVER 395.00

Sparklingly new . . . **SB-34** retains all the well-proved, bi-lateral and other circuit advances of SB-33, adds important new plus-performance features. As in SB-33, transistors and diodes replace vacuum tubes (except for the 2—6GB5's in PA and 12DQ7 in driver) greatly reduce size of the equipment and lower the current drain. When transmitter filaments are switched off for casual listening **SB-34 draws only 500 ma on receive standby.**

- Built-in supply, 117V AC and 12V DC. Just use proper power cord. (Provided).
- No relays . . . solid-state switching. **Breakthrough!**
- Delta receiver tuning, ± transmitter frequency.
- Solid-state dial corrector . . . uses Varactor.
- Extended frequency coverage—MARS—DX bands.
- Single-knob, dual speed tuning.
- USB or LSB selectable by panel switch.
- Collins mechanical filter—transmit/receive.
- Pre-wired for VOX/100kc calibrator accessories.
- Size: 5"H, 11¼"W, 10"D. 20# approx.

Please send information on SB2-LA and SB-34.

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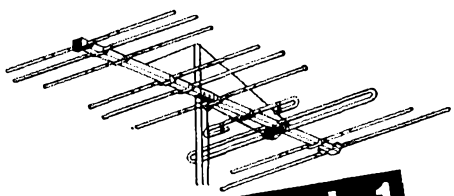
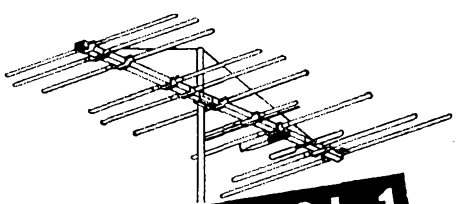


2 ANTENNAS in 1

MODEL A-62 · 300 OHM

On 2 Meters:	On 6 Meters:
18 Elements	Full 4 Elements
1-Folded Dipole Plus Special Phasing Stub	1-Folded Dipole
1-3 Element Colinear Reflector	1-Reflector
4-3 Element Colinear Directors	2-Directors

Amateur Net **$33.00**
Stacking Kit **$2.19**



2 ANTENNAS in 1

MODEL A-62 GMC · 50 OHM

On 2 Meters:	On 6 Meters:
Equivalent to 18 Elements	4 Elements
1-Gamma-Matched Dipole	1-Gamma-Matched Dipole
1-3 Element Colinear Reflector	1-Reflector
4-3 Element Colinear Directors	2-Directors

Amateur Net **$34.50**
Stacking Kit **$18.00**

MODEL AB-62 GMC

On 2 Meters:	On 6 Meters:
Equivalent to 30 Elements	Equivalent to 6 Elements

Amateur Net **$52.50**

Also:
5 New 6 Meter Beams
3 New 2 Meter Beams
1 New 1¼ Meter Beams

Gold Corodized for Protection Against Corrosion

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or write Dept. QS for Catalog 20-226

The FINNEY Company - Bedford, Ohio

ing a keyer. WB2OTT was elected pres. of Bayside HSRC. WB2AWX moved his QTH about a mile on Pearl Harbor Day. WA2YLL is busy putting up wire beams on 15, 20 and 40. K2SJP isn't allowed to put an antenna on his 250-ft. co-op so he devised a way of loading up the building's frame! If anyone wants to know more, contact him. WA2PJL checks into NYCLIPN from W2SZ at Rensselaer. W2PF would rather switch from a 32S-1 to a 32S-3 than fight, so he did! New officers of the QCWA are W2MM, pres.; W2-KW, vice-pres.; and W2JE, exec. secy. WB2NSQ is rasselin with a Heath Cheyenne, a Heath Comanche and a Totem Pole vertical on 75 meters! WB2MJQ has a CP-15 and is now on from W1SW at Phillips Academy in Mass. New Tech. WB2JQM is a nurse at Brooklyn VA Hospital. WA2GAB is a brand-new Al-Operator. W2FWV, WA2HUF, K2UPA, W2JKF, K2TVR, W2YCW, WA2TZY, WA2OGU, K2DGI, W2GPQ, WB2BOM and WB2FDY, all of the Nassau County 10-Meter AREC Net, received the NYC-LI ARPSC Award. W2OBU is going wild with an HT-44, tilt tower and tri-band beam. WA2RKK is now using an International FCV-2 Converter. WA2JKX works 80- and 40-meter c.w., but his XYL, WA2LOZ, works 40- and 80-meter c.w., which seems to be the right order of things. WA2TYF, who passed the General class exam in April, still is trying to get the license away from FCC's computer. W2ZAI reports that WB2FCB and WB2EUH are new members of the Nassau County 10-Meter AREC Net, bringing the net membership to 117. WN2PTL is a brand-new call in these parts. K2UYG just grabbed his 304th country using his new kw. W2BHJ and the Nassau/Suffolk 10-Meter mobile gang started their Captree "Eyeball Meets" again with the first one held Oct. 11. WA2VLK is indundated with books instead of traffic at the U. of Buffalo. K2-CMV has a new Hy-Gain trap-type antenna and TR-44 rotator, but hasn't figured out what to do with the combo yet. WA2IPC is at Rensselaer. WA2TAQ was appointed EC for Queens County and W2BOT was appointed EC for Queens 2-Meter nets. WA2DTY is a new ORS, while WB2NSQ and WB2LUK are new OPSs. The v.h.f. bands have a new OES in WA2AQQ. Happy New Year! The Rockaway ARC will hold a Two-Meter Amateur Hudson Division Contest Sun., Jan. 10 . . . object for those in the Division to work ten members, and those outside to work *five* members. Contest runs from 1800 to 2300 GMT. Submit GCR list to Ken Ribet, WA2OOL, 267 Beach 141 St., Rockaway Park, N.Y., for contest certificate. Traffic: WA2GPT 858, WA2RUE 603, W2EW 592, WB2HWB 436, WB2EUH 349, WA2QJU 283, WA2TQT 244, WB2IQG 177, W2DRQ 120, WA2LJS 97, W2GKZ 86, WB2DBW 76, WB2LUK 73, WB2MLN 57, WB2OTT 52, W4TRU/2 40, WB2IGV 36, WB2AWX 29, WA2YLL 27, WA2OOL 23, W2ELK 19, WA2WIH 17, WB2EGV 15, WA2WAO 14, W2EC 12, K2SJP 10, WA2-PJL 9, WA2DTY 8, WA2UYQ 8, WB2NSQ 5, W2PF 5, WA2RMP 4, W2GP 3, WB2HLM 3, WB2BLH 1.

NORTHERN NEW JERSEY—SCM, Edward F. Erickson, W2CVW—Asst. SCM: Louis J. Amoroso, W2-LQP. NNJ ARPSC Nets:

NJN	3695 kc.	7:00 P.M. Daily	WA2BLV-RM
NJ Phone	3900 kc.	6:00 P.M.	W2PEV-PAM
NJ Phone	3900 kc.	9:00 A.M. Sun.	W2ZI-PAM
NJ 6&2	51,150 kc.	11:00 P.M. M W Sat.	K2VNL-PAM
NJ 6&2	146,700 kc.	10:00 P.M. Tu. Sat.	K2VNL-PAM
NJNN*	3725 kc.	7:30 P.M.MTWTh	WB2HLH-RM
16N	1880 kc.	7:30 P.M.Tue.	WA2UOO-RM

*Novice and slow speed. All times local. AREC Net sked information is available from K2ZFI, SEC. New appointments: W2TSN as EC Warren County; WA2-JVO as OO; WB2KLD as OBS, 145.242 kc. 6 P.M. MWF, 6 A.M. MF, 9:30 P.M. Sun.; WA2YJV as OBS, 144.800 kc. 9:45 P.M. TF, 8:45 P.M. Sun. New officers of the Union County ARA are W2JZD, pres.; W2GBY, vice-pres.; Bob Reiboldt, secy.; Frank Aim, treas. Meetings are held Fri. at the Roselle C.D. Building; 2nd and 4th regular; 1st and 3rd code and theory. WA2TEK is mobile with a new Swan 240. W2ZAL will visit Bayonne clubs to expand AREC coverage. WB2GFY took first place for N.J. in the Illinois QSO Party. WA2BNF handles liaison between Hudson AREC #2 and NY-LI V.H.F. Nets. New officers of the Highland Park HSRC are WB2GMR, pres.; WB2ICH, vice-pres.; WB2GFY, secy.-treas. WA2PWI is coordinator of the CHC-FHC Service Net. Congratulations to WB2PLK on the receipt of his General Class license. WA2HGL and WA2-BLS have new tri-band beams. K2RXQ/4 has received a Navy Dept. certificate for working 15 maritime mobiles. Bill says it takes 5 QSOs to qualify and is available from the Director of Naval Communications, Wash., D.C. K2IBF has a new AZL 2-meter converter. WB2KQJ has added 40 c.w. and 75 phone to his station. WA2JIA is RO for Bayville. Emil operates mostly 40-meter c.w. and has logged 1054 QSOs in 30 states since

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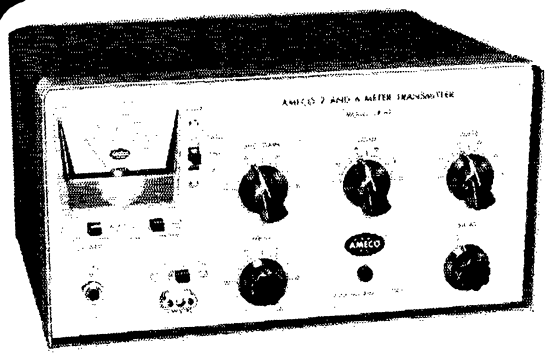
NEW 2 and 6 Meter TRANSMITTER



The NEW AMECO TX-62

In response to the demand for an inexpensive compact VHF transmitter, Ameco has brought out its new 2 and 6 meter transmitter. It is easy to tune because all circuits up to the final are broadbanded. There is no other transmitter like it on the market!

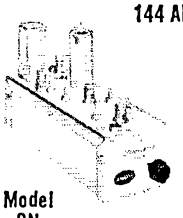
SPECIFICATIONS AND FEATURES

Power input to final: 75W. CW, 75W. peak on phone.
Tube lineup: 6GK6—osc., tripler, 6GK6 doubler, 7868 tripler (on 2 meters) 7984-Final. 12AX7 and 6GK6 modulator.
Crystal-controlled or external VFO. Crystals used are inexpensive 8 Mc type.
Meter reads final cathode current, final grid current and RF output.
Solid state power supply.
Mike/key jack and crystal socket on front panel. Push-to-talk mike jack.
Potentiometer type drive control. Audio gain control.
Additional connections in rear for key and relay.

Model TX-62 Wired and Tested only $149.95

• HAS BUILT-IN MODULATOR AND POWER SUPPLY • 75 WATTS PHONE AND CW • ATTRACTIVE LIGHT GRAY PANEL AND DARK GRAY CABINET • COMPACT SIZE 11½" WIDE, 9½" DEEP, 6" HIGH.

NUVISTOR CONVERTERS FOR 50, 144 AND 220 MC. HIGH GAIN, LOW NOISE



Model CN

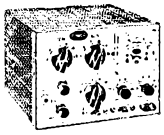
Has 3 Nuvistors (2 RF stages & mixer) and 6J6 osc. Available in any IF output and do NOT become obsolete as their IF is easily changed to match any receiver. Average gain — 45 db. Noise figure — 2.5 db. at 50 Mc., 3.0 db. at 144 Mc., 4.0 db. at 220 Mc. Power required 100-150V. at 30 ma., 6.3V. at .84A. See PS-1 Power Supply. Model CN-50W, CN-144W or CN-220W wired. (specify IF.) **$49.95.** Model CN-50K, CN-144K or CN-220K in kit form. (specify IF.) **$34.95**

ALL BAND NUVISTOR PREAMP 6 THRU 160 METERS

MODEL PCL, Wired, $24.95
MODEL PCLP with built-in power-supply, wired, $37.95

2 Nuvistors in cascode give noise figures of 1.5 to 3.4 db. depending on band. Weak signal performance, image and spurious rejection on all receivers are greatly improved. PCL's overall gain in excess of 20 db. Panel contains bandswitch, tuning capacitor and 3 position switch which puts unit into "OFF," "Standby" or "ON," and transfers antenna directly to receiver or through Preamp. Power required — 120 V. at 7 ma. and 6.3 V. at .27 A. —can be taken from receiver or Ameco PS-1 supply. Size: 3"x5"x3".

COMPACT 6 THRU 80 METER TRANSMITTER



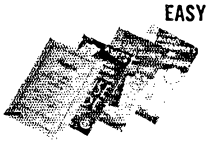
Model TX-86

Handles 90 watts phone and CW on 6 thru 80 meters. Final 6146 operates straight thru on all bands. Size — only 5" x 7" 7" — ideal mobile or fixed. Can take crystal or VFO. **Model TX-86 Kit $89.95 — Wired Model TX-86 W $119.95. Model PS-3 Wired $44.95. Model W612A Mobile Supply wired $54.95.**

CB-6

CB-6K — 6 meter kit, 6ES8-rf Amp., 6U8-mix./osc. $19.95
CB 6W — wired & tested ... $27.50
CB-2K — 2 meter kit, 6ES8 1st rf amp., 6U8 — 2nd rf amp/mix, 6J6 osc. $23.95
CB-2W — wired and tested. ... $33.95
Model PS-1 — Matching Power Supply — plugs directly into CB-6, CE-2 and CN units. **PS-1K — Kit ... $10.50**
PS-1W — Wired $11.50

EASY TO UNDERSTAND AMECO BOOKS



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Radio Operators' Lic. Guide, EL 1-2 ..... **.75**
EL 3 ..... **1.75** EL 4 ..... **1.25**
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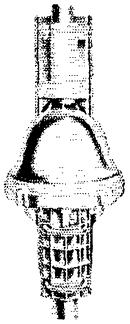


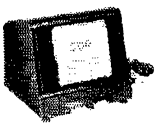
Introducing the TR-44, a high-performance rotor system for the Amateur on a budget who's ready to upgrade his antenna installation.

The TR-44 approaches the accuracy and ruggedness of the famous Cornell-Dubilier HAM-M but is designed specifically for intermediate loads.

Check these features:

- Control box contains the HAM-M meter.
- Dimensionally identical to TV rotor types AR-22, TR-2 and TR-4. The TR-44 even fits the same bolt holes!
- End of rotation electrical motor cut-off.
- No mechanical clanking, no electrical pulse noise.
- Increased rotational torque...up to twice as much as TV rotors!
- 48-ball bearing movement.
- New idiot-proof brake system.

If you are now getting marginal results using a TV rotor, the TR-44 is for you! It will give you the increased torque, braking and accuracy that are needed for large VHF arrays and small HF combination antennas. For technical information, contact Bill Ashby K2TKN or your local CDE Distributor.



CDE makes a complete line of the world's finest rotors: the HAM-M; the new TR-44; heavy-duty automatic TV; heavy-duty manual TV; standard-duty automatic TV; standard-duty manual TV; and the industry's only wireless remote control rotor system! Cornell-Dubilier Electronics, Div. of Federal Pacific Electric Co., 118 East Jones St., Fuquay Springs, N. C.

CDE CORNELL-DUBILIER

1959. K2RDX is looking for schedules on 432 Mc. WB2-JCP has 23 states confirmed on 50 Mc. WA2JVO and WB2FYB continue to pioneer 220 Mc. in Bergen County and are looking for new stations. WA2VYN and WB2-BCS are operating 420-Mc. RTTY and TV. WB2DEP received 2nd place for N.J. in the CHC QSO Party. WB2ALF has 11 states on 2 meters. WB2EZY has rearranged his shack. Officers of the new Bergen ARA are WA2IDH, pres.; WB2ONF, vice-pres.; K2RHH, secy.; WB2HID, treas. Club frequency is 50.25 Mc. The Net is held at 9 P.M. Sun. except when meetings are held, also on Sun. WA2BLV has been reelected NJN Mgr. for 1965. WB2HLH has been appointed manager of the N.J. Novice Net. W2VMX, OO, reported many spurious emissions in the 5-Mc. region during October. Be careful! Out-of-ham-band emissions are very serious violations. Traffic: (Oct.) WB2ALF 731, K2VNL 438, W2-CVW 221, WA2GQZ 206, WA2TEK 199, WB2HLH 189, WB2AEJ 173, WB2DEP 162, K2ZFI 151, WA2VID 126, W2ZAL 106, W2LQP 94, WA2UOO 87, K2UCY 85, WB2-GFY 80, WA2BNF 47, W2PEV 35, WB2ERM 28, WA2-WAJ 26, W2TFM 24, WB2ICH 22, WB2KXG 21, WA2-CCF 19, K2JTU 19, WA2TWS 15, WA2TBS 14, WA2WHZ 13, WB2JWB 12, WA2PWI 10, K2EQP 6, WB2KLD 6, W2CFB 5, WB2IYO 5, WA2MYB 4, WA2ZKT 4, W2-NAK 3, W2NIY 3, W2VMX 3, K2VVL 2, W2EWZ 1. (Sept.) K2JTU 32, W2LQP 30.

MIDWEST DIVISION

IOWA—SCM, Dennis Burke, WØNTB—Asst. SCM: Ronald M. Schweppe, KØEXN. SEC: KØVBM. RMs: WØLGG, WØUSL. PAMs: KØBBL, WØLSF. New ECs are WØYLS for Dubuque and KØYWC for Plymouth.

Nets	*QNI*	*QTC*	*Sess.*
Interstate SSB	1221	665	31
75 Meter Phone	1050	96	27
160 Meter	846	7	31
Hamilton County	152	2	27

WØUSL has given up NCS for Interstate S.S.B. We hope W9NWK will do as well as John but it will be a real challenge. KØVBM, our fine SEC, is giving up the job Jan. 1 and although I expect to fill the spot temporarily as best I can I would appreciate suggestions and applications. These two fine amateurs are not lost to ham radio but in each case the pressure of work and personal affairs is responsible so thanks and best wishes to both of you. Iowa reports two Silent Keys this month, WØJXY and WØANK. Our SET was somewhat disappointing this year in the number of reports. Those we did receive were very good but let us all get into the game next year. Traffic: WØLGG 2002, WØBJR 1368, KØQKD 134, WØUSL 112, WAØFSW 107, KØ-VBM 78, WØNTB 75, WØGQ 32, KØTDO 19, WØYDV 10 KØHLX 6.

KANSAS—SCM, C. Leland Cheney, WØALA—SEC: KØBXF. RM: WØSAF. PAMs: KØEFL, WØBOR. V.H.F. PAMs: KØVHP, WØHAJ. Net traffic reports for Oct.

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QTC*	*QNI*	*Ave.*
KPN	3920	1245Z	M-W-F	17	61	326	19.2
KPN	3920	1400Z	Sun.				
QKS	3610	0030Z	Daily	26	58	95	5.25
KSBN	3920	0400Z	Daily New net effective Jan. 1.				

NCSs all nets: WØORB, KØGII, KØUER, KØEFL, WØBYV, KØBXF, KØIRL, WØSAF. Please note that a brand-new net will start operation the first of the year. The RM will be WØBOR. The mode will be s.s.b. Operators will be needed so get in touch with the RM and let's go. Appointment activity awards for the year ending Oct. 31 are as follows: WØBYV as ORS, KØGII as OPS, WØIFR as OBS, WAØDZI as OES, WØPFG as OO. Trophies have been presented to each of the winners. Note that WØHAW is now working at Cape Kennedy and WØEZT is in Tehran, Iran. My, how some of these hams travel. Hi! If you do not already hold an appointment in our field organization and wish to, please contact your SCM. There's lots of room. Traffic: WØ-OHJ 857, KØGII 169, WØBYV 76, WØZUX 45, WAØ-CCW 42, WAØEDD 17, WØBLI 15, KØJMF 13, KØEFL 10, WØWFD 10, KØGIG 6, WØVBQ 2, KØVQC 1.

MISSOURI—SCM, Alfred E. Schwaneke, WØTPK—SEC: WØBUL. I have suffered a grievous loss and hope all will bear with me in this report. My wife was killed in an auto accident Nov. 1 at 9:30 P.M. The requirements of carrying on the family will curtail some of my activities on the air but I will continue as your SCM as long as you want. I wish to express my deep appreciation to everyone for the many expressions of sympathy and comfort from all over the state and surrounding

a new Look

IN SSB AND CW PERFORMANCE

the versatile **HX-50A**

The new HX-50A is the latest addition to Hammarlund's long line of outstanding communications equipment. Designed with operating convenience and flexibility in mind, the HX-50A includes, as standard equipment, Hammarlund's exclusive ZBZ (Zero-Beat-Zero) for hands-off frequency spotting. Assures precise frequency regardless of mode selection without touching front panel transmitter controls. Front panel calibration level control assures precise zero-beat signal level regardless of receiver gain. Optimum CW break-in operation with delay control independent of VOX adjustment. **AND** for extra punch, SSB power input has been upped to a full 200 watts P.E.P.

In addition to new operating convenience and increased power, the HX-50A retains all of the well known features of the "fabulous '50" including:

- ☐ Complete coverage — 80 to 10 meters (160 optional)
- ☐ Broadband coupling throughout —band-to-band and edge-to-edge with only minor final re-tuning
- ☐ Filter-type SSB generation
- ☐ Built-in antenna changeover, VOX, and CW break-in
- ☐ Illuminated band-in-use slide rule dial

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Frequency	Loss Per 100 Ft.	Frequency	Loss Per 100 Ft.
5 Mc.	.37 Db.	30 Mc.	.83 Db.
10 Mc.	.45 Db.	50 Mc.	1.22 Db.
20 Mc.	.65 Db.	150 Mc.	2.02 Db.

Heavy non-contaminating vinyl outer jacket protects the pure, bright copper braid, low-loss nitrogen foam dielectric and heavy copper center conductors. Excellent flexibility even under sub-freezing environmental conditions. ONLY .83 Db loss Per 100 Ft. at 30 Mc.

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200	36.00
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500	80.00
1000 (2—500 Ft. Reels)	150.00

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sections. I am also sorry to report that WØDYN, son of WØBXB, is a Silent Key because of an auto accident. The St. Louis Amateur of the Year award by KØLIR went to KØPHD, of the Zero Beaters ARC, Washington. The Zero Beaters ARC's new officers are WØZAF, pres.; WØVMIX, vice-pres.; WAØFAE, secy.; WAØAVG, treas.; WNØFEF, act. mgr. New officers of the U. of Mo. at Rolla ARC, WØEEE, are KØVXU, pres.; WAØEZX, vice-pres.; KØSGI, act. mgr. The Mules ARC at Warrensburg received the call WAØKNV for its club station. WØAIM reports that simulated messages or "canned" traffic is being used successfully on the 5 County AREC Net to teach methods of handling traffic. KØLQH is moving to West Chicago. WAØFUI is now Gen. Class. KØWOP has a new antenna tower. Officers of the U. of Mo. ARC, Columbia, WØZLN, are KØANB, pres.; KØRNK, vice-pres.; WAØAIY, secy.-treas. Net reports for Oct.:

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*	*Mgr.*
MEN	3885	2345Z	M-W-F	12	253	150	WØBUL
MON	3580	0100Z	Tu.-Sun.	30	215	249	WØOUD
MNN	3580	1900Z	M-Sat.	26	74	32	WØOUD
SMN	3580	2200Z	Sun.	4	18	39	WØOUD
PHD	50.4	1245Z	Wed.	4	74	14	WAØFLL

Traffic: (Oct.) KØONK 11629, KØAEM 271, KØLIR 266, KØFPC 229, WØOUD 225, KØEQY 137, WØHVJ 120, WAØFLL 103, KØBUL 92, WØTPK 67, WØKIK 44, WØRTW 42, KØLQH 41, KØWOP 28, WØAIM 26, KØLGZ 19, WØOMM 18, WAØFKD 14, WØBVL 10, WØGBJ 5, KØVIP 5, WØGQR 2. (Sept.) KØLQH 34, KØLGZ 11, KØWOP 10, WØOGC 4.

NEBRASKA—SCM, Frank Allen, WØGGP—SEC: KØJXN. Net reports for Oct.

Nebr. Morn Phone	3982.5	1330Z	QNI	604	QTC 76
West. Nebr. Net	3850	1400Z	QNI	658	QTC 37 WX 346
Nebr. Emer. Phone	3982.5	1830Z	QNI	877	QTC 98
Nebr. Storm Net	3982.5	2330Z 0030Z	QNI	984	QTC 25
AREC Net	3982.5	1430Z Sun.	No report		
Nebr. C.W. Net	3525	0100Z	QNI	201	QTC 26
		0400	QNI	127	QTC 24
Nebr. AREC C.W. Net	3782.5	0000Z	QNI	22	QTC 2

SEC KØJXN has just completed a series of trips throughout the state contacting AREC members and lining up ECs for all counties. If you have not been contacted to learn your part in the AREC, please get in touch with Larry. AREC calling and emergency frequencies are 3982.5 and 28,600 kc. Net activity is on the climb in the state, and check-ins to any of the above listed nets are always welcome. Traffic: WØLOD 89, KØJFN 72, WØNIK 53, WAØBID 52, KØDGW 42, WØNYU 40, WAØBIE 34, WAØAES 31, WØOCU 30, WØAHB 27, WØBFN 27, WØFIG 26, WØFQB 24, WØMTI 24, WØZHV 24, WØGGP 23, KØFRU 18, KØHNW 18, KØRRL 17, WØYFR 12, WAØBOK 11, WØLJO 11, WAØBYK 10, WØECQ 10, WAØGHZ 10, WAØJCI 10, WAØCMK 9, WAØDOU 8, KØFJT 8, WØNOW 8, WØCEZ 7, KØCWK 7, WØFCE 5, KØHNT 5, WØKDW 5, WØVEA 5, WØFBY 4, WAØDFS 3, WØCTW 2, KØGSY 2, WØHOP 2, WØPQP 2, KØJCH 1, WØWZR 1, WØZOU 1, WØZWG 1.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, Robert J. O'Neil, W1FHP—This report was submitted by W1YBH. CPN reports for Oct.: 31 sessions, 110 messages, average of 4; average daily attendance 14 stations; average net time 34 minutes. Attendance leaders: K1OQG 29, K1AQE 26, W1YBH 24, W1LUH 23, K1LFW 20, K1PPF/1 18, K1EIC 17, W1GKF 17, K1SRF 17, K1UQQ 17. CN reports: 31 sessions, 607 messages; average 11.7 stations and 19.6 messages per session. Report includes the SET. High QNI: Q1ZFM, K1STM, W1CTI. Traffic: W1RGD 566, K1WKK 503, K1LFW 219, W1CTI 125, K1GGG 109, W1BDI 94, K1EIR 90, W1EFW 81, WA1ALZ 64, W1YBH 59, K1EIC 50, W1GKF 33, K1JAD 15, K1SRF 15.

EASTERN MASSACHUSETTS—SCM, Frank L. Baker, Jr., W1ALP—W1AOG, our SEC, received SET reports from these ECs: K1s PNB, DZG, AQI, ICJ, W1s RMI, EHT, JSM, NZP, LVK, STX, also one from K1YKZ. Don and I want to extend to all a Season's Greetings. W1AOG would be glad to take care of the license expiration service, see page 45 Oct. *QST*. W1s PLJ, OSQ, PXH, K1s WJD, RPA and WA1CRK took part in the Sept. FMT. W1PEX and W1LES made the BPL. W1EFW presented the Danvers Club with its ARRL Charter of Affiliation. W1ALP was present. W1ALP visited ARRL and also attended the 3rd Annual Banquet of

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6KE8	Tripler/1st Mixer	6AQ5	Rec. Audio/ Modulator
6EJ7	2nd Mixer		
6BA6	10.7 MC IF Amplifier	6AQ5	Modulator
		6KE8	VLO, Buffer
6BE6	3rd Mixer	6KE8	OSC/Tripler
6BA6	456 KC Amplifier	12BY7	72 MC Amplifier.
6AL5	Diode Detector/ Noise Limiter	12BY7	Doubler
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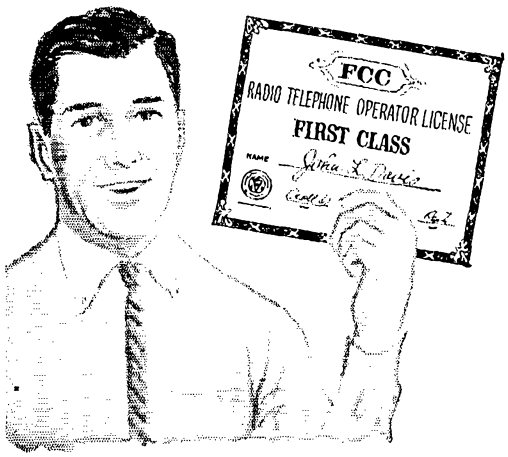

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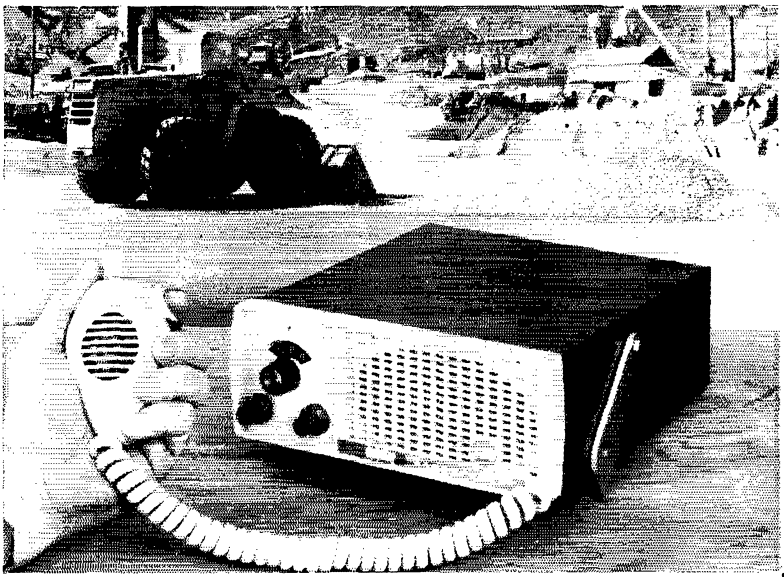
Massasoit ARA. KZ5KG/1 will be in Boston for awhile and will be on 6. K1HMP says that K1UGN, B.U. ARC, is on the air and the Milton Club meets the 2nd Thurs. Heard on 75: W1s OUM, ABI, THT, PXK and WA1-AZR. K1QAG had an operation. K1OYP, WA1BQZ and WA1DAG are on many bands. K1VUT is working DX. Q1AGW, W1NC and WA1CAV are Silent Keys. K1WHM and W1IH are on 6. W1ALP had LO-Nite at his QTH. W1s AOG, OFK, K1s BGK, PNB and XYLs were present. W1ERH is at WIHS-TV in Boston. The EMISON had 33 sessions, 167 QNIs, 231 tfc. in Sept. and 30 sessions, 206 QNIs, 291 tfc. in Oct. W1OTZ broke his hip and is coming along slowly. K1OJQ is writing a column "Ham Radio" in the *Sunday Globe*. K1DYA is on from Colorado Springs with the call WØIXH. K1BUF and Jerry bought a house in Burlington. The T-9 Club met at W1TYP's QTH. K1OLQ is attending the U. of Mass. WA1CVV is K1OGA's son. The Middlesex ARC has a lot of new members. W1s KCO and AMO flew to the New London Hamfest with W1HXK. W1s LXR and HOM are new members of the QCWA. W1MVO has a new vertical antenna. W1BAB has NCX-3 mobile. W1TZ has a 50-year award from the QCWA and is on 20. K1OIC, W1s UQH and AZU were on WBSM's program "Open Line" in New Bedford concerning our hobby. The 6-Meter Net had 22 sessions, 360 QNIs, 34 tfc. W1WAW and K1EAV are back on the air from a new QTH in Chelmsford. K1BGK says to look for Santa Claus on 50.2 Mc. this Christmas Eve from Hull at 6 P.M. K1UCT has a ten-element beam on 6. W1JBA has a 44-element array on 220. W1AWA and K1DGI are going to Florida again. K1JMM is down there. K1VPJ is an Alt. NC for the 6-Meter Net. The Needham Emerg. Net now is on 51.75 Mc. K1ESG has skeds with W1UYY and WA2RUE for traffic. WA1CRK has ROOA. W4-YAC/1, a new ORS, finds DX across the pond easier up here. Appointments endorsed: W1PSG, Gloucester. W1-JSM Waltham, W1YYZ Randolph, K1QAM Mansfield as ECs; W1JSM as OES; W1WU and K1OJQ as ORSs. K1-WHM is a new OBS; W1WAJ a new OO. W1WU gets on 40-meter c.w. W1WAJ is back on the air. The Framingham Club held a meeting. W1s FRR and LMZ spoke at the Wellesley Club with slides, "On the Air in Europe." W1LSR is moving to Florida. W1YYZ now is working for Lincoln Lab. His town has acquired a new site at the foot of the Blue Hills for a C.D. Center. W1AEM-K1AG says his auto plate number is like two old tubes, 210-807. K1QAM says that Mansfield and Norton have joined together for c.d. work. WA1CLR and WN1CRR are in our 2-Meter Net. W1ELP has worked 3000 on 6 with 1822 of them W and K1s. W1SIV and XYL went on a cruise to West Indian waters. K1GTX was in a car accident. W1ZSS is enjoying his retirement by going to N.J., Westfield, Mass., etc. New officers of the Danvers ARA are W1HVN, pres.; W1JZV, vice-pres.; K1-TWJ, secy.-treas. ROs are W1s LN, VMD and K1LVV. The QRA held a meeting. W1FJL showed slides of his trip. K1PNB put out a nice Novice bulletin. WA1CDG is on 6-meter s.s.b. with an HX-30 and a Drake 2B. K1VGM has a new NCX-3. K1EPN has a Clegg 99er on 6. K1MEM is on the air. W1QGN has a new QTH. W1HKG went to California. W1AKY has a sked with his son. Traffic: (Oct.) W1PEX 2068, W1EMG 486, W1-LES 472, K1ESG 319, K1PNB 175, K1WJD 175, W1OFK 136, WA1DAG 112, WA1CRK 102, W1DOM 96, W1EAE 88, K1VPJ 78, W1AOG 60, W1ZSS 44, K1GKA 31, K1-LCQ 31, W1SW 13, K1MEM 11, K1VOK 10, W4YAC/1 10, K1BGK 9, K1CMS 8, K1DZG 4, K1WHM 4. (Sept.) W1EAE 97.

MAINE—Acting SCM, Herbert A. Davis, K1DYG—SEC: K1DYG. PAMs: K1BXI, K1ZVN. RM: K1NAN. V.H.F. PAM: K1QIG. Traffic nets: Sea Gull Net, 3940 kc. 1700 to 1800 and 2000 to 2100 local time Mon. to Sat.; AREC Net, 0900 Sun. 3940 kc.; Two-Meter Phone and Traffic Net, 14,508, Thurs. 1930 to 2030; C.W. Pine Tree Net daily 1900 on 3596 kc.; State of Maine C.D. Net Wed. on 3530 kc. at 1900 and Sun. 1100 on 3940 kc. By this time many of our summer friends are down south operating from their sunny locations. Many skeds are being kept on many parts of the bands. Because of conditions a pre-net group is on before net times to help pass traffic and informals. The Two-Meter Net is doing a nice job helping to pass traffic and is looking for more members. Most counties have an active group in the AREC which is open to all the amateurs. There are many new hams in the state. A hearty welcome to them and we wish them success and pleasure along the way. Traffic: K1TVT 79, K1QIG 62, K1NAN 54, K1-SZC 44, K3VIV/1 34, K1DYG 28, K1LHE 16, W1OTQ 6.

NEW HAMPSHIRE—SCM, Robert C. Mitchell, W1SWX/K1DSA—SEC: W1ALE/W1TNO. PAM: K1-APQ. RM: W1DYE. The Granite State Phone Net meets on 3842 kc. (alt. 3845 kc.) Mon. through Fri. at 2330Z and Sun. at 1430Z. VTNHN meets on 3520 kc. Mon. through Fri. at 2359Z. New appointments: K1PSR



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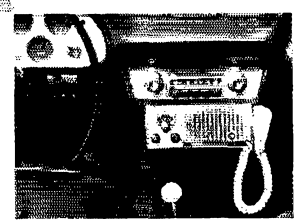

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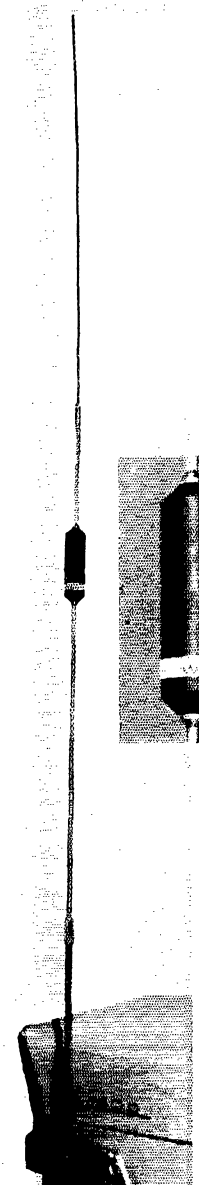

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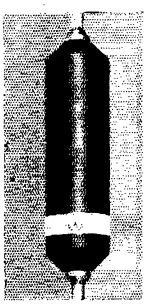

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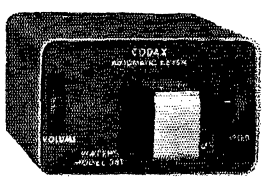

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as OES. W1DYE as RM/ORS. Endorsements: W1CBB as ORS/OO. K1APQ reports 474 check-ins and 24 traffic for GSPN. K1UZG reports 113 check-ins and 49 traffic for VTNHN. W1YMJ is out of the hospital and active on GSPN. W1YHF is on the air with a.m. on the mountain where he works. Welcome to new hams WA1CXQ and WA1CYA. K1APQ and yours truly have discussed utilizing 3842 kc. for the N.H. monitor and calling frequency. K1UYA has been issued a GSPN certificate. W1KOC mobile is heard often on 75. We need more liaison between nets. Any suggestions or volunteers? W1RCC, Nashua Mike and Key Club president, reports that logs are pouring in from the NH QSO Party. W1EVN has a new inverted "V" antenna on 75. The Monadnock and the Souhegan Radio Clubs received their ARRL affiliation certificates. These were presented by our New England Director, W1EFW. W1PYM is working in W6-Land. Traffic: K1BGI 21, W1DYE 15, K1NBN 8, W1SWX 2.

RHODE ISLAND—SCM, John E. Johnson, K1AAV—SEC: W1YNE. RM: W1BTV. PAM: W1TXL. V.H.F. PAM: K1TPK. New appointment: W1RDH as EC. Endorsements: W1YNE as OO, ORS and OPS; K1PAM as OO and OES. Section Net certificates were issued to K1AUO and K1SMI. The RISPN reports 31 sessions, 714 QNI, 114 traffic. RIN reports 22 sessions, 136 QNI, 86 traffic. The W1AQ Club of Rumford issued WRI certificate No. 54 to WA1AGE, having all contacts on 6 meters. Code classes are being conducted at the club Fri. at 1930 by W1YUT. The W1AG Rag Chew Net is now operating Thurs. at 2100 on 28.75 Mc. K1s AMG, AGA, PEL, OYK, W1s WAC and YUT compose the W1AQ Club's bowling team, which meets on Wed. nights. K1NJT has completed his rig for 2 meters. New Novice tickets were issued to WN1s CVC, CVD, CWA, CWZ and CXF. New Tech. Tickets were issued to WA1s CYN, CYW and CZB. K1EWL has received his fifty awards endorsement seal from the Certificate Hunters Club. The R.I. Emergency Net meets Mon. at 2000 on 51.5 Mc. The RI AREC Rag Chew Net meets Mon. at 2030 on 51.0 Mc. Send your AREC applications to the SEC or SCM. Traffic: W1YNE 169. W1BTV 131, K1TPK 128, W1TXL 128, W1VWR 91, W1YKQ 70, K1NJT 48, K1USD 38, W1BTV/W1YKQ 36, K1VYC 35, K1YYI 33, K1YDR 31, K1VEY 30, K1BRJ 20, K1EWL 6.

VERMONT—SCM, E. Reginald Murray, K1MPN—SEC: W1VSA. RM: W1WFZ. Green Mt. Net, 3855 kc. daily at 2230Z; Vt. Fone Net, 3855 kc. Sun. at 1400Z; VTNH Net 3520 kc. Mon. through Fri. at 2400Z; Vt. C.D. RACES Net, 3993 kc. (a.m.) Sun. at 1500Z. Congrats to new Novice WN1CSX in Northfield, new Conditionals K1FSM in Saxtons River, WA1CSS in Essex Jct., WA1CUI in S. Burlington and to new General K1YGI in Fair Haven. K1BQB has been appointed OBS and earned her BPL certificate. K1IJJ is getting a kw. lined up. We wish a speedy recovery for K1RMF who was injured in an accident. K1UZG is doing an FB job with the VTNH Net. Some wide-band f.m. activity on 2 meters is being planned in the Burlington area. The BARC club house burned Oct. 17 with an almost total loss. Oct. net check-ins: Gr. Mt. 667, Vt. Fone 115, VTNH 113. Happy New Year. Traffic: K1BQB 523, W1KJG 49, K1UZG 44, W1WFZ 34, K1LLJ 24, K1MPN 16, W1IZS 4.

WESTERN MASSACHUSETTS—SCM, Percy O. Noble, W1BVR—SEC: W1BYH/K1APR. C.W. RM: K1IJV. 75-Meter PAM: K1RYT. Hampden County 10-Meter Traffic Net Manager: K1PKZ. There is very little news this month except from club bulletins. I don't wish to cancel any appointments, but that will be the inevitable result unless more reports are forthcoming. Those certificates aren't just for wall decoration. They certify action and monthly reports also. New members of the Hampden County Radio Assn. are W1DEW, K1ZFT, WA1AMO and K1HBX. W1QWJ was guest speaker at the October meeting. Members of the HCRA are urged to get into the Wed. 28.7 Mc. Net at 9 P.M. The Pittsfield Civil Defense RACES furnished communication during the Halloween Parade. Those participating were W1BKG, K1CTL, K1GFT, W1IW, K1SGK, W1UUJ, K1CVE and W1WF. K1BII now has a 2nd-class commercial ticket. WA1CPD has a new Shawnee. The following are successfully chasing DX: W1DGT, K1JGW, K1RTY, W1WF, W1COI and W1UUK. W1MEW is building a homebrew receiver. Traffic: (Oct.) W1BVR 118, K1YMS 55, K1LBB 41, W1ZPB 8, W1DYW 6. (Sept.) W1UYY 209.

NORTHWESTERN DIVISION

IDAHO—Raymond V. Evans, K7HLR—PAM: W7GGV. On Halloween four mobiles and two fixed stations assisted the Rexburg City Police with goblin patrol.

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Participating stations were W7DWE, K7ENE, K7ULJ, K7WHY, W7WWU, K7DXP, W7WBK and W7FGM. The C.D. exercise, "Alpha Ex," was the best exercise that this section has ever seen and was made possible by the extensive planning of W7YON and others. Participation by hams as well as C.D. officials was terrific. If you missed this one be sure to get in on the next one this coming spring. K7DZA has beenn appointed EC for the Idaho Falls area. The Idaho Falls gang also assisted in the goblin patrol again this year. Only one EC report was received for the SET, that by K7SJM of Challis. FARM Net: sessions 22, QNI 629, QTC 54. Traffic: K7HLR 80, W7FGM 38, W7GGV 6.

MONTANA—SCM, Joseph A. D'Arcy, W7TYN—SEC: W7KUH. Montana S.S.B. Net meets Mon. through Fri. on 3910 kc. at 0100 GMT; Missoula Area Emergency Net (AREC) Sun. at 1600 GMT on 3890 kc.; Montana PON Sun. at 1530 GMT on 3885 kc. Endorsements: W7COH as EC; W7BLK as OO, ORS and EC; K7UPH as OPS; W7RZY as OES. Several radio clubs throughout the state have expressed interest in an Annual Montana QSO Party and your SCM wonders if any of the Montana gang could suggest a date for such an event. K7PWY is doing a great job getting the PON going in Montana. W7TUO has a new Swan and is getting his feet wet on s.s.b. W7LBK, W7COH and W7NPN sent reports on the Oct. SET. The Anaconda Radio club has a 2-meter repeater in the works. The frequency will be 145.350 Mc. in the Butte Anaconda area. W7NML is getting on with the new Heathkit gear. W7LPL is back on s.s.b. WA7BAT and WN7BQS are new calls in the Bozeman area. WN7BYC is a Novice call in the Anaconda club. K7SVR sent out 14 OO notices in October. W7NPV had a total error of less than 4.7 parts/million in the recent ARRL FMT. K7JHN and K7NHV are attending M.S.C. K7PGN has moved to Illinois. K7IUN is on 20-meter c.w. using transistors. Clubs are requested to send the SCM news and time and dates of your club meetings for publication in this column. Traffic: K7EWZ 182, K7SVR 53, W7NPV 48, K7UPH 37, W7LBK 13, W7IUW 1, K7JAT 1, W7QGJ 1, K7WRH 1.

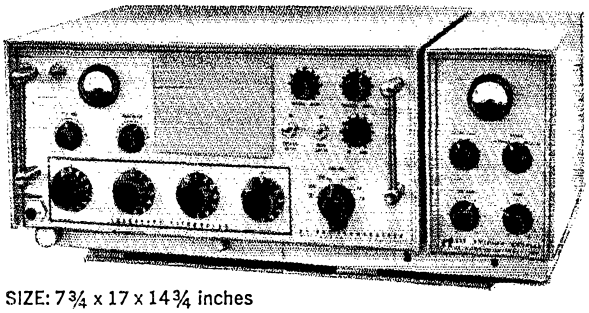
OREGON—SCM, Everett H. France, W7A—N—RM: W7ZFH. Net activities: K7IWD, OSN net mgr. reports sessions 23, attendance 143, high 9, traffic 81, high 15, average 3.52; BRAT awards went to W7ZFH, K7IWD and K7SGX. This net has held its own since 1949, regardless of lack of c.w. interest in Oregon. W7GWT, Asst. EC for the Portland area AREC, reports on the activity of the 2-Meter Net. K7SHD is net mgr. The net operates on 146.475 Mc. at 8:00 P.M. Mon. through Fri. Check-ins for October were 430 with traffic 3. EC W7DEM reports on the Oct. 4 SET. The Grants Pass AREC group covered Josephine County using 2-meter mobile and fixed equipment. W7AHP is mobile s.s.b. now. WN7ADT is 2-meter mobile using an ARC-1 transceiver converted for 12-volt use. K7KBK is active on the AREC and RACES nets and has a new 1000-watt power supply for emergency use. K7GWE is attending O.S.U. W7KTG now is living in Medford and finally received a permit from the City to install an autenna. He has his beam up again and is active in AF MARS 2-Meter Net. K7DVK, K7KRE and W7VEE are busy working over commercial-type Motorola 2-meter f.m. transceivers. K7AUV is now living in California. His new call is WB6JKQ and he is working 40-meter s.s.b. with an NCX-3. W7CXK says his 13-year-old son is General Class with the call WA7BMB and is on 40 meters with a BC-459A. Traffic: K7IWD 236. K7KBK 65, W7ZFH 53, W7DEM 8, W7MAO 5, K7DVK 2.

WASHINGTON—SCM, Robert B. Thurston, W7PGY—Asst. SCM/SEC: Everett E. Young, W7HMQ. RM: W7AIB. PAM: W7LFA. The Northwest Slow Speed Net had 28 sessions with 240 QNIs and 68 QTCs during October. The North Seattle Amateur Radio Club is helping a blind boy to obtain his license. K3CNP/7 soon will return to W3-Land from Larson Air Force Base. W7UUO has moved to Tacoma. K7NZO is trying for the PARKA certificate. W7HMA is preparing to install a tower. W7MCW is tending shop during his XYL's illness. K7VUS, K7VVB. W7NPK, W7HMA and others assisted W7BTB in mounting his quad on a 42-ft. mast. W7BV was presented a beautiful certificate of appreciation for his excellent work as vice-chairman of the QCWA section for the '63-'64 term by W7OS, chairman for the QCWA in this section. The LCARA of Longview is converting motorola transmitters and receivers for amateur use. W7HMQ, our SEC, reports 92 pieces of traffic received during the SET drill. W7NPK is very QRL with activities such as Radio Officer and asst. secy. for Bremerton ARC, while trying to teach some forty radio enthusiasts Mon., Tues., and Thurs. of each week. W7OEB says standard time has again upset all evening traffic skeds for him. K7ZRF is heard regularly on WSN and RN7. K7PWM is QRL at Columbia Basin J.C.

SSB COMMUNICATIONS

FOR MILITARY APPLICATIONS

TRANSCEIVER MODEL RF-301



FREQ. RANGE: 2-15 MC.
SYNTHESIZER: 1 KC Channels
STABILITY: 1 part 10^6 standard, 5 parts 10^8 available.
VFO MODE: Continuous tuning calibrated to 100 cycle increments.
POWER OUTPUT: 100 Watts p.e.p. & Average
MODES: USB, LSB, CW, AM FSK (with external tone keyer)

SIZE: 7¾ x 17 x 14¾ inches
WEIGHT: 55 pounds
POWER INPUT: 115/230 Volts, 50/60 Cycles AC & 24 Volts D.C. No external boxes required (12 V.D.C. can replace 24 V.D.C.)
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The RF-301 Transceiver is intended to be used in tactical military applications. It is **COMPATIBLE** with high-frequency SSB equipment now being used by all U.S. defense agencies. The RF-301 can be set to **ANY** channel with 1 KC spacing between 2 and 15 Mc with the built-in high-stability synthesizer. Between 1 KC steps a V.F.O. is included for **CONTINUOUS** tuning with 100 cycle calibration.

This is the only transceiver available with the advantages of BOTH a stabilized synthesizer and continuous tuning for both transmit and receive.

Providing continuous duty 100 watt power output (both p.e.p. & average), the RF-301 is ideal for **SSB, AM, CW, & FSK** operation. The transceiver is rated to operate continuously at ambient temperatures up to 65°C. It meets the vibration specifications of MIL-E-16400 and is splash-proof and resistant to humidity and fungus.

THE RF-301 CAN BE USED IN OPEN VEHICLES AND BOATS

Complete input power flexibility is provided internally in this transceiver. It can operate with 115/230 volt, 50/60 cycle A.C. power **AND** 24 volt D.C. power with no accessories or external converters. A 12 volt D.C. capability is available in place of 24 volt D.C. The RF-301 is COMPLETELY TRANSISTORIZED with the exception of the P.A. and R.F. stages.

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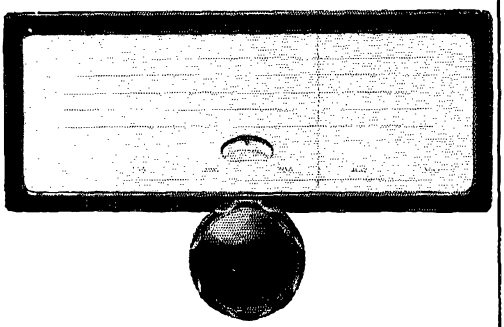

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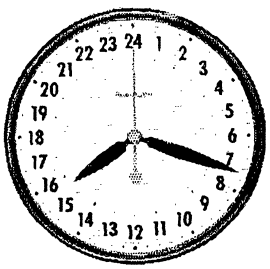

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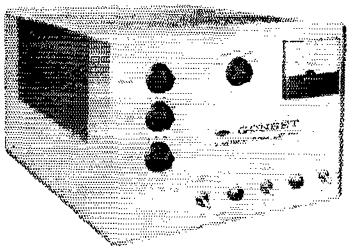
K7QFY has the entire station on block. K7PVO completed basic at Lackland AFB, Tex., and is heading for Georgia. K7RSM is attending Navy Radio School at Pensacola, Fla. K7QOM is building a track for his pole and installing prop-pitch motor. The WSN reports 30 sessions, 308 QNIs and 269 QTCs. W7AIB reports the first signs of bad skip showed up near the end of October. K7MGA is enjoying his Swan 240. W7AMC still is having a rough time with arthritis, which curtails his activity on the nets. W7JEY has moved to Vantage. W7UVR still is having rotator and beam trouble. The Noontime Net reports 28 sessions, 1055 QNIs and 755 formal QTCs. This net meets daily except Sun. on 3970 kc. at 1130. W7EBU says too much work with the local telephone company curtails his ham activity. K7CWQ and W7DGV are Silent Keys. K7CHH lost his power transformer during the CD Party. The Radio Club of Tacoma, Washington will hold its annual "Logger Contest" among members Jan. 16, 1600 PST to Jan. 17, 1600 PST. This is a fine chance for other operators to get a "Logger Certificate." Contact ten members in good standing in the Radio Club of Tacoma and give a list of stations worked with dates to the 10th member worked. Just break in on "CQ Loggers" from members in the Tacoma general area. There is no fee and your log will be checked with the members. Traffic: (Oct.) W7BA 1036, K7JHA 816, W7DZX 660, W7NPL 413, W7OEB 284, W7APS 224, W7HMQ 188, K7CTP 182, K7TCY 93, K7SRI 72, W7BTB 61, K3CNP/7 50, W7AIB 46, K7MGA 41, K7SRD 33, W7GYF 23, W7AMC 17, W7JC 10, W7JEY 1. (Sept.) K7SRI 153, W7GYF 43.

PACIFIC DIVISION

EAST BAY—SCM, Richard Wilson, K6LRN—WN6RXZ is a new Novice in Dixon. K6TFT attended the MARS conference in Fresno. WA6KLL is busy repairing and building his equipment and won second place in mobile judging at the Pacific Division Convention at Sacramento. K6GK still is fighting noise on 40 and 80 meters. WA6VAT bought a 75-ft. crank-up tower, put it up with 10 guys instead of 16, had two break and decided to leave it at the 54-ft. level. He says it is easier on the nerves. WA6WNG/WB6CRC is a new RM but claims he is having trouble getting a certificate. W6TYM ran up a total of 413 QSOs in 59 sections in the Oct. CD Party. WA6PRV, WA6YET, W6ERA, W6LGW and W6HOF are all enjoying their HW-12s. WA6PTU took part in the Red Cross-Oakland RC drill Oct. 20 and was in contact with K6EAG, the Hayward Radio Club station. WA6GUM and W6UB are doing their part in helping keep the Nimitz Freeway clear. Locally the Nimitz is referred to as the world's longest parking lot. WB6HDH, in Antioch, has a new tower and tri-band beam. WB6ETY is busy with school work and has the rig torn down again. W6OJW is custodian of the SCM-73 award and reports only 3 have been issued and then only for Class 5, contact with 15 SCMs. A speedy recovery to W6IT and W6BSE. The Livermore Klub had an auction at a recent meeting. K6YSS has retired and is living at La Selva Beach, near Watsonville. The MDARC held its second Annual Goblin patrol with 21 hams participating. Those operating mobile were WA6ANE, W6QEN, WA6KUF, WB6BSD, W6LNK, K6LRN, W6LGW, WB6EKX and W6LKE. Riders were WB6EIU, WB6EIV, WB6JGS, WB6BSE, WB6DHH, K6IMV, WA6LUU and WA6YET. WA6MIE was NCS, with WA6FBS and WA6NFF at one end of the 2-meter liaison and K6RPY at the other at the Concord Police station. W6KTF was the EC in charge of the whole operation. Operation was started at 1900 and secured at 2230. WA6NWL has joined Silent Keys. Our condolences to his family. There is great need for more stations to QN1 NCN. NCN meets at 0300Z/1900 each evening on 3.635. We sure could use more people from the Oakland-San Leandro Hayward area. Don't worry about your speed, the NCS will reply only as fast as you send. Keep the cards and letters coming. Wish you all a Happy New Year. Traffic: K6GK 105, K6TFT 76, WA6WNG 42, K6LRN 22, WA6FBS 20, WA6PTU 16, WB6ETY 9, WA6KLL 1.

NEVADA—SCM, Leonard M. Norman, W7PBV—SEC: W7JU/K7JU. The election results are in and thanks to one and all for the support. Now let's all make Nevada the outstanding ARRL section. If you don't see any *activity* from your area in this section then it's because you didn't report anything or I couldn't dig it out. The LVRAC's new board of directors for the coming year includes W7ANW, K7RBM, W7RBV, K7PPE, W7OYQ, W7FJN, K7TNY and K7YXX. WA7BAV has a Galaxy 300. WN7BOQ is a new amateur in Tonopah. W7FBL has the HB kw. going. W7THH has a TR-3. W7FJN is on RTTY 80 through 10. K7YXX is using a Cliffdweller. W7ANW has moved into a new QTH. WA7AJB is running a complete Collins setup for c.d. Traffic:

POWERFUL BIG NEWS



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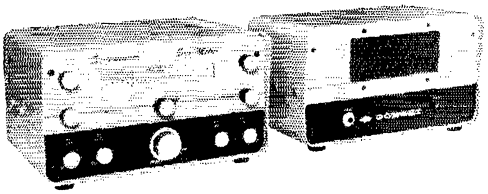

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Carrier Suppression:	—50 db on SSB
Unwanted Sideband Suppression: VFO or Crystal Control	—40 db
RECEIVER:	
Frequency Stability:	Highly stable incremental tuning utilizes same VFO as transmitter
Sensitivity:	½ μv or better for 10 db $\frac{S+N}{N}$
Selectivity:	Lattice crystal filter for both receiver and transmitter
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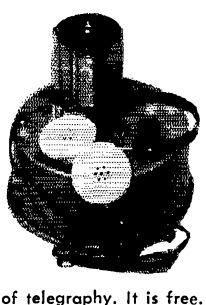

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(Oct.) W4CJB 763, W7JU 11, W7FBL 9, WA7BAV 8, W7PBV 6.

SACRAMENTO VALLEY—SCM, George R. Hudson, W6BTY—Asst. SCM/SEC: Mary Ann Eastman, WA6HYU. Those seen wearing distinctive *green* baseball type hats with gold and green emblems "SFARC" are the dedicated members of the fairly new and growing Sierra Foothills Amateur Radio Club, K6CBP. They are urgently in need of two-way communications gear to complete their emergency communications trailer for community service to be used in the Placer County Area. You are invited to join them Sun. at 9:00 A.M. on 3975 kc. The Sacramento Amateur Radio Club, W6AK, had movies and slides on emergency communications and a demonstration of club's repeater station in action at a recent meeting. K6PIV will share his theory on "parasitics." *RAMS News* indicates that the SV2MRC (Sacramento Valley 2-Meter-Repeater Club) has moved to the location of the repeater. The El Dorado County Amateur Radio Club, meeting the 2nd and 4th Tue. at the Pollock Pines Fire House #2, conducted its SET program from EDARC's emergency communications center to mobile participants and urges support of its net on 145.5 Mc. WA6MMO, EC, Yolo Amateur Radio Club, coordinated the services of 13 civic agencies for participation in the SET program using a simulated jet passenger plane crash. Defense and Disaster Offices, county fire coordinators, fire depts., sheriff's dept. and Sheriff's Reserves, Calif. Highway Patrol, AREC, Sacramento ambulances, Civil Air Patrol and others immediately responded to the alert and direct contact was maintained throughout with the CAP on 2 meters (4 frequencies in all) while K7UDG (K7FER) stood by on 40 with K6VFE for traffic. Traffic: W6LNZ 34, WA6HYU 22.

SAN JOAQUIN VALLEY—SCM, Ralph Sarovan, W6JPU—Happy New Year to all of you, and hope this finds everyone turning over a new leaf! W6JUK has a new 75S-3 receiver and is using it on RTTY with good results. WB6ETQ is mobile with an SB-33 and a linear amplifier on 40-meter s.s.b. W6QFR is chasing gremlins in his transceiver. WB6HVA is a new ORS and is checking into NCN. WB6HVA also is mobile on c.w., keeping skeds with his wife, WN6KUG, when he is out of town. W6QON is being heard on 75-meter s.s.b. using his Swan. WB6EYC is on 6 meters. K7KAP/6 is operating on 6 meters here in Fresno. WA6DAZ in Orosi is on 75-meter s.s.b. Forgot to mention that W6FKL, W6HKV and W6NTK also attended the convention in Sacramento. The Marsfest with W6BJI in charge held its meeting here in Fresno with approximately 75 in attendance and a good time was had by all. W6NKZ is building a panadapter. K6PBN has a Model 15 RTTY and won a BC-221 at the MARSFEST. Please drop me a line about your activities, as I need it for this column. Would like to hear from Bakersfield again. Traffic: W6ADB 157, WA6VPN 92, WB6HVA 37.

SANTA CLARA VALLEY—SCM, Jean A. Gmelin, W6ZRJ—Asst. SCM, Ed Turner, W6NVO. SEC: WA6HVN. RM: W6QMO. V.H.F. PAM: WA6RXB. Over 400 amateurs attended the Greater Bay Area Hamfest at San Bruno. Participating clubs in the S.C.V. included NPEC, SCARS and San Mateo RC. W6RSY is working on RTTY gear for future operations. K6DYX visited League Headquarters and discussed Communications Department activity with WINJM and WIBDI. K6GZ reports that signals still are normal even though we are now at the sunspot minimum. W6YBV visited W6QAE and W6FD in Los Angeles. W6AUC is active as OO and in traffic work. W6HC is installing a new antenna system. W6DEF reports that Red Cross Station W6WWJ now checks into NCN with K6RAC at the key. Hal also reports that new officers of the SCARS are WB6CAB, pres.; K6MPN, vice-pres.; Althea Honey, secy.; WA6YDP, treas. W6PLS has recovered from surgery. Gene reports that the Half Moon Bay organization functioned during the SET. Gene is now a member of the Northern California DX Club. W6QMO is active on NCN. K6MTX operated in the SET on RTTY and is working on a proposed RTTY message form. WB6FHH is active on NCN. W6ZRJ is building a new final. WA6YMX reports that the organization of a Santa Clara County Council of Radio Officers is moving along with Gilroy, San Jose, Santa Clara and Mountain View now taking an active part. W6RFF now has a 75A-4. WA6HVN sent a preliminary report on Santa Clara Valley section operation in the SET. K6YKG is active in CD Parties. K6LFZ moved to a new location in Hollister. W6AUC received a Public Service Award for operation in the Alaskan Earthquake. W6PJW reports activity in the San Mateo AREC. OOs sending in reports of monitoring include W6MMG, W6SAW, W6WX and W6ASH. K6HEP reports operation of W6BB at U.C. W6CFK has recovered well from broken ankles received when he fell as he was climbing down from his roof last summer. Dick ex-

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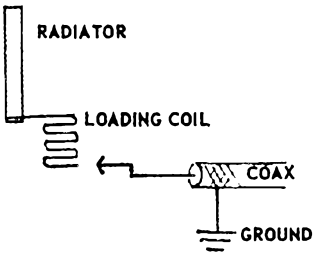

We are often asked if a Gotham vertical antenna will operate on MARS, C.D., C.B., MARINE, or other non-ham frequencies. Here is a simple method of tuning to any desired frequency within the range of the antenna: The inner conductor of one end of the coax is moved up the loading coil a turn at a time while the other end is coupled to a grid dipper tuned to the desired frequency. At one point, there will be a decided dip, and this is where permanent connection is made. With an SWR indicator, this point will indicate minimum SWR. With a field strength meter, maximum radiation will be achieved. Using a transmitter, this point will permit proper loading.

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CASE HISTORY #71

"I am very delighted with the first V80 and want another for a different location." A. C., California.

CASE HISTORY #159

"I ordered a Gotham V40 Vertical Antenna and found it so successful that several others are wanting them, too. Will you please send me four more." W. A., Alaska.

CASE HISTORY #248

"I just wanted to let you know how pleased I am with my Gotham V80 antenna. I have worked a W.A.S. of 46/43, a WAC of 3/3, and DXCC of 14/12 in about 12 months." G. W., Maryland.

CASE HISTORY #111

"The V160 did a beautiful job on a VE1 for me. Also, I forgot to take it down during the hurricane of last week. It is just as straight as it was when I bought it." D. S., New Jersey.

CASE HISTORY #613

"I have never been happier with any antenna than I have been with the V80. I have worked all bands with it and have had tremendous success — i.e., DL4s, ZS3, etc., all solid copy." R. D. S., Penna.

CASE HISTORY #483

"My V80 is working wonders. I am able to maintain a 1:1 SWR all across the 40 meter band. After many years on 10, 15, and 20, the XYL and I are getting great kicks out of some of the lower bands." J. A., New Mexico.

CASE HISTORY #146

"I have had very good luck with mine (my V80) feeding it with a Johnson Adventurer; works fine on all bands." B. I., Nebraska.

CASE HISTORY #555

"Being an owner of your V80 vertical I would like to let you know of the excellent results I am getting with it, both working the DX and the local stations on the lower bands. It certainly is an excellent antenna system." F. H. Jr., New York.

CASE HISTORY #84

"A few months ago I purchased your V40 vertical and have achieved outstanding results on the air." K. G. B., North Carolina.

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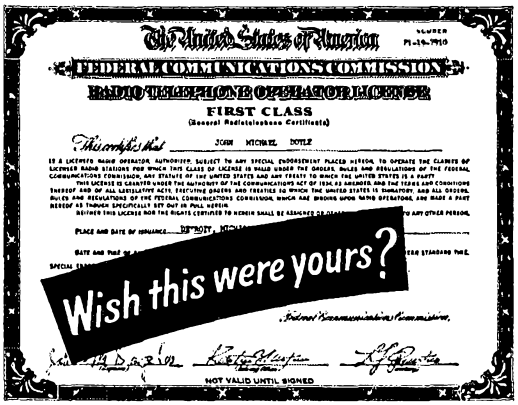

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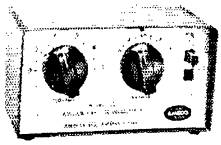
plained that he was checking the direction of true north, not for antenna purposes but for amateur astronomical work which he does. The PARA now has a trailer and plans to use it as an emergency operations center and for a club station. The SCCARA operated a successful booth on amateur radio at the Santa Clara County Fair. The Santa Cruz Club took part in the SET on 75 and 2 meters. The Northern California Amateur RTTY Society held a November annual dinner meeting. Traffic: (Oct.) W6RSY 947, K6DYX 196, W6AIT 137, K6GZ 129, W6YBV 114, W6QMO 111, W6AUC 98, W6HC 94, W6DEF 67, W6PLS 38, K6MTX 29, WB6FHH 28, W6ZRJ 22, W6RFF 16, K6YKG 10, WA6HVN 9, K6LFH 2. (Sept.) W6PLS 48.

ROANOKE DIVISION

NORTH CAROLINA—SCM, Barnett S. Dodd, W4RNU—Asst. SCM: Robert B. Corns, W4FDV. SEC: W4MFK. RM: WA4FJM. PAM: W4AJT. V.H.F. PAM: W4HJZ. Congratulations to W4LEV, WA4PDS and K4CDZ on making the BPL. W4EVN has received his VACWC award. WA4PYJ now has 25 watts on 2 meters. WA4ANH says he is getting a little interest in AREC started in Gaston County. WA4FFW has received four first-place certificates in QSO Parties this year. W4COJ reports that the High Point V.H.F. Amateur Society has built a new clubhouse and is planning big things in the future. K4QDO reports the Nash-Edgecombe AREC Net has been activated and meets Sun. only. W4HJZ has completed an s.s.b. transverter, and now can run 2-kw. p.e.p. on 144 Mc. WA4EYA is now at N.C. State. W4RWL made the high N.C. score in the C.W. DX contest. Net traffic: NCN (E) 249, CCEN 160, SSBN 158, NCN (L) 93, THEN 68. Traffic: W4LEV 1317, WA4PDS 537, W4IRE 327, W4EVN 292, K4CDZ 217, WA4FJM 158, WA4BVF 130, W4LWZ 112, WA4ICU 99, WA4LWE 97, WA4PYJ 94, W4BDU 75, W4BNU 63, WA4ANH 59, K4CWZ 57, K4EO 28, W4RWL 24, WA4FFW 22, W4COJ 15, K4QDO 7, K4QWQ 7, W4ACY 6, W4HJZ 2.

SOUTH CAROLINA—SCM, Charles N. Wright, W4PED—SEC: K4HJK. RM: K4LND. PAM: (a.m.) K4OCU. PAM: (s.s.b.) K4LNJ. Nets: C.w., 3795 kc. at 0000Z and 0300Z; A.M. 3820 kc. at 0000Z daily and 3930 kc. at 1830Z and 2030Z Sun. s.s.b., 3915 kc. at 0000Z. Sept. FMT results (average error in parts per million): W4NTO, 1.7; K4HDX, 10.3; W4FFH, 11.8; WA4LPX, 14.0; WA4LPV, 14.2; and W4JA, 50.4. Officers of the State Radio Council for 1965 are W4PED, chairman; W4CE, vice-chairman; K4LNO, secy.; K4FYS, treas.; W4SMQ, member of the executive committee at large. The next meeting of the council will be held Jan. 16 in Columbia. The council plans an active program for 1965 and all clubs are urged to consider affiliation. WA4HFA reports reorganization of the Anderson Club with WA4HFA, W4FVV, W4ZJJ and K4LNU as officers. The club recently participated in a joint civil defense drill which was very successful. Net traffic: C.w. 77; a.m. 35; s.s.b. 189. Traffic: WA4PFQ 226, K4LND 105, W4WQW 59, K4WOI 58, K4OCU 53, W4AKC 49, W4PED 48, K4BMI 34, W4HMR 25, WA4LPV 20, W4NTO 17, W4YOH 16.

VIRGINIA—SCM, Robert L. Follmar, W4QDY—Asst. SCM and SEC: H. J. Hopkins, W4SHJ. PAM: W4DKP. RMs: W4ZM, WA4EUL, W4SHJ, W4QDY. Other net mgrs.: W4OKN, W5VZO/4, W4SUF, K4DOR. In the successful SET operation Area 4, under the able leadership of W4RHC, made a good showing. K4GRZ stirred up a lot of interest in Giles and Montgomery Counties; W4THM turned in a fine performance from Bristol; K4ASU, in the Tidewater area, did very well; K4JDK kept Virginia Beach on the map. WA4BTK/4 received the Base Cmdr's Award for his part in the Alaskan earthquake. He operated at KL7EFN and KL7FBI at Shemya Island. WA4IVM says that the Va. Tech Amateur Radio Club, K4KDJ, is back in full swing. WN4SGD passed the General Class exam. W4PTR worked phone in the CQ WW DX Contest, joined the P.O. Net and put up a two-element beam on 20. OBS WA4EUL notes that his new sked is at 2315 GMT S-T-Th on 3680 kc. W4JUJ took part in both the C.W. and Phone CD Parties. He also got the last Mass. County needed and a rare N.Y. County. WA4TDZ has been operating portable from the Science Bldg. of Madison College. K4BZV is attending Lynchburg College. W4DLA our iron man and mainstay, is suspending all operations because of a tentative change in QTH. K4UYY is converting an APX-6 for 1260 Mc. and would like a sked with anyone using this band. W4RHA is building a vacuum tube keyer. The holidays always aid the traffic nets. All are urged to participate in this great pastime and perform a Public Service. Traffic: (Oct.) W4PFC 748, WA4EUL 297, W4RHA 252, W4DLA 243, W4DVT 237, W4ZM 157, WA4FCS 149, K4ITV 136, K4GRZ 121, K4VDL 105, K4ASU 103, K4FSS 101, W4LRN 93, W4QDY 83, W4SHJ 81, K4LMB 78, W4OKN 78, W4OWE 71, W4TE



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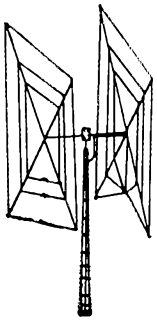

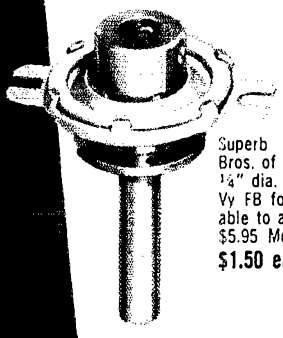

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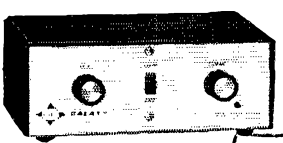

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WEST VIRGINIA—SCM, Donald B. Morris, W8JM—SEC: W8SSA. PAM: K8CHW. RM: K8HID. C.W. Net Mgr. W8LMF. S.S.B. Net Mgr.: W8EEO. The nets operate on 3570, 3890, 3903 and 3905 kc.; local and regional nets also on 6 and 2 meters. Congrats to W8IRN, EC for Kanawha County. His ARPSC members are setting a fine example for all of the state in emergency training. WA8JWM is active in c.d. work in the northern area of the state. WN8HQK is now WA8NWN in Fairmont and WA8NXE is a new ham at Monongah. New officers of the MARA for '64-'65 are W8QR, pres.; W8GQE, vice-pres.; W8JM, secy.; WA8EQI, treas.; WA8HHA, act. mgr. Meetings will be held at C.D. Hq. in Fairmont and the club call W8SP will be heard again. W8LMF reports 26 sessions of the C.W. Net with 101 stations and 52 messages. K8CHW reports for the Phone Net, 21 sessions, 355 stations and 80 messages. The Sept. report for the S.S.B. Set shows 18 sessions, 177 stations and 12 messages handled. W8HZA is quite active in c.d. and RACES work. Traffic: K8TPF 175, WA8KUW 52, W8HZA 47, W8LMF 41, K8CHW 40, W8CKX 17, K8ELH 15, WA8DGE 7, WA8FIE 7, K8ZDY 4, W8DUV 3, W8JM 3, WA8GGI 1.

ROCKY MOUNTAIN DIVISION

COLORADO—SCM, Donald Ray Crumpton, KØTTB—SEC: WØSIN. WØIXH is now active in Colorado Springs, where he is assigned to Hq. Air Defense Command. WAØAAV, the son of WØUPS and KØHFB, Fort Collins, Colo., suffered severe burns on his hands and face Oct. 25 when a gas can exploded as he was working on his Corvair. The car, garage, a tower, beam and other antennas were destroyed along with other small articles of ham gear. Richard is now recovering nicely. WØLYV, of Louisville, Colo., suffered a heart attack Oct. 26 and is in Boulder Memorial Hospital, Boulder, Colo. WAØBXR, one of the CWXN net control stations, gave an excellent lecture on semi-conductors at the Denver Radio Club meeting. John is a professor and teaches electrical engineering and semi-conducter principles at Denver University. He will begin conducting a seminar on variactors and semi-conductors applications very soon. This seminar is for amateur radio operators. More details later. High Noon Net traffic: 184. Traffic: KØZSQ 216, KØDCW 100, KØLCZ 18, KØMIC 2.

NEW MEXICO—SCM, Newell Frank Greene, K5IQL—Asst. SCM: Kenneth D. Mills, W5WZK. SEC: K5QIN. RM: W5ZHN. New officers of the Caravan Club are K5TCU, caravan master; K5CXN, emergency caravan master; K5YTQ, program director; K5FXQ, secy.-treas. A new code and theory class in Los Alamos has 15 members. K5HTT is giving code practice, and theory is administered by K5QIN and WA5JTF. W5ROH is running regular code practice sessions on 3562 kc., at 2100 MST Mon. and Wed. The Artesia AREC now has 8 members participating. K5RHR and K5QIN continue to check 10-meter propagation as Dick motors to distant points. The latest feat is a QSO via c.w. between Los Alamos and Eagle Nest, more than 100 miles over high mountains. Two-meter activity still is on the increase. The boys are learning that a "Twoer" on a groundplane won't do it but moderate power on a good beam will cover lots of ground. Traffic: (Oct.) WA5DUH 212, W5UBW 36, K5HTT 18, W5LUX 14, W5ROH 7. (Sept.) W5UBW 48.

UTAH—SCM, Marvin C. Zitting, W7MWR/W7OAD—SEC: W7WKF. The Utah SET held in October was a big success with about 25 stations participating. The Salt Lake County AREC provided transportation for anyone needing it to the voting poles during the election of Nov. 3 and as a result received a considerable amount of favorable publicity for ham radio in the newspapers, on TV and on radio. W7OCX reports that conditions are improving on BUN. K7SDF is a new OO. K7TLX can be heard on 2 meters with a powerful Seneca. W7HHW still is experimenting with 2-meter antennas. K7CTB is mobile with a "Twoer." Jim finally finished the radio room at W7LQE/W7VTJ. W7VTJ has had less time for BUN since going to work as a medical secretary. W7MWR has had very little time for hamming because of work moving a local broadcast station. Send in your reports, fellows. Traffic: W7LQE 138, W7OCX 95, W7VTJ 44, W7JHM 26, W7ZC 11, W7MWR 4.

WYOMING—SCM, Wayne M. Moore, W7CQL—SEC: W7YWE. RM: K7IAY. PAMs and OBSs: W7TZK and K7SLM. Nets: Pony Express, Sun. at 0830; YO, Mon., Wed., Fri. at 1830 on 3610; Jackalope, Mon. through

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HQ100C	109		
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HQ145X	179		
HQ150	159		
NC88	67		
NC155	139		
NC183D	177		
NC188	77		

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POLYCOM PC6	239
POLYCOM 62B	279
DX35	39
DX40	44
DX60	77
VHF1 SENECA	159
HX10	299
HA10	189
RX1	179
HR10	69
HW32	119
HP23	39
MT1 XMTR	47
MP1 DC SUPPLY	27
HW29 6er	37
VF1 VFO	19
HG10 VFO	34
QF1 Q MULT	9
HD11 Q MULT	14
HM10a GDO&COILS	29
UTICA 650	89
UTICA 650 VFO	22
LAFAYETTE HE10	49
CENT B SLICER	59
KNIGHT T50	27
KNIGHT T60	37
KNIGHT VTVM	27
AMECO TX86W	47
EICO 723	34
EICO 666	49
BC221D&AC SUPPLY	89
S11A SCOPE	44
HICKOK 533AP	69
TRIPLETT 3414	69

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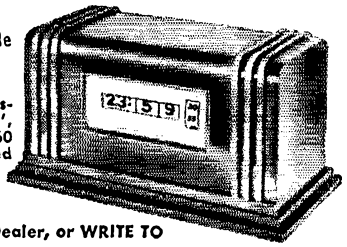

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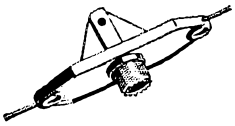

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Sat. at 1230 on 3920 kc. K7BTD is the new EC for Sheridan. K7VWA now has a low-drain battery-operated transceiver so she won't have to start the light plant to get on the air, compliments of K7AHO. K7IAY has received the Public Service Award for assistance in the Montana flood. W7RSJ (ex-WØTFB) and W7VB have been on RTTY for some time and really are enjoying it. The Casper Club has 27 signed up for the code and theory classes. It is gratifying to learn of the mobile interest and activity in the state as the mobiles play a very important part in the emergency plan set up by our SEC. One for the books: Some of the members of the V.H.F. Club are working 160 meters. Doing real well at it, too. Traffic: K7IAY 65, K7SLM 37, K7VTM 22, W7BHH 13, K7ITH 12, W7BAH 9, K7YPT 9, K7QGV 6, W7ASB 5, W7YWW 4, K7GBX 2, W7NKR 2, W7TZK 2, W7AEE 1.

SOUTHEASTERN DIVISION

ALABAMA—SCM, William S. Cratts, K4KJD—SEC: W4NML. RM: WA4EXA. PAMs: K4NSU and K4WHW. Thanks for your vote of confidence in reelecting me without opposition. W4NML will continue as SEC and will be Asst. SCM. We look forward to working with you all for a better Alabama section. All Alabama hams were saddened by the death of W4KCQ/W4YSG. Pat helped originate the fine Alabama emergency net system. K4NUW is the new NM of Ala. PON. WA4FJF was active in YLAP. KN4UPY is a new ham in Tuskegee. K4DJU is on 6 and 2 meters with 150 watts from Auburn. K4FJZ is on 2. WA4EBS has an APX-6 on. W4NML has the tower and beam up. K4IKR is busy chasing DX. Oct. net reports (times GMT):

Net	Freq.	Time	Days	Sess.	Ave. Tfc.	Ave. QNI
AENB	3575	0100	Daily	30	6.6	9
AENM	3965	0030	Daily	32	10.8	49.3
AENO	50.55	0115	T/T/Sat.	11	1.3	20
AENP	3955	1230	Mon.-Sat.	26	1.1	15
AENP	3955	2400	Daily	36	3.86	21.16
AENR	50.55	0115	Wed./Fri.	10	8.4	20
AENT	3970	2230	Daily	37	1.6	5.3

We still are looking for qualified operators to serve as OOs. If interested, drop me a line. Are you a member of AREC? If not, how about joining! Traffic: (Oct.) W4NML 460, WA4EXA 218, WA4MGI 171, K4NUW 136, K4KJD 87, K4WHW 82, WA4JWS 70, K4BSK 65, W4YNG 59, WA4EXB 58, WA4FJF 28, K4GXS 26, K4DJU 24, WA4HFE 24, WA4GLX 19, WA4HKZ 19, WA4HGN 18, K4NSU 18, W4YER 14, W4YRM 12, WA4FYO 7, K4BTO 6, WA4EBS 5, W4TSY 5, W4DGH 3, K5IQA/4 3, K4WOP 2, W4CIU 1, K4WOQ 1. (Sept.) WA4MGI 14, WA4FYO 8.

EASTERN FLORIDA—SCM, Guernsey Curran, W4GJI resigned—SEC: W4IYT, C.W. RM: K4RDN-res, RM RTTY: W4RWM. PAM H.F., W4SDR; PAM S.S.B.: W4OGX. PAM V.H.F.: WA4BMC. From OES WA4STJ we learn that he is building some 50-Mc. RC equipment, "Nothing spectacular, but I can now control the house lights 100 feet away with one transistor transmitter on 53 Mc. Nice when I come home late at night." W4QVJ received the call CEØAJ and is on a DXpedition from Easter Island. By the time this is printed K4SJH will have been back in harness as SCM for the interim until a new election. If anybody knows the job, it is he. Many have asked why I resigned and my only answer is that "it was for the best interest of the League." The SCM is the only elected official in communications in his section. It is his duty and prerogative to make all appointments from SEC on down to OES. Conversely, he has the authority to cancel any appointment. Last month my report wished my successor good leaders. From back in August we were plagued with some jurisdictional differences as probably evident from recent reports. It seemed best that the SCM step out rather than that other dedicated leaders be relieved. I have so advised Hq. and after thoughtful deliberation presented my resignation so others can carry on. It is with sincere appreciation that I state that during my year in office I have had the most wonderful cooperation from all the members in the section and I thank you for letting me serve you. I am particularly grateful to my PAMs and RMs for the wholehearted support that they have afforded me. To the sidebanders who performed so well during an awesome hurricane season I say, "Well Done!" I'll be seeing you around. So long and may your tubes run cool! Traffic: (Oct.) WA4BMC 508, W4DFU 404, W4IYT 255, W4URX 251, K4KDN 237, K4QAY 195, WA4NEV 187, WA1AFP 169, WA4TBM 168, WA4JYB 161, W4AKB 133, W4LUV 131, W4TRS 110, K4BY 100, WA4NBE 100, WA4RSQ 94, W4SDR 94, WA4GDS 92, W4NLX 76, W4TJM 66, W4GJI 63, WA4RNG 60, WA4COR 56, WA4IYG 54, W4VWL 54, W4IEI 49, WA4FGH

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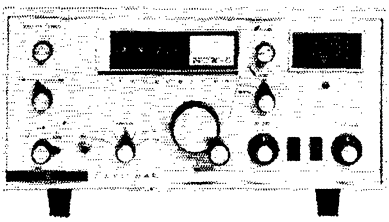

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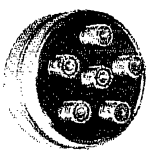

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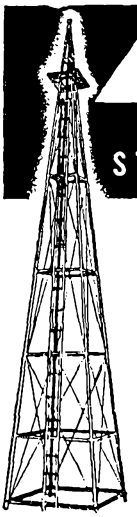

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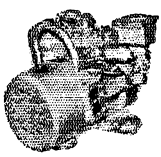

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41, K4COO 37, K4ILB 37, W4MVB 34, K4ENW 33, W4AYD 30, W4GWF 29, WA4FYV 28, K4BNE 26, W4CP 23, W4OGX 22, K4MZR 20, W4GUJ 19, K4EBE 18, W4EHW 16, W4BKC 14, W4IE 9, W4QVJ 9, WA4JSW 5, WA4PWF 5, WA4UXZ 4, W4LVV 2, WA4STJ 2, WA4VFB 2. (Sept.) WA4MKE 17, W4EHW 15.

GEORGIA—SCM, Howard L. Schonher, W4RZL—SEC: K4MDC. RM: W4DDY. PAMs: K4PKK, WA4EHT, WA4HSN. K4PLR is active on 6 and heading for 2. Dick also finds time to edit a fine bulletin for the Lanierland Club. K4TZN has a fine article in the Savannah club bulletin on club projects and interest. The Georgia S.S.B. Assn. Amateur of the Year Award went to W4DDY at the club's annual meeting at the DeSota Hotel, Savannah. Congratulations, Homer. Thanks to K4VWN on the fine activity report. K4EIK/4 is in Portsmouth, Va. New officers of the Ga. S.S.B. Assn. are WA4EHT, pres.; K4SBH, vice-pres.; W4SLP, secy.-treas.; K4AUM and WA4JSU, members of the board. K4BAI is active on MARS. W4HOS has a new 75S3-B. WA4JXL is going 6-meter f.m. K4QPL replaced the Super Pro with an SX-100. W4YE continues to operate c.w. mobile. We appreciate the many stations who took part in the SET. W4NSO, W4LAJ, W4RTY and W4GGZ participated in the Habersham County c.d. drill. GTN meets on 3900 kc. with WA4HSN as manager each Sat. at 1600 GMT. Mobile activity is at an all-time high with 75-meter s.s.b. predominating but lots of activity on 6 and 2 in the metropolitan areas. Please participate in at least one section net. Your ham friends are looking for you. Traffic: W4DDY 179, K4FLR 143, W4NSO 65, WA4CJN 61, W4RZL 55, K4DKJ 48, W4YE 47, WA4EHT 40, WA4LLI 31, K4QPL 23, WA4BVD 21, WA4JXL 5.

WESTERN FLORIDA—SCM, Frank M. Butler, Jr., W4RKH—SEC: W4MLE. PAM: K4NMZ. RM: W4BVE. Pensacola: The PARC has changed its meetings to Mon. at 7:30 P.M. K4PIY is back at Grice Electronics. W4HKK attended Collins factory school. WA4QFK is a new General Class licensee on the 10-meter net. K4QOJ and K4BDF set up a station at the c.d. booth at the Interstate Fair, and passed traffic to WA4ECY and K4VND for relay to NTS. 117 messages were handled. K4QOJ now is Radio Officer for c.d. Fort Walton: W4BVE is net mgr. of QFN. WA4ABP was appointed OBS. Milton: W4POY/4 handled traffic during the Whiting Field Open House. Panama City: WA4JIM and WA4NVG were appointed OPSs. K4PAIO was appointed Asst. EC for Bay County. Defuniak Springs: K4VWE prepares his own message blanks in a convenient form. WA4IZS is working on a 3-band quad. Chipley? W4IKB is now working for the State Road Dept. Tallahassee: WA4DNY has a new Swan 120. W4MLE got a three-element 20-meter beam. K4DAD and W4MLE were appointed OOs. K4DAD edits an FB club bulletin for the TARC. Traffic: (Oct.) W4BVE 146, K4NMZ 116, WA4EOQ 76, K4VWE 59, WA4JIM 32, K4SOI 31, WA4NRP 22, WA4NVG 3. (Sept.) WA4ECY 103, K4BDF 99, W4BVE 88, WA4EOQ 50. (Aug.) WA4ECY 121.

SOUTHWESTERN DIVISION

ARIZONA—SCM, Floyd C. Colyar, W7FKK—SEC: K7NIY. PAM: W7CAF. RM: K7TNW. The Amateur Radio Council of Arizona is to be congratulated on its fine job in installing and operating the Arizona State Fair station, WA7AOW. K7QWR attended the World's Fair and while there was a guest operator of K2US. K7VVD put grid-block keying in the DX-100. A talk and demonstration of amateur radio was given to the Boy Scout Explorer Post No. 244 by W7FKK. The Central High School Radio Club elected K7RGG, pres.; K7TXS, publicity chairman. K7GHW has just finished a K2POO automatic key and VT keyer. K7TXS has a new 40-ft. tower. The hidden transmitter hunt sponsored by the Arizona Amateur Radio Club was won by K7CEH and K7ZSO. K7PLO has a new SB-200 Heath Linear on the air. K7MJC did a fine job of handling Hurricane Hilda traffic. W9KLD/7 has been issued the call W7AYY. K7WMA reports the Old Pueblo Radio Club (Tucson) is sporting a new Swan-400 transceiver and making plans for a permanent station. K7ZBM has just received a new CP-20 certificate. How many Arizona traffic men read "Traffic Topix" regularly in QST? You can improve your ARRL procedure, expedite traffic and have smoother operating nets by doing so. Traffic: K7NHL 266, K7TNW 206, W7CAF 184, K7MTZ 155, W7FKK 37, K7UXB 25, K7RUR 5, K7WMA 2.

LOS ANGELES—SCM, John A. McKowen, W6FNE—SEC: K6YCX. Asst. EC: W1KUX/6. PAM: W6ORS. RMs: W6BHG, W6QAE, WB6BBO. A successful potluck dinner dance at the So. Calif. V.H.F. Club was the top event I attended in Oct. I have been visiting a lot of the clubs lately and would like to have the pleasure of talking to your club. Have your program chairman drop me a

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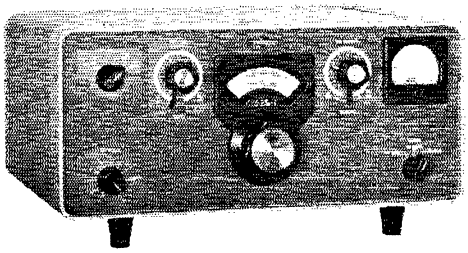

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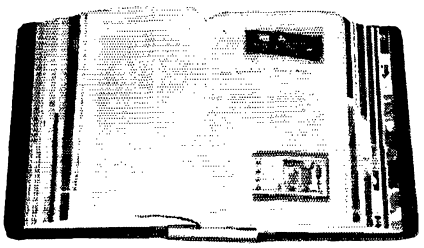

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line to set a date. Two new OOs in the section are WB6BWZ (ex-KH6CWQ) and WA6YKP. W6OZ transmits code practice daily on 3750 and 7198 kc. with retransmissions by K6BPC on 50.85 Mc. and 14,505 Mc. Mon. evenings. W6KMJ is transmitting on 3757 kc. T-W-F at 8 P.M. From the above times and frequencies there should be no reason to not be able to catch at least one. WA6ORJ is in Fla. WØEZT/6 QSYd from upland to Teheran, Iran. WA6TYX is very active in traffic again. Good to see you back, Dave. Just to show that his RM/ORS, doesn't mean he's one-way W6QAE has been working 75-meter phone. K6MDD still is active with the SA Net and others. W6USY shows his biggest traffic total for several years. Come on, Les, you can still make RPL. WB6BBH and XYL WB6GXI are very active on the Six-Meter 8 Ball Net. K6LJ is displaying a *big* signal on 6 meters. W6BHG transmits Official Bulletins on 2-meter RTTY on regular schedule. W6LVQ/EC is active in the new statewide RTTY net at 0500Z on 3625 kc. T-F-S. K6LDM now is training officer at K6BPC, Paramount C.D. Hq. LA Section AREC Hq. station. W6SRE still is piling on the miles and is about due for a new car, I'll bet. K9ELT/6 and WA6KZI are stirring up activity at W6YRA/UCLA. Support your section net, the Southern California Net (SCN) on 3600 kc. at 0300Z daily. The AREC still is attempting to fill leadership appointments. If you want to work in emergency communications with a dynamic organization, contact Frank Merrit, K6YCK our SEC. Traffic: (Oct.) W6GYH 1198, WA6WTK 919, WB6BBO 666, WA6TYX 411, W6QAE 266, K6MDD 200, W6FD 126, K6GIL 81, WB6ARZ 69, W6USY 58, WB6BBH 46, WB6GXI 41, K6LJ 35, W6BHG 26, W6LVQ 15, K6LDM 14, K6HV 9, W6PCP 9, W6SRE 4. (Sept.) W6GYH 836, WB6BBO 590, WA6WTK 553, K6MDD 552, WA6VFM 300, WA6WTX 188, W6QAE 172, WB6FKD 116, WB6BBH 85, W6FD 60, WB6GXI 58, W6LVQ 57, WB6FPQ 55, K6GIL 48, W6BHG 22, WA6VUW 22, WA6CXB 20, K6HV 17, WB6AKZ 16, W6PCP 9, W6ZJB 9, W6NKR 8, W6USY 8, W6SRE 4.

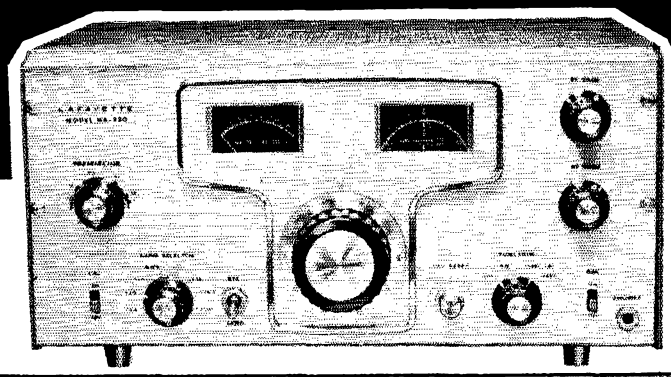
SAN DIEGO—SCM, Don Stansifer, W6LRU—Asst. SCM: Thomas H. Wells, W6EWU. SEC: W6SK. RM: W6EOT. RM for Orange County: K6IME. EC San Diego County: W6MHY. EC Orange County: W6VAA. EC Imperial County: W6DLN. The Astro Radio Club enjoyed ARRL films at its November meeting. W6EOT, RM and ORS, reports handling 23 SET messages on TCC long-haul skeds. W6OFT, Oceanside, went deer hunting in Utah. WN6MSE, Fallbrook, is the son of W6LKC and W6YZV. WA6FQG spoke at the October meeting of the Orange County Club on power line interference and man-made noise. ORS W6VNQ received a Section Net certificate in November. WA6ZWR says he needs more traffic to handle on the SoCal Six Net on 50.4 Mc. WB6GMM was active during the SS hunting for his 50th state, Delaware. W6PTN, Radio Officer for c.d. in Chula Vista, passed away in early November. A new Orange County traffic net now operates on 0203 GMT on 145.62 Mc. Net manager is W6DNA. Speaker at the San Diego V.H.F. Club November meeting was K6GHO. A new member in the V.H.F. Club is WB6EZI. The W/K6 QSL Bureau, run by the San Diego DX Club, received over 80 pounds of cards in a one-week period in November. WN6MLS is the son of W6RCD. The SCM welcomes club news and lists of newly-elected officers. Such information received appears in this column. The December meeting of the San Diego DX Club was held at the home of W6LRU. Traffic: (Oct.) W6IAB 4892, K6BPI 4814, W6YDK 3083, WB6JUH 820, W6EOT 307, W6VNQ 121, WA6ROF 87, K6IME 47, K6LKD 37, WA6ZWR 29, WB6GMM 20, W6DGM 3, WN6JLC 2. (Sept.) WA6UUO 26, WA6TAD 3.

SANTA BARBARA—SCM, Cecil D. Hinson, WA6OKN—RM: W7WST/6. WA6OJM is now operating K1CTQ, which is the Exeter Academy station, while at school in New Hampshire. John placed 5th nationally in the DX Contest under 150 watts. K6BUD took a vacation in the Northwest with his SR-150 and XYL. The Thousand Oaks Picnic drew about 150 hams and friends in spite of a slight rain. New officers of the Ventura County ARC are K6LS, pres.; K6UJV, vice-pres.; WA6JMD, secy., WA6SNA, treas. K6ARK, who has returned from Japan, again is a spark plug in that club and editor of its papers. K6GHU and his active XYL, K6KCI, submitted a traffic report for activity during the Santa Barbara fire. K6DXW and his RACES group missed many hours of sleep during the same fire. Traffic: K6GHU 59, K6KCI 47, WA6OKN 5.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. L. Harbin, W5BNG—The Terry County ARC held its Annual Free Swapfest in Brownfield Nov. 1 with more than 600 attending. The Oklahoma State ARRL Convention was held Oct. 31-Nov. 1 at the Lake Texhoma Lodge with more than 400 in

NEW! LAFAYETTE



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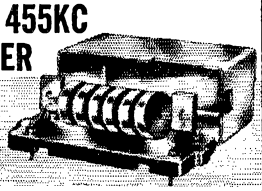

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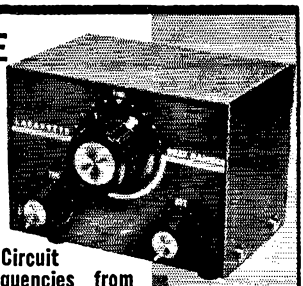

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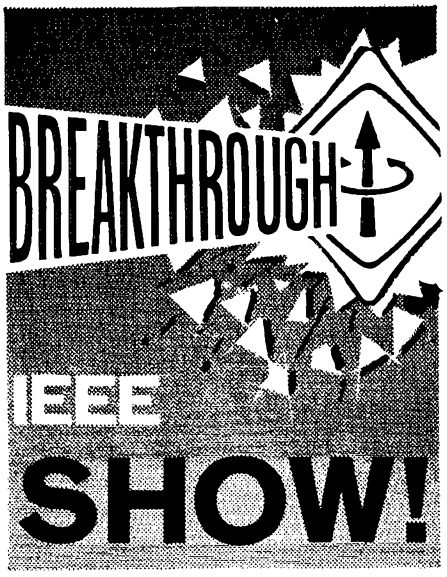

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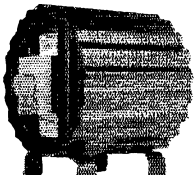

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attendance. This was a very fine convention and if it was a sample of what the Oklahoma Central V.H.F. Club has planned for the West Gulf Convention next July you should not miss it. A new idea in transmitter hunting was introduced by W5YUO. Walt used his airplane to hunt the transmitter and found it but disqualified himself because of the method used. W5THI took credit for the find. W5BOO has been appointed Texas State Director for Army MARS. The Arlington ARC reports 12 students in its code and theory class. The Ft. Worth 2-meter group has installed a repeater on top of a tall building and reports fine results. W5JSM has been appointed Director of Civil Defense for Herford. The Midland ARC furnished communications along the 110-mile route for the Midland Section of the West Texas Sports Car Club Sept. 20. Mobile operators taking part were WA5DZW, WA5ETE, WA5FDL, W5IPH and K5SHL. The control station was operated by WA5DFF, WA5DFJ, K5MTB and K5MRC. WA5CBS, WA5EMP, K5FVH and W5MPC used a box kite to support a 300-ft. wire for 6 meters with good results. Traffic: (Oct.) W5CVB 200, W5ACK 163, W5VFM 115, K5DBJ 57, K5UOR 45, W5-VEZ 24, WA5EVS 17, W4OSG/5 12, K2GKK/5 8, W5JA 4. (Sept.) K5DBJ 85.

OKLAHOMA—SCM, Bill F. Lund, K5KTW—Asst. SCM: Cecil P. Andrews, W5MFX. SEC: K5DLP. 75-Meter PAM: W5DRZ. K5ZCJ has been busy working on the new club room in the Red Cross Building and has not had too much time to do any hamming. W5EHC is looking for a rotator for his v.h.f. antenna to put on top of his new 40-ft. tower. The Oklahoma City v.h.f. group set up its booth at the Okla. State Fair and handled most of the traffic over the state on v.h.f. New officers for the Enid Amateur Radio Club are WA5FVJ, pres.; K5OXE, vice-pres.; W5FWP, secy.-treas. The Wheat Straw Radio Club is a very unique club in that it has members in nine towns and rotates meetings from one town to another until all are included, then they start over again. It has memberships in the following towns: Okarche, Kingfisher, Dover, Calument, Watonga, Geary, El Reno, Yukon and Oklahoma City. Meetings are held the 2nd Sun. of each month and the club call is WA5IPE, located in Calument with K5RLM as trustee. We had a very good meeting with the group at the Oklahoma State Convention at Lake Texhoma Lodge. ARRL officials attending were W1ICP, W5QKF, W5UYQ, K4DLP, W5BNQ, W5AIR, K5AEX, W5MFX and W5ZC, the oldest living former director in the U.S. Traffic: K5VFR 1021, WA5HUN 804, W5PPE 771, K5DLP 410, K5YFC 254, WA5AOB 246, K5PIA 107, K5SWL 60, K5CAY 54, K5KTW 45, W5MFX 43, K5OCX 12, WA5-FLV 5, W5EHC 4, W5ERY 2, K5ZCJ 2.

CANADIAN DIVISION

ALBERTA—SCM, Harry Harrold, VE6TG—SEC: VE6FK. PAM: VE6PV. RM: VE6AEN. ECs: VE6SA, VE6SS, VE6ABS, VE6AJY, VE6AFJ. OPSs: VE6CA, VE6PV, VE6HM, VE6SS, VE6BA. OOs: VE6HM, VE6-NX. OBSs: VE6HM, VE6AKV. ORS: VE6BR. OESs: VE6DB, VE6AKV, VE6AJY, VE6MC. APN is now on winter sked. VE6HM and his XYL have returned after a wonderful time in England and Scotland, and Charlie is back in the groove handling the traffic from the far north. Yours truly had the pleasure of meeting the Canadian Vice-Director Colin Dumbrille at a supper meeting in Calgary which was enjoyed by all who attended. His talk and question period was very impressive. The west is looking forward to another visit from him in the very near future. VE6FK is now on 75 meters trying out s.s.b. VE6SA is doing a very good job these days with his emergency group. Come on, fellows, and let us make this province the biggest and best emergency group in the west. Lethbridge and Calgary reported very good success this year with police patrols as a public service on Halloween. Traffic: VE6FK 148, VE6-HM 46, VE6SA 6, VE6HJ 5.

BRITISH COLUMBIA—SCM, H. E. Savage, VE7FB —Reports on the Oct. SET show that our ECs were very active. Thanks to all of you for supporting our Amateur Radio Public Service Corps and my ECs. Those awarded SNC, for activity on BCEN, are VE7BMR, VE7BMD, VE7QQ and VE7BCV. VE7BPB, with a pair of 807s, homebrew transmitter and v.f.o. is an active BCEN member. The Canadian University Net meets Mon., Wed., Fri. on 14,140 Mc. at 1830 GMT with VE4UM net mgr. VE7ACS, University of B.C., is a member and this year BCEN members are attending U.B.C. and seeing that the station will be heard often. VE7AGF has departed for a place in the north called Alert to operate DOT and has resigned as RM. VE7QQ is our new RM and is running 300 watts from USK. The British Columbia Amateur Radio Assn. held a general meeting and elected VE7BHH, pres.; and VE7BBS, secy-treas. Past-president VE7ALE had served six

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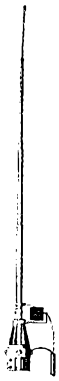

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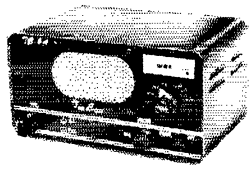

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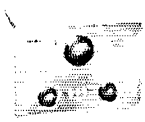

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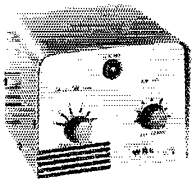

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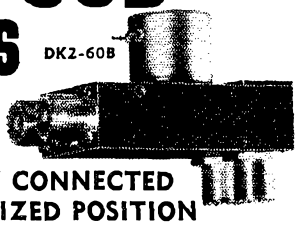

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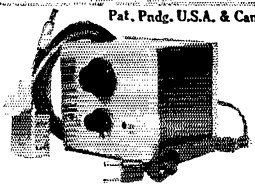

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busy years and has seen the granting of amateur's calls on his vehicle license plates and the Michael Swaile Fund become a blessing to one boy, whose life on this earth has been extended. VE2BK, our Vice-Director, held a very informal meeting with 39 lower mainland amateurs. VE7PO is recovering slowly from his operation. Our SEC is pleased with his ECs, but would like to see more reports monthly. Traffic: VE7BHH 90, VE7OM 37, VE7AC 32, VE7ACS 26, VE7BOZ 21, VE7QQ 16, VE7DH 6, VE7BPB 3.

MANITOBA—SCM, William H. Horner, VE4HW—VE4JT is the new RM and ORS for Manitoba. From his Brandon QTH Tom has organized the new c.w. net operating on 3570 kc. at 0100 GMT daily. Through the efforts of VE4AX the St. Johns Cathedral Boys School at Selkirk is now operating as VE4SJC and code and theory classes are being conducted by Frank. With VE4MA as base station and VE7PD/VE4 as field coordinator the Winnipeg 6-meter group recently provided valuable assistance to the St. Vital Police Force in coordinating an extensive search for a missing child. Among those taking part were VE4TH, VE4CF, VE4PI, VE4NY, VE4TB, VE4LU, VE4PU, VE4SK, VE4GP, VE4HW, VE4HA, VE4QX and VE4HB. VE4PH has donated his beam to VE4SJC and the new Swiss quad now has his interest. VE4XO now has a quad up. VE4LZ has his flying license. VE4QX is s.s.b. with an SB-10. OO VE4JW says VE4GH has moved to B.C. VE4NJ transferred to Ontario. VE4EZ, now at Base, has the beam up. VE4QP is not too active. VE4CK is on 75 with an Apache. VE4JW overhauled the big rig and does all operating on 75 but expects to be on 20 soon. VE4AU changed his Brandon location and says operating conditions are better. VE4PD has a new house, new transceiver and new beam. VE7PD (ex-VE4FO) reports lots of 2-meter f.m. activity in Vancouver. Traffic: VE4JT 76, VE4QD 20, VE4FF 14, VE4HW 14, VE4JA 11, VE4QJ 10, VE4XA 5, VE4AN 4, VE4GB 4, VE4XQ 4, VE4PA 2, VE4HF 1.

ELEVENTH ANNUAL VE1 CONTEST

Jan. 23-24 and 30-31, 1965

All VE1 amateurs are invited to participate in a contest sponsored by the New Brunswick Amateur Radio Association. The contest is divided into two sections, phone and c.w. The highest scoring contestant in each section will be awarded permanent possession of an engraved cup, the NBARA Trophy.

RULES: 1) The c.w. contest will begin at 2400 GMT Saturday, Jan. 23 and end at 2400 GMT Sunday, Jan. 24. 2) The phone contest will begin at 2400 GMT Saturday, Jan. 30 and end at 2400 GMT Sunday, Jan. 31. 3) Any and all amateur bands may be used but only c.w. to c.w., or phone to phone contacts will count. Any contestant may participate and be eligible for awards in both sections. 4) The same station may be counted but once for credit (in each section) regardless of band used. Mobile, portable, and home stations covered by the same station license constitute the same station. 5) The general call is "CQ VE1." 6) Exchange signal reports, county, province, and operator's name. Local QTH is not required. 7) Logs should show band, type emission, signal reports, county, province, time, and date. Logs not showing this information IN FULL will be disqualified. 8) Score one point for information received and one for information sent and confirmed. Multiply total points by the number of individual counties worked in the three provinces to determine final score. For contest purposes Sable Island will be classed as part of Halifax County. 9) Decisions of the contest committee will be final. Logs must be postmarked not later than Feb. 7 and should be in committee hands not later than Feb. 15. Forward all entries to: Contest Committee, P. O. Box 366, St. Stephen, N. B., Canada.

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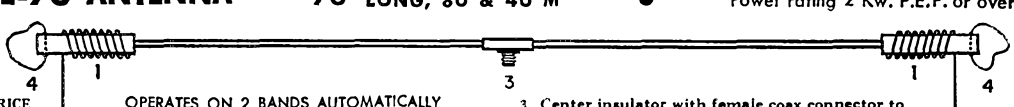

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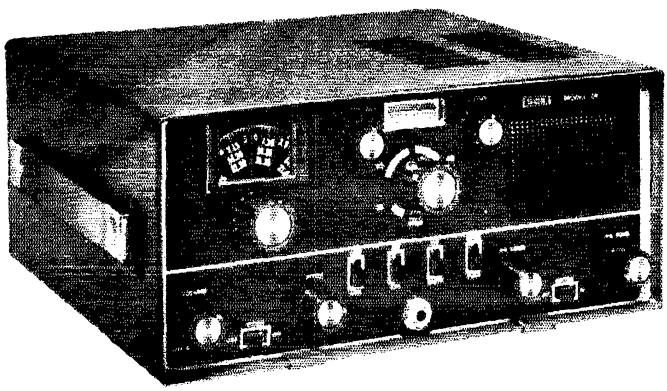

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	300-F	144-146	28-30	$12.95 ppd.
	300-Q	144-148	14-18	$12.95 ppd.
6M	300-B	50-51	.6-1.6	$10.95 ppd.
	300-C	50-54	14-18	$10.95 ppd.
	300-J	50-52	28-30	$10.95 ppd.
20M	300-G	14.0-14.35	1.0-1.35	$10.95 ppd.
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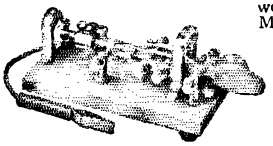

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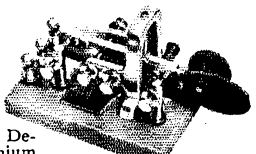

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MARITIME—SCM, D. E. Weeks, VE1WB—Asst. SCM: A.E.W. Street, VE1EK. Deepest sympathy is extended to the relatives and friends of VE1CO and VE1PA who have joined the ranks of Silent Keys. Congratulations to VE1VC and his XYL on the new arrival. VE1s DB, EK and OM held their 11th consecutive annual outing at Hubbards operating as VE1EK/1 in the October CD Party. Sincere thanks to all who participated in the recent Boy Scout Jamboree-on-the-Air. Don't forget the annual VE1 Contest, (c.w.) Jan. 23-24, (phone) Jan. 30-31. VE1RB (ex-VE2YA) is active from the Halifax area. Newly-elected officers of the Goose Bay Club include VO2DP, pres.; K6QYK/VO2, vice-pres.; VE2JJ/VO2, secy.-treas.; VO2NA, awards mgr. VE1NC has transferred to Saint John. VE1AGH and his XYL have returned from Bermuda where they were guests of the Bermuda amateur fraternity. Bertus will be going all out to win the Worked All Bermuda Contest again next year! Congratulations to VE1AGN, who has passed the phone exam. The ARPSC Net still is operating Sun. at 2200 GMT, 1800 AST, on 3750 kc. Your assistance is greatly appreciated. Traffic: VE1RT 58, VE1OM 17, VE1-DB 13.

ONTARIO—SCM, Richard W. Roberts, VE3NG—The Windsor ARC won the Field Day trophy for Canadians sponsored by the Radio Society of Ontario. The Windsor ARC trophy for the first in three-transmitter class in Canada was won by the Contest Club of Montreal, VE2NE/2. The s.s.b. boys wish to thank VE3GH for his effort in arranging the excellent get-together which was held recently in Toronto. The Scarboro ARC held its Annual Dinner in early Nov. The South Waterloo ARC is away to a good season. VE3FLU is now in Galt. VE3CJ, ARRL Canadian Director, and VE2BK, Canadian Vice-Director, were guests at a recent Ottawa ARC dinner in that city. The West Side ARC of Toronto held its Annual Dinner in October. VE3DKR, who is EC 11 meters Metro Toronto and also president of the Cooksville ARC, reports his club is off to a running start. Many ECs were lax on the SET held recently. These tests are very valuable to us and we urge you to think *now* for future tests. Congrats to a new ham in the Sarnia area, VE3DED. VE3BDX, in Ottawa, is a new OBS for v.h.f. in that area. I am preparing a list of those clubs who have bulletins and the mailing QTHs. Clubs who are interested in swapping may have a copy if they drop me a card. The Kitchener-Waterloo ARC has a new mailing address, VE3KCD, P.O. Box 603, Kitchener. If you are in Kitchener and are 2-meter mobile or portable, call in on 144.450 Mc. Traffic: VE3CYR 190, VE3BZB 154, VE3NG 122, VE3DRF 121, VE3DPO 109, VE3AWE 100, VE3EHL 83, VE3FGV 79, VE3BUR 65, VE3ETM 62, VE3GI 54, VE3LK 54, VE3BLZ 46, VE3DWN 36, VE3-BTV 33, VE3EAM 28, VE3DU 25, VE3EBC 21, VE3CFI 17, VE3BZT 15, VE3ELQ 15, VE3AKQ 14, VE3BWM 14, VE3EGG 10, VE3DLC 9, VE3AUU 8, VE3WW 6, VE3DVE 4.

QUEBEC—SCM, C. W. Skarstedt, VE2DR—Asst. SCM: Michel St. Hilaire, VE2BEZ. We thank you all for your cooperation and wish you a very pleasant Holiday and a rewarding year to come. VE2NE/2 won the Windsor trophy for high score during Field Day. The QSL cards, publicizing the 1967 Expo, and ARRL National Convention, soon will be available. VE2TA delivers an interesting bulletin on 3790 kc. every Sun. at 10 A.M. in connection with local and ARRL news. Under responsible leadership the MARC now teaches some 85 newcomers the fundamentals of code and theory. VE2BMS, BLR, BQJ, KM, BEC, HV and SH deserve praise for this undertaking. The AREC Net on 3755 kc. Sun. at 11 A.M. is well patronized with VE2AUU, our SEC, as the usual NCS. VE2II traded his SX-96 for an SX-111. We are extremely sad to add yet another call to Silent Keys—VE2KH, who had been active in amateur circles for many years. VE2SF entertained a number of his friends at a pleasant get-together. We salute the Sherbrooke Club, which is now ARRL affiliated. VE2BSP is very active on 80-meter c.w. VE2AGI and VE2AJD again have started class for beginners with approximately 15 taking part. VE2AKF and VE2BRC were leaders of ham groups at Drummondville and vicinity. Our Asst. SCM, who made the BPL again, is too busy hunting to write. It would be worth your while to investigate the Ont./Que C.W. Net on 3535 kc. daily at 7 P.M. It has turned into a very efficient net under the able leadership of VE3CYR. Traffic: VE2DR 216, VE2BEZ 168, VE2ALH 64, VE2OJ 64, VE2BRT 43, VE2BRD 41, VE2BMS 35, VE2EC 19, VE2BG 18, VE2AIR 15, VE2ABT 12, VE2CP 6.

SASKATCHEWAN—SCM, Mel Mills, VE5QC—Greetings and best wishes from myself and SEC VE5CU and all the ARRL gang. We resolve to serve you with all our thoughts and actions aimed at making this great hobby of ours fill your fondest dreams and desires. *But*

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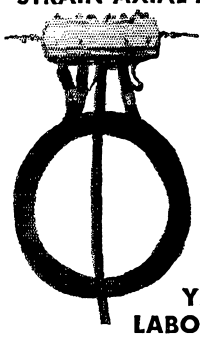

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we can do this only with your help and backing. Resolve now, you ECs, to send that monthly report in no matter how small; you AREC and net members follow ARRL procedures *all* the time to make you more effective in your message handling and, last but not least, *all* you amateurs review your own operating procedures. Are you giving your call sign enough? Are you zero-beating that QSO you're joining? Are you listening before and *during* that test period? Let's be *constructive* rather than *destructive* in our criticism and help. Bouquets for 1964: SEC VE5CU for a very FB job with the AREC; EC VE5BO for a tremendous job of organizing and getting the complete support of the larger northern area; PAM VE5HP and all net members for improved operation of the net. Every little bit helps us keep our bands. Traffic: VE5HP 119, VE5LM 51, VE5OB 22, VE5BO 19, VE5CB 6, VE5HQ 5, VE5QC 4, VE5RE 2.

Novice Roundup

(Continued from page 65)

3) *QSOs*[2] Contacts must include certain information sent in the form as shown in the example. QSOs must take place on the 80-, 40-, 15-, or 2-meter bands. Crossband contacts are not permitted. C.w. to phone, c.w. to c.w., phone to phone, phone to c.w. contacts are permitted. Novices work any amateur stations eligible; non-Novices work only Novices. Valid points can be scored by contacting stations not working in the contest, upon acceptance of your number and section and receipt of a number and section.

A Novice may operate in the Novice portion of the competition until he *receives* his General Class License, then *must* operate as a non-Novice entry.

4) *Scoring:* Each exchange counts one point. Only one point may be earned by contacting any one station, regardless of the frequency band. The total number of ARRL sections (see page 6 of this *QST*) worked during the contest is the "section multiplier." Yukon-N.W.T. (VE8) also counts as a multiplier. A fixed scoring credit may be earned by entrants who hold ARRL Code Proficiency certificates. If an entrant does not hold a CP award he can apply for credit by attaching to his Roundup report a copy of qualifying run from W6OWP, January 8, or February 4, or from W1AW, January 19 or February 17. CP credit equals the w.p.m. speed indicated on the latest certificate or sticker held by the entrant. The final score equals the "total points" plus "Code Proficiency credit" multiplied by the "section multiplier."

5) *Reporting:* Contest work must be reported as shown in the sample form. Reporting forms and a map of the United States will be sent gratis upon request. Indicate starting and ending times for each period on the air. All Roundup reports become the property of ARRL and must be postmarked not later than March 5, 1965.

6) *Awards:* A certificate award will be given to the high-est-scoring Novice in each ARRL section.

7) *Disqualifications:* Failure to comply with the contest rules or FCC regulations are grounds for disqualification. ARRL Contest Committee decisions are final. QST

OPERATOR OF THE MONTH

Have you thought back over the past month and picked out your nomination for "operator of the month?" Details appeared on page 35, August *QST*. Let's hear from *you*.

During November the following additional amateurs were nominated in recognition of their extra skills and courtesies:

W1DIY W4MS
W1JYH W4NTO
K1UNW W4VMS
WB2EUH WA8MBG
WA2UWA WN8NIX
K3COQ W9DCU
WA4KKG VE7BDH
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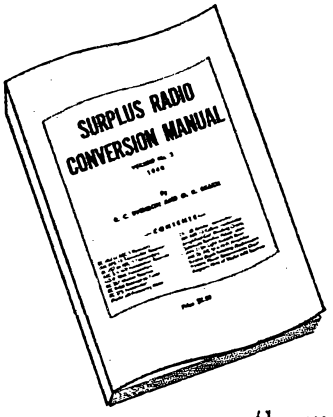

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VOLUME II—BC-454 or ARC-5 Rcvrs.; AN/APS-13 Xmtr./Rcvr.; BC-457 or ARC-5 Xmtrs.; ARC-5 V.H.F. Xmtr./Rcvr.; GO-9/TBW Xmtrs.; BC-357 Marker Rcvr.; BC-946B Rcvr. as Tuner; BC-375 Xmtr.; Model LM Freq. Meter; TA-12B Bendix Xmtr.; AN/ART-13 (Collins) Xmtr.; Simplified Coil-Winding Charts; Selenium-Rectifier Power Units; AVT-112A Light Aircraft Xmtr.; AM-26/AIC to a Hi-Fi Ampl.; Surplus Beam Rotating Mechs.; ARB Rcvr. Diagram Only. Book #322

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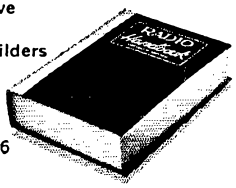

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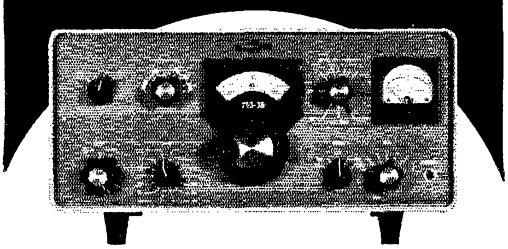

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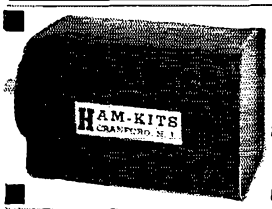

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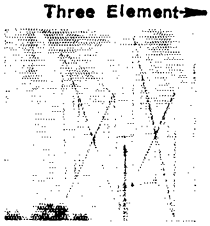

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IT is with deep regret that we record the passing of these Amateurs:

W1AGW, Shepard B. Wilber, New Bedford, Mass.
K1DYQ, Spencer Blatz, Norfolk, Conn.
W1JT, Edward J. Wurtz, Riverside, R.I.
W1ZRO, Fred Jervis, Coventry, R.I.
WA2BNR, Donald E. Elman, Caledonia, N.Y.
W2DAC, Louis Aherne, College Point, N.Y.
W2EG, Earl C. Williams, Neptune, N.J.
W2EHI, Everett A. Stout, Brooklyn, N.Y.
K2GK, Earl J. Atkinson, Central Islip, N.Y.
W2PTP, John Kellogg, North Syracuse, N.Y.
WA2QLK, Walter Eisenbach, Glasser, N.J.
WA2TNL, Floyd C. Fury, Port Leyden, N.Y.
W3AYG, John Harris, Philadelphia, Pa.
W3DXT, John P. McGoldick, Scranton, Pa.
W3GBJ, Thomas Appler, Ellicott City, Md.
W3IWH, Robert P. Stevenson, Pittsburgh, Pa.
W3JCU, James P. Fleming, Baltimore, Md.
W3KYK, Dr. Charles Fleming, Johnsonburg, Pa.
W3KYM, Peter W. Kornely, Pittsburgh, Pa.
W3NUG, William G. Walker, Pittsburgh, Pa.
W3QWE, Paul Leary, Baltimore, Md.
K3UEF, Hugh Green, District Heights, Md.
W4FWS, Kenneth L. Hargis, Harriman, Tenn.
W4KCQ, Patrick J. Ryan, Tuscaloosa, Ala.
W4POI, Curtis Steed, Thomasville, Ga.
K4QVG, Loyd A. Jennings, Augusta, Ga.
W4RFE, Frank Rippetoe, Stone Mountain, Ga.
WA4ROE, John Stebbins, Ft. Myers, Fla.
W4RX, Martin L. Covington, Monroe, N.C.
K4TAY, John M. Studstill, Marietta, Ga.
W4TCM, Archie D. Love, Petersburg, Va.
W5AEH, C. W. Peters, New Orleans, La.
W5HAJ, Ed Lockey, Troup, Texas
K5IEJ, Jack E. Kelly, Fort Worth, Texas
W5LIR, Donald Eagle, El Reno, Okla.
K5OCY, Charles Lester, Tulsa, Okla.
W6AJN, Harold J. Sowers, Berkeley, Calif.
W6EA, Howard Seefred, Glendale, Calif.
K6EYU, R. H. Lewis, Riverside, Calif.
WA6KDT, Roy C. Marcum, Winters, Calif.
W6PTN, William Elkerton, San Diego, Calif.
W7AVP, Donald D. Oberhillig, Boise, Idaho
W7BZD, Ivan J. Frost, Salem, Oregon
W7DGV, Nicholas Spinelli, Lingview, Wash.
W7EHH, Hugh E. Christopher, Spokane, Wash.
Ex W7FIA, H. A. Moser, Los Angeles, Calif.
W7NJG, Noel W. Jernigan, Seattle, Wash.
W7PBD, Marshall E. Rettig, Douglas, Ariz.
KN7QZM, Edward C. Littel, Orting, Wash.
K7YGR, Richard L. McDougal, Marion, Iowa
K8ADB, Ralph O. Sutherland, Dowagiac, Mich.
Ex W8EFI, Walter J. Malec, Detroit, Mich.
K8NXD, William N. Pedigo, Ashland, Ohio
W8OZP, Auburn C. Esslinger, Owosso, Mich.
W8PBF, Robert L. Watson, Cincinnati, Ohio
W8RWP, Cornelius Van Oeveren, Allendale, Mich.
W8TA, Edward Ficher, Cleveland, Ohio
K9AAB, Robert K. Pratt, Pekin, Ill.
W9BLL, Milton Ruyle, Alton, Ill.
W9CCR, Sherwin L. Mossmann, Chicago, Ill.
W9CIH, Robert Palmer, Ashland, Wisc.
W9CLG, Walter H. Mundt, Elmhurst, Ill.
W9GC, E. H. Giddings, Lanark, Ill.
WA9GCZ, Alvin Lora, Milwaukee, Wisc.
W9HQZ, Lloyd D. MacDermaid, St. Charles, Ill.
W9MF, Edmund H. Scholz, Chicago, Ill.
W9MYE, Harold Huffman, Chicago, Ill.
Ex W9SLD, W. C. Bridges, Superior, Wisc.
WØANK, Nemel A. Kimberlin, Diagonal, Iowa
WØCOX, Russell W. Battern, Minneapolis, Minn.
WØDYN, Charles R. Arnold, Kansas City, Mo.
WØEYF, Clarence I. McPherson, Kansas City, Kansas

continued on page 142

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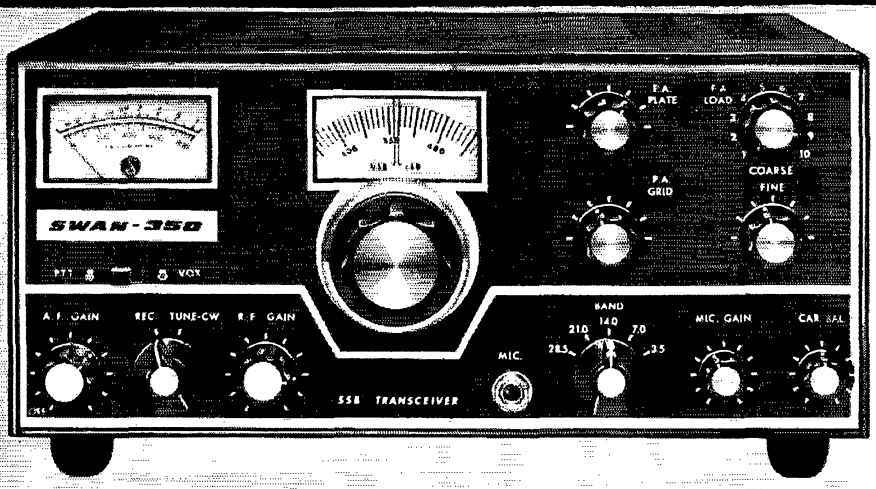

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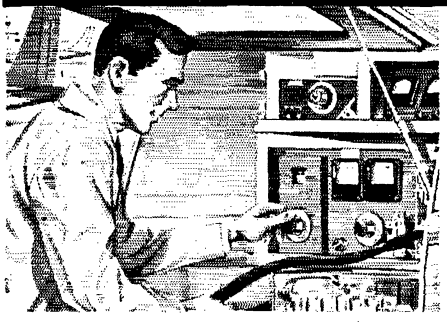

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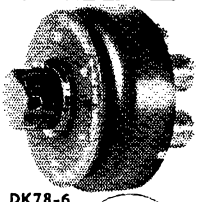
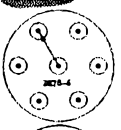
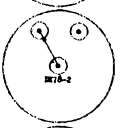
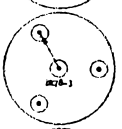
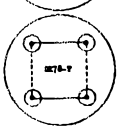


DK78-6









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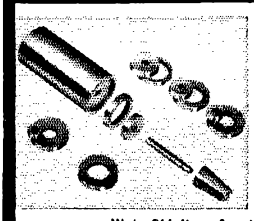

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Silent Keys

continued from page 140

W0JXY, Fred H. Jones, Woolstock, Iowa
WØNWS, Robert J. Anderson, St. Charles, Mo.
KØQHH, Florence P. Fredrickson, Roseau, Minn.
WØTYP, Joseph W. Farrell, Baudette, Minn.
G3DUQ, Dr. T. R. Stevens, Dorchester, England
G8OO, W. Moore, Dorchester, England
KP4AHG, Hubert B. McGill, San Juan, Puerto Rico
VE1CO, A. H. Mackie, Summerside, P.E.I., Canada
VE1PA, G. H. McKenzie, Halifax, N.S., Canada
VE3DNM, George McKay, Cranbrook, B.C. Canada
VE3NZ, J. E. Turner, Stroud, Ontario, Canada
VE3US, J. E. Darbyshire, Scarborough, Ont., Canada
VE3WT, Francis Ellerbeck, Burlington, Ont. Canada
XE1SO, Lucio Pontecorvo, Mexico 5 DF, Mexico

(Continued from page 81)

How's DX

November's "How's" for other entry particulars or drop an s.a.s.e. to LIDXA Contest, P.O. Box 599, Lynbrook, N. Y. Washed-up DX old-timers are said to be attempting to save face with the newcomers by pretending disinterest or lack of time for this one . . . . . W6ISQ, *QST*'s Al Capp, is beating the bushes for pre-1925 amateur radio literature in good condition. "Haven't much of a budget for the stuff but let me know if you run across anything." . . . . . K3UXY is smitten by an old paradox: "As a kid I had plenty of time for ham radio but no money for parts; now I have the money but no time. Upon reaching retirement age will I have the time *and* the money but insufficient interest?" Not if *QST* can help it, Henry . . . . . K2YFE pushes buttons at KL7WAH, mainly 10 and 15 c.w. and phone, with hopes of a few Pacific stops later in the year . . . . . K2UTC wonders when the HH gang will be back on the air. News out of Haiti doesn't give much encouragement . . . . . K7ZTM (es-K5KYR-K9VRV/4) offers Utah to DX stations on 15-meter week ends. Pete still ships old *Handbooks* to needful DXers overseas . . . . . "I'll certainly miss those juicy 20-c.w. DX signals from over the pole," muses KL7CYS/Ø, now settling down on 21-, 14- and 7-Mc. c.w. in Colorado. "Plan to use no more than 100 watts. More sport that way." . . . . . W2OLU hears the west coast on 40 c.w. middays, something unthinkable during "normal" sunspot years . . . . . WA9AUM is back in the bottom DX layers after a year in traffic work. It's refreshing to switch around . . . . . Remember how rare (illegal) a PJ contact was prior to 1954? PJ2CU tells us of the Curacao Certificate, a sheepskin commemorating the tenth anniversary of the Antilles Statute, based on QSOing five Curacao PJs between December 15, 1964, and January 15, 1965.. Applications with ten International Reply Coupons must reach VERONA, P.O. Box 383, Willemstad, Curacao, Netherlands Antilles, before March 1, 1965 . . . . . W6EAY is thinking of adding a few more wavelengths to his 14-Mc. 500-footer. Eric's 28-watt 2E26 thinks it's a kilowatt when working off the ends. K7QXG is another modest-power devotee at 78/64 worked/confirmed with his 60-75-watter on 20 and 15 . . . . . Poughkeepsie s.w.l. K. Deschere ought to make a fine ham, already building his own receivers for 15-meter DX. Fellow tuner C. Maher of Mississippi enters the Navy this month with hopes of further radio training . . . . . W6BCT and Orange County DX Century Clubbers entertained and were entertained by guests W9WNV/DX and HK7AKJ at a lively November meeting . . . . . W3ZNB met VP7s NE and NS on his Bahamas honeymoon in September . . . . . "After catching up with the mail my next chore will be getting back on the air," writes VO2NA after a 10-month VE8 assignment. "At first glance I see only my 20-meter ground-plane still intact at Goose Bay." . . . . . Tidbits from the local scene thanks to club organs: W5ENE, a WGDXC founding father, is back at his dials after an 11-year slowdown. Ben must prefer the DX challenge of scant sunspots. . . . VP9s NB L, Ws 1NBA and 2YTH DXcursioned to Anguilla (VP2s KA KI) and the B.V.I. (VP2VI) in November. . . . FDXC is pushing 3815 kc., 1500 GMT, Sundays, as its club DX-gossip slot. . . . YS1HUKE got that crazy label by having his MARS call suffixed to the Salvador ham prefix. . . . Ws 1DMD 5EGS 9UZS, WA2CRX, DL1IA and G3CEG are proud new possessors of DXCPR's 8X8X8 award. . . . W9RBI, Wisconsin's Big Bomber, tried not to spill too many trade secrets as guest speaker at a November gathering of Milwaukee Amateur Radio Club.

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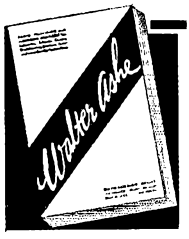

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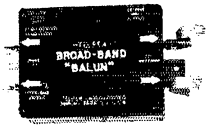

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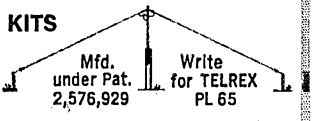

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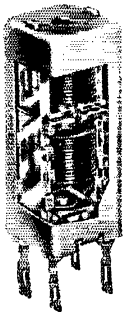

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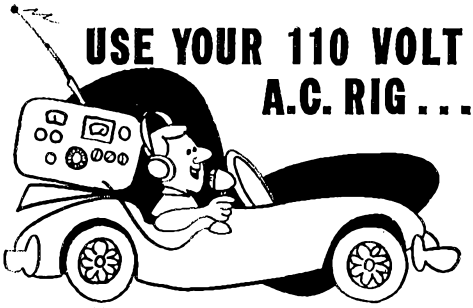

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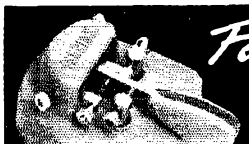
See Page 151



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The Mox-Box

(Continued from page 24)

time ask for any sales flyers. Some excellent bargains can be obtained in this manner. In Fig. 1, we specify a certain type of relay for K_1. However, almost any double-pole double-throw relay can be used. Also, the relay doesn't have to have a 115-volt a.c. coil. If you find a bargain in a relay with a 6.3-volt a.c. coil, you can power it by taking the 6.3 volts from the tube heater transformer winding in either your receiver or transmitter.

It is also possible to substitute other types of transistors in the circuit. We tried about a dozen different types and they all worked.

Construction Details

The Mox-Box was built into a 2 × 5 × 9-inch chassis. However, the layout is not at all critical and any convenient-size enclosure can be used. The relay should be mounted close to J_3, J_4 and J_5 in order to keep the leads short. Also, as S_1 is your station operating switch, it should be mounted so that it is clear of any obstructions. Some hams like to use a foot switch mounted on the floor under the operating bench. To go from receive to transmit, they merely step on the switch. If this type of operation is desired, two leads can be connected in parallel with S_1 to the foot switch.

The components for the monitor are mounted on terminal strips. The battery is supported by leads of solid wire soldered directly between the battery terminals and the tie points on the terminal strip. When wiring P_1 and P_2, be sure that the chassis ground leads are connected to the ground portion of the plugs. The purpose of S_2 is to turn off the monitor when the station is not in use. Leaving the key open might accomplish the same thing, but having the switch is a good reminder to turn the unit off when going off the air.

On CR_1, the arrow on the diagram indicates the anode and the bar, the cathode. The cathode end of a silicon rectifier is indicated either by a raised rim, a colored ring, a dot of paint, or a positive sign (+).

The code-practice-oscillator components were mounted on a piece of mounting board, but it just as easily could have been a piece of wood. Fahnestock clips were used for the headphone and key terminals.

Using the Mox-Box is quite simple. Insert the key plug, P_2, into the transmitter key jack, the headphone plug, P_1, into the receiver headphone jack, and connect up the a.c. to the unit. Your key should be plugged into J_2 and the headphones into J_1. The antenna is connected to J_4 and the receiver and transmitter to J_3 and J_4. Your station is now controlled by S_1. QST

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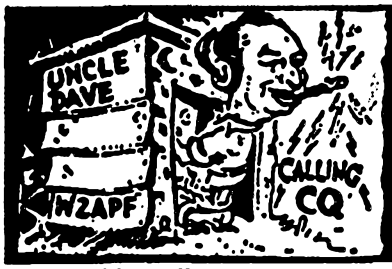

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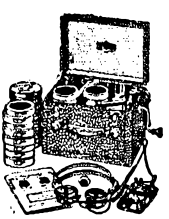

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World Above

(Continued from page 42)

gle contact! Just can't seem to reach Detroit or Pontiac from this QTH just outside of Ann Arbor." Now this seems a shame, how about some of you fellas looking up, down or around Ann Arbor way for WA8HYR/8. Illinois brings reports from W9RSV, KL7EBB/9, WA9IML and WA9FIII. These boys all noted the October 4 opening; all but one caught the opening of the 8th and WA9FIII caught an additional opening on the 20th when WA4DNU "almost" checked into the local six meter net. 1's, 2's, 5's and Ø's were heard during these openings into Illinois. From Indiana and WA9JVL we hear that E^2 was observed into 1 and 2 lands on October 20; and that groundwave was average to good during October with W4TQQ, W9CWW (or ZWW) and an unidentified K4 being heard. Bill is going to build a mixer for 50 Mc., and probably 144 Mc. and would appreciate any information on good circuits for either band. WA9ASZ comments that there was a day or two during October during which contacts were made at distances up to 800 miles but Steve believes there was much less DX than during the same period a year ago. In Wisconsin W9HWQ caught the opening of the 5th to the East Coast and on the 9th to Tennessee, Kentucky and South Carolina. "Sorry if I missed anyone by taking call districts in sequence" sez WØPFP, "but during the openings of the 5th and 9th it was the only way I could hear anything copyable." "Sounded like 20 meter QRM during contests." Jim worked 1's, 2's and 3's (all s.s.b.) on the 5th, and 2, 3, 4 and 8 call areas on the 9th. Jim recently took down his 60-foot tower and broke a couple of ribs in the process. We couldn't figure out at first if it was the ribs of the tower or Jim's ribs but he finished off his report by saying: "Now on with the antenna at 30 feet. Hope to go up to 80 feet soon as ribs get better!" Must be *his* ribs! WAØFLL reports 1, 2, 3 and VE lands coming through into Missouri on the 8th and the 16th produced Rhode Island signals "as strong as locals". K7ICW notes that the frequency of E_s is unusually high for October. Al observed openings on the 16th, 18th, 20th and 22nd with other openings probably missed. On the 20th, southern California stations were noted coming through into Las Vegas viz backscatter on low power s.s.b. "Signals on the 22nd were very fluttery with the usual carrier from W5SFW being 40 db. over S9. However, backscatter signals were nearly as strong as W5SFW," Al also tells us that K7ZOK and K7RKH have been QSOing recently on 50 and 144 Mc. RTTY for a first in that area.

What ARRL Means To Me

(Continued from page 64)

The word "league" is the last of those comprising the name, and this to me signifies the social fraternity that groups together all those people with a common interest. For all of the American Radio Relay League members have such a common interest—to study and enjoy radio.

When these individuals are grouped together as a team, America continues to move forward. United voices can clearly be circled around the world and interests become more adequately protected. Therefore, all this is what the ARRL means to me, and I feel that it can be truly said that organization is an expression of our democratic system, and does join a common interest.

Now the certificate for the wall and the card for my pocket are no longer just pieces of paper, but have a special meaning of which I am a part. The magazine delivered each month now becomes a symbol of Mr. Maxim's efforts and links me with the rest of my fellow-members.

A 64-page cumulative index to *QST* is available for 25¢ postpaid, covering the years 1950–1964. Request your copy from ARRL Hq., 225 Main St., Newington, Conn.

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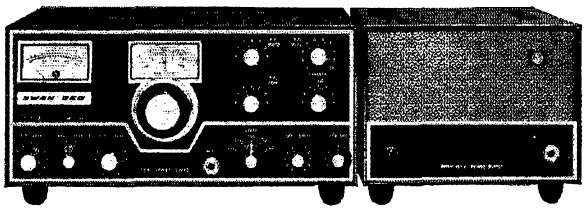

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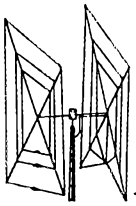

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Interest in AREC Groups

(Continued from page 45)

lected. Get the gang together for a dinner (PAØ-style, with wives, girl or boy friends, kids or what have you) or a dance or an outing occasionally and forget the serious side for a while. We don't mean leave your gear at home (although probably most XYLs would prefer this), but use it as a source of pleasure and amusement for a change to balance the more serious and sober side of emergency communication. A social program is as much a necessity to a well-balanced AREC group as is an emergency plan.

And So . . . .

Someone is going to say that it's all very fine to talk about road patrols, cooperation with civic agencies, participation in parades and athletic events and public functions, but how does a poor confused EC go about making the initial contacts to get his AREC group utilized for such purposes?

This was covered in a previous article [1] and we can't repeat it verbatim here, but one thing is sure: before you can offer services, you have to have some services to offer. It's easy enough to test your ability to perform, for example, a traffic patrol by trying it on a quasi-simulated basis — that is, conduct an *actual* traffic patrol, but don't attempt any official coordination. Just do it for your own information and experience. Once you have set up your lines of communication and accumulated some experience and know you can do a good job, *then* is the time to offer to do it. True, maybe the chief of police will turn you down, saying he already has plenty of traffic-control communication. Maybe he won't even listen to you tell him of the tests you have been making and what it is you can do for him. If so, you still haven't lost anything and you have gained some experience that just might be valuable in some emergency some time when the chief or other official will discover he isn't so well off, communications-wise, as he thought he was.

Once you have made your contacts in accordance with the above-referenced article, and start being known around town as the leader of that "bunch of amateur radio nuts," you will soon find out whom to contact to offer your services for special events; and once you have successfully rendered communications services for a few of them, it will soon be unnecessary to make offers, because *they'll* be seeking *you*. Nothing succeeds like success. And no group of amateurs is more valuable to the preservation of our precious amateur privileges than the group that renders efficient, systematic and *regular* service to the public. QST

[1] Hart, "The Amateur Radio Emergency Corps," *QST*, May, 1964, p. 32.

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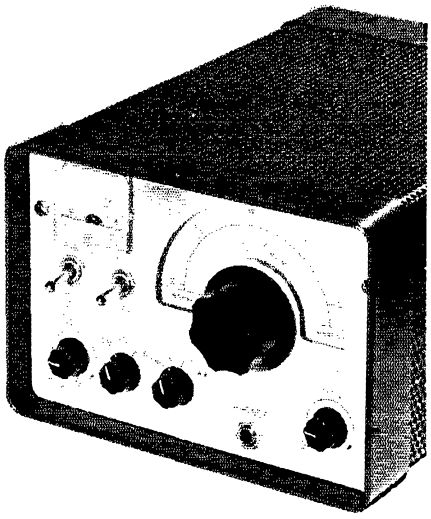

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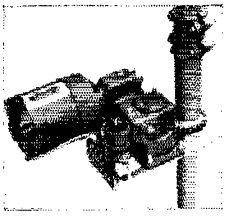

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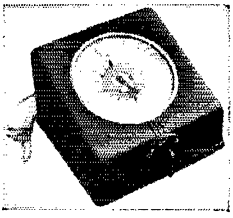

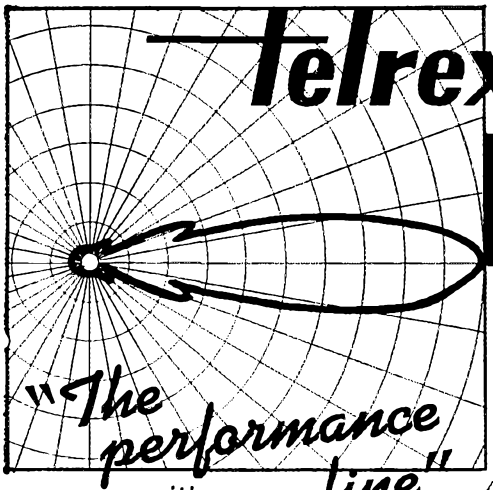

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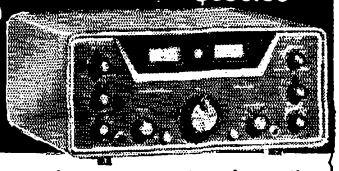

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W2, K2, WA2, WB2 — North Jersey DX Ass'n, P.O. Box 303, Bradley Beach, N. J. 07720.
W3, K3, WA3 — Jesse Bieberman, W3KT, P.O. Box 204, Chalfont, Pa. 18914.
W4, K4, WA4 — Thomas M. Moss, W4HYW, Box 20644, Municipal Airport Branch, Atlanta, Ga. 30320.
W5, K5, WA5 — H. L. Parrish Jr., W5PSB, P.O. Box 9915, El Paso, Texas 79989.
W6, K6, WA6, WB6 — San Diego DX Club, Box 6029, San Diego, Calif. 92106.
W7, K7, WA7 — Salem Amateur Radio Club, P.O. Box 61, Salem, Oregon 97301.
W8, K8, WA8 — Walter E. Musgrave, W8NGW, 1245 E. 187th St., Cleveland, Ohio 44110.
W9, K9, WA9 — Ray P. Birren, W9MSG, Box 510, Elmhurst, Illinois 60128.
WØ, KØ, WAØ — Alva A. Smith, WØDMA, 238 East Main St., Caledonia, Minn. 55921.
VE1 — L. J. Fader, VE1FQ, P.O. Box 663, Halifax, N. S.
VE2 — John Ravenscroft, VE2NV, 135 Thorn Crest Ave., Dorval, Quebec.
VE3 — R. H. Buckley, VE3UW, 20 Almont Road, Downsview, Ont.
VE4 — D. E. McVittie, VE4OX, 647 Academy Road, Winnipeg 9, Manitoba.
VE5 — Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Sask.
VE6 — Karel Tettelaar, VE6AAV, Sub. P.O. 55, N. Edmonton, Alberta.
VE7 — H. R. Hough, VE7HR, 1291 Simon Road, Victoria, B. C.
VE8 — George T. Kondo, VE8RX, % Dept. of Transport, P.O. Box 339, Fort Smith, N. W. T.
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KP4 — Joseph Gonzalez, KP4YT, Box 1061, San Juan, P. R.
KH6 — John H. Oka, KH6DQ, P.O. Box 101, Aiea, Oahu, Hawaii 96701
KL7 — Alaska QSL Bureau, Box 6226, Airport Annex, Anchorage, Alaska.
KZ5 — Ralph E. Harvey, KZ5RV, Box 407, Balboa, C. Z.

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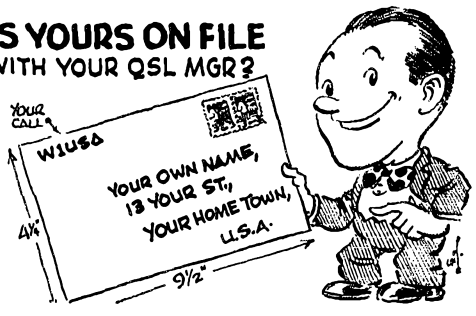

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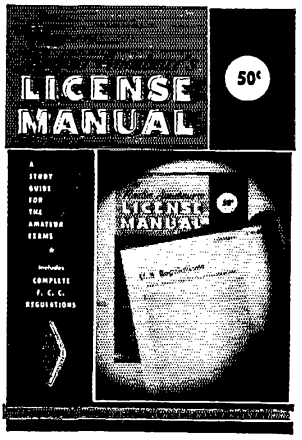

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(1) Advertising shall pertain to products and services which are related to amateur radio.

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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.

DAYTON Hamvention, April 9 and 10, 1965. For information write G. L. Shearer, Box 44, Dayton Ohio 45401.

MIDLAND (Texas) Amateur Radio Club Annual St. Patrick's Day Swapfest, March 21st. Inquiries invited. 510 Midland Savings Building, Midland, Texas 79704.

WANTED: Early wireless gear, books, magazines, catalogs before 1922. Send description and prices. W6GH, 1010 Monte Dr., Santa Barbara, Calif.

MOTOROLA used FM communications equipment bought and sold. W5BCQ, Raph Hicks, Box 6097, Tulsa, Okla.

WANTED: military or Industrial laboratory test equipment. Electronicraft, Box 13, Binghamton, N.Y.

WANT 1925 and earlier ham and broadcast gear for personal collection. W4AA, Wayne Nelson, Concord, N.C.

MICHIGAN Hams! Amateur supplies, standard brands. Store hours 0830 to 1730 Monday through Saturday. Roy J. Purchase, W8RP. Purchase Radio Supply, 327 E. Hoover St., Ann Arbor, Michigan. Tel. NOrmandy 8-8262.

WANTED: All types of aircraft on ground ratios. 17L 618F or S 388, 390, GRC, PRC, 51J, RVX. Collins linear amplifier, Type 204; Especially any item made by Collins Radio, ham or commercial. Also large type tubes and test equipment in general. For fast cash action contact Ted Dames, W2KUW, 308 Hickory, Arlington, N.J.

SELL swan or buy ancient radio set and parts, magazines. Laverty, 118 N. Wycombe, Lansdowne, Penna.

COLLINS Equipment bought, sold & repaired. Paul A. Reveal, 129 Midland Ave., Glen Ridge, N.J.

SAVE On all makes of new and used ham equipment. Write or call Bob Grimes, 89 Aspen Road, Swampscott, Massachusetts; 617-598-2530 for the gear u want at the price u want to pay.

FOR Sale cheap: QST or CQ, any quantity. Send your list for quotation. Cash for call books before 1942. Want early radio gear and publications. Erv Rasmussen; Box 612, Redwood City, Calif.

WANT: R-391/URR receivers, parts, assemblies. Nick Thompson, 99 Water, Millinocket, Me.

FOR Sale: Plate Transformers 3600-0-3600 VAC @ 1000 Ma. CCS, with 110 V and 220 V primaries, $35.00. One Year Guarantee. Peter W. Dahl Co., 5331 Oaklawn Ave., Minneapolis, Minn. 55424. Tel. 922-7618.

WANTED For personal collection: Benwood Bakelite Rotary Gap; antique gear dating back to 1915 or earlier. Spot cash! WØZAB, 4 Williamsburg, St. Louis 41, Mo.

WANTED: 2 to 12 304TL tubes. Callanan, W9AU, 118 S. Clinton, Chicago 6, Ill.

CASH For Callbooks. For private collection, U.S. Government Callbooks before 1927, Radio Amateur Callbook Magazine 1942 wanted. W8EF, 801 Lake Shore Road, Grosse Pointe 36, Mich.

WANTED: VFO-Matic, P&H Model 8010 for KWS-1. R. K Palmer, K3MTW, Smethport, Penna.

200V SSB, $545; HT-32, $225; AN/FRR-21 rcvr. 14-600 Kc., $175; SP-600JX-17, $425; Collins R-390, R-390A, R-391, R-388, 51J-3, 51J-4 general coverage receivers. Alltron.cs-Howard Co., P.O. Box 19, Boston, Mass. 02101. Tel: 617-742-0048.

WANTED: For personal collection: QST, May 1916, WICUT, 18 Mohawk Dr., Unionville, Conn.

QSLS? WPES? SWLS? Personalized made-to-order, fast service! Largest variety samples 25¢. Deluxe samples 35¢ (Refunded). Sakkers, W8DED, Box 218, Holland, Michigan (Religious QSL samples 25¢).

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QSLS "Brownie" W3[illegible], 3111 Lehigh, Allentown, Penna. Catalog with samples. 25¢.

QSLS-SMS. Samples 10¢. Malgo Press, Box 375 M.O., Toledo 1, Ohio 43601.

QSLS "Frier" Harvard St. Schenectady, N.Y. 12304. Large "Clip and Design" Catalog with samples. 25¢.

DELUXE QSLS. Petty, W2HAZ. Petty Printing Co., Inc., 1702 5th, Trenton, N.J. 08638. Samples. 10¢.

QSLS Stamp and Call bring samples. Eddie Scott, W3CSX, Fairplay, Md.

QSLS. See our new "Eye-Binder" cards. Extra high visibility. Samples 25¢. Dick, W8VXK. 1994 N. M.-18, Gladwin, Mich.

QSLS, SWLs, XYL-OMs (sample assortment approximately 9¢) covering designing, planning, printing, arranging, mailing; eye-catching, comic, sedate, fatabulous, DX-attracting, prototypal, snazy, unparagoned cards (Wow!), Rogers, KØAAB, 961 Arcade St., St. Paul 6, Minn.

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QSLS. Samples 10¢. Wildcat Press (W6CMN, Bill), 6707 Beck Ave., North Hollywood, Calif. 91606.

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QSLS Distinctive samples dime. Volpress, Box 133, Farmingdale, N.Y.

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ATTRACTIVE QSLS: Guaranteed largest variety of individual samples (25¢ deductible). Paul Levin, K2MTT, 1460 Carroll St., Brooklyn, N.Y. 11213.

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SUPERIOR QSLs, samples 10¢. Ham Specialities, Box 73, Hobbs, New Mexico (formerly Bellaire, Texas).

QSLS. Samples 25¢. Rubber stamps: name, call and address $1.55. Harry Sims, 3227 Missouri Ave., St. Louis, Mo. 63118.

QSLS 300 for $4.35. Samples 10¢. W9SKR, "George" Vesely, Rte. #1, 100 Wilson Road, Ingleside, Ill. 60041.

QSLS 3-color glossy, 100, $4.50. Rutgers Vari-Typing Service. Free samples Thomas St., Riegele Ridge, Milford, N.J.

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GREET Ham Friends with 3-D Personalized Christmas cards. Newest holiday idea. Brilliant, sparkling designs. Samples 10¢. 3-D QSL Co., Monson 2, Mass.

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RUBBER Stamps, 3-line, $1.00. Andrew Travis, 2002 West 8th, Austin, Texas, 78703.

RUBBER STAMPS $1.00. Call and address. Clint's Radio W2-UDO, 32 Cumberland Ave., Verona, N.J.

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QSL Specialists. Distinctive Samples. 15¢. DRJ Studios, 2114 N. Lavergne Ave., Chicago, Illinois. 60639.

PICTURE QSL Cards of your shack, etc. Made from your photograph. 1000, $14.50. Also unusual son-picture designs. Samples 20¢. Raum's, 4154 Fifth St., Philadelphia, Penna. 19140.

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FINEST Canadian custom quality QSLS. Fast service. Free sample. Starlite, 7 Colony Road, Scarboro, Ont., Canada.

CANADIANS: Sell National NCX3 AC supply, $585; Heathkit 10-21 scope, $60; Johnson Matchbox 250 W with SWR bridge, $100; Mosley TA33 Jr, Delhi 40 ft. tower, CDR rotator, all for $150; Electro-Voice 729SR mike ceramic cardiod with on-off switch, $20; Johnson 100 kc calibrator, $15; Eico 710 grid dipper, $20. Louis Joe, VE3BJR, 1029 Laurier Cresc., Sainia, Ont., Canada.

HAM Discount House. Latest amateur equipment. Factory sealed cartons. Send self-address stamped envelope for lowest quotation on your needs. H D H Sales Co., 170 Lockwood Ave., Stamford, Conn.

WANTED: Tubes, all types, write or phone W2ONV. Bill Salerno, 243 Harrison Avenue, Garfield, N.J. Tel. GArfield Area code 201-471-2020.

COLLINS 75A owners, tuning knob, 6 to 1 reduction, $7.00 postpaid. Wenglare, W4VOF, 1517 Rose St., Key West, Fla.

WANTED: Ancient tubes, de Forest spherical audion with screw base, "H" transmitting tube, Fleming valve. WD-11s, other old junkers. March 1938, Radio Craft, W9BWK, 610 Monroe Ave., River Forest, Ill. 60305.

TUBES, Diodes, transistors wanted. High cash prices paid. Astral Electronics. Box 636, Elizabeth, N.J. Tel: 354-3141.

ACT Now!! Barry pays cash for tubes (unused) and equipment. Barry Electronics, 512 Broadway, NYC 12. Call 212-WAlker-5-7000.

RTTY Gear for sale. Write for list, 88 or 44 Mhy Toroids five for $1.75 postpaid. Elliott Buchanan, W6VPC, 1067 Mandana Blvd., Oakland, Calif. 94610.

304TL tubes wanted. Also other xmttg and special purpose tubes. We will buy military or commercial transmitters and receivers with designations ARC, GRC, URR, 51 and MN. Air Ground Electronics Co., 64 Grand Pl., Kearny, N.J.

TUBES Wanted. All types, highest prices paid. Write or phone Lou-Tronics, Inc., 74 Willoughby St., Brooklyn 1, N.Y. 11201. Tel. UL-5-2615.

FOR Sale: Collins 75S-1 receiver with c.w. filter and xtal. In perf. condx. 10 day free trial, $340. Plus shipping. E. Shafer, W8MSG, 3479 Kersdale Rd., Cleveland 24, Ohio.

COLLECTORS: Early tubes, gear, magazines. Send SASE for list. 75A4 serial 5806. Best offer. A. R. Theberge W1SMI. Hoyt Ave., Lowell, Mass.

COLLINS KWS-1. 74A4. both factory modified last year and in exclnt condx. TA-33, Ham-M rotator and Spaulding 40 ft. SS tower. All one year old. Complete package deal: $1300. Lt. Jerry Nielsen, KØDTO, P.P. Box 1217, Blytheville AFB, Ark.

WANTED: HRO-60 coil sets. WB2FIL RD 1, Box 315, Old Bridge, N.J.

SELL: Hammarlund HQ-170 rcvr; WRL Globe Scout trans, $40; 2-meter Gonset Comm: III. $175.00; Astatic D-104 mic, $15. CDR Ham Rotor. Alan Woolman, WA2AEO, 275 Central Park West, NYC.

COLLINS 32S-1 xmtr, $300.00. J. F. Young, W5HXW, 1234 Glen Cove, Richardson, Texas. Tel: 14-235-6927.

COLLINS S/Line, complete station for $1300 with possible financing or best cash offer. R. G. Paige, 4615 Shoreline Dr., Salem, Oregon.

CONSIDERING A top quality sideband station with less than 50 operating hours? Am offering minc tor $625.00. Will ship your instructions and expense. Equipment is HT-32A, SX-101A, R-47 speaker, D-104 mike on grip stand, Johnson 275 watt Matchbox with separate SWR bridge and meter. All in immaculate and like-new operating condx. Additional misc. equipment on inquiry. WB6JZW/KØQVX, 1610 Kitchener Dr., Sunnyvale, Calif.

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KEYER-Monitor keys your transmitter safely, for months on two, internal flashlight cells. Monitors your keying with crisp speaker-tone. Sealed relay contacts for long life. Keys beyond 100 WPM. Attractive cabinet has front key-jack, tone/off control, and rear keying terminals. $18.95. PP USA. Electro-Signal Lab, 782 Broad St., Weymouth, Mass. 02189.

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CLIFF-DWELLER 80-40, $75.00; Hy-Gain TH-3, $70.00; AR-22, $20.00. Leedham, WA2TDH, 101 West 23rd, NYC 11. Tel: WA 4-1825.

WANTED: Collins 30L1, cash buyer, call Max, 1-203-5282175.

NCX-3, DC supply, Bandspanner, P/T mike. Bought new last month. Sacrifice: $400. Onderwyzer, K1KSS, 26 Dodds Ct., Burlington, Vt.

NCX-3 and NCX-A: New condx, $349.00. 8815 Mobud, Houston, Texas Tel: GY-4-4748.

CASH For Your Gear. We buy, sell and trade. Send for free bargain list. H & H Electronic Supply, 506 Kishwaukee St., Rockford, Ill.

We Buy all types of tubes for cash, especially Eimac, subject to our test. Maritime International Co., P.O. Box 516, 199 Front, Hempstead, N.Y.

WANTED: Collins Parts, BC-610, GRC-27. Autodyne, Bethpage, L.I., N.Y.

CRYSTAL Bargains. Free list. Nat Stinnette, W4AYV, Umatilla, Fla. 32784

RANGER I, in excint condx. Includes PTT, TR-switch es extra final. Make offer. WA5HJG, 7911 Lazy Lane, Austin, Texas.

SELL: Factory wired Valiant. Provision for SSB exciter. Hallicrafters SX-100 with speaker. Both for $310.00. Units are in excint condx. W. H. Wiley, 411 W. Valero, Santa Barbara, Calif.

SELL: Valiant II, HQ-170-C, speaker, Turner S-22 D PTT mike and relays. All-band dipole: $600. Will deliver within 200 miles radius. K5MIJ, 703 Charles Pl., N. W., Albuquerque.

USED Mylar tapes, 1800 feet, 1 mil., $1.00 each. Send check with order. B. Freeman, 800 W. 87th St., Kansas City, Mo. 64114.

SALE: RME 4350, $99.50; HQ-170, $219.50; Drake 2B, $179.50; Gonset G76 w/AC pwr. supply, $229.50; Heath MT1, $69.00; MR1, $69.00; HG10, $19.95; DX-60, $49.00; DX-40, $35.00; HX20, $159.95; HR20, $99.95; HP10, $19.95; HP20, $19.95. Guaranteed in good condition. Reliable Service Co. 1815 Industrial Road, Las Vegas, Nevada.

FOR Sale: Collins KWM-2 w/516F-2, $850; 312B-5, $200; 30S-1, $900; 351D-2, $50; MP-1, $100; TH-4, $50; 65 ft. tower, $100; Ham-M, $50; package deal: $2000. Model 15, $125; CV-31B, $75. F.o.b. Petersburg, Va. K8JIM/4, 129 North Park Drive, Petersburg, Va. 23805. Tel: 703-732-8346.

SELL: Like-new Elmac AF-68, PMR-8 receiver, M-1071 power supply and speaker, $300.00. WA2QHI, 10-30 River Road, Fairlawn, N.J. Tel: SW 6-1892.

TRADE: SBE-33 transceiver, 1 yr. old, recently factory overhauled. Like new condx, together with new SB1 VOX, PTT mike, transistor mobile p/s mobile mount and manuals, plus $400 cash. For trade on KWM 2 and A/C P/S or will consider Collins 30S-1 linear. Give or take. Call, write, or tone day or evenings: CH 9-0923, A. J. Bertolisi, 382 Fulton St., Farmingdale, L.I., N.H. 11735.

KWM-2 with 516 F a.c. supply, $900; 30L-1, $400. Factory checked and aligned, cables and manuals. Condition excellent. Ted Brix, 5573 N. Van Ness Blvd, Fresno 5, Calif.

DX-40 with VF-1, $55.00. George Moore, 6230 Dove Road, Smiths Creek, Mich.

SELL: Johnson Valiant F/W, $225; HQ-170C with noise silencer, accessories, $235.00, both: $440.00. Sorry, no shipping. WA2-GVQ, Middleton, 14 Lake Shore Dr., Parsippany, N.J.

SX-101A, used 3 months, in excint condx. Must dispose due to unfortunate circumstance, $195.00 F.o.b., New York. Al Adams, 1533 Jasmine Ave., New Hyde Park, N.Y.

SPACE Gun antenna, works 40 meters, attaches to driven element of beam, never used, $30; Eico 720, $55; SM-1 Collins dynamic microphone with coiled cord and plug, $20; 729 SR cardiod microphone with coil cord stand and plug, $10; Calrad 400C microphone with stand and plug, $5.00. Long Island, N.Y. Days 516-15-1-9844, evenings 516-MA-1-2629.

VALIANT, $175; NC-303 w/xtal calibr., $285. Both in excint condx. Will sell separately or both for $435. Will deliver within 75 mile radius of Utica, N.Y. WB2DZP, 36 Lyndon Road, Whitesboro, N.Y. Tel: 736-4445.

100-watt mobile G76, DC supply, 350 Turner mic., all cables, manual. Heliwhip, 10, 15, 20 antenna: complete: $250.00. WA4QEQ, Ted Meeker, 5444 Sanders Road, Jacksonville, Fla. Call nights 305-721-0657.

ELECTRONIC Tubes Top Brands Sold at substantial savings! (Minimum Order $15.00). *Authorized GE Distributor.* Send for *Free Buyers' Guide* for all your Tube *Requirements. Top Cash Paid* for your excess inventory (*New Only-Commercial Quantities*). *Metropolitan Supply Corp.*, 443 Park Avenue South, New York, N.Y. 10016, 212-MU 6-2834.

SCHOOL, Must sell: Eico 720, $60; 730 w/cover, $45, or package deal w/ant. relay, $105; Knight VFO, $18; R-100, $65; T-150, $85; HQ-145, $185. Prices include shipping. Offers, plus shipping, will be considered. Charles Walden, Box 4248, University of South Carolina, Columbia, S.C.

IRE Proceedings from 1946. Some volumes complete. $4.00 volume. Single copies 50¢ each F.o.b. K4LVP, Henry Davis, 1201 Riverside Dr., Indialantic, Fla.

SELL: Heath SB-300 with 400 CPS c.w. filter and 3.75 Kc AM filter. Professionally wired. Call Gerry Gesch, 201-647-3200, Squires-Sanders, Inc. Millington, N.J.

HEATHKIT Apache. Must go for college. In gud condx. Contact Box 652, Fairfield University, Fairfield, Conn.

SELL: Valiant, $160 and RME-4350, $90. Both F/W and in excint condx. You pay shipping. K8TCV, 711 Alton Street, Defiance, Ohio.

FOR Sale: Home brew linear 4 811's w/power supply. Will ship at your expense. Price $85.00. A. H. Knotts, K8KRU, 409 East Bluemont St., Grafton, W.Va.

SELL Or trade for Seneca. Gemark stereo tape-recorder, in excint condx WN9LXF, 1724 Prather, DeKalb, Ill.

SELL: HQ-170, used 5 hours: $230.00. S-20R, $40. W9EMB, 616 E. Illinois St., Wheaton, Ill.

MUST Sell: The following in mint condx: KWM-2, $750; PM2, $90; MP1, $100; 312B4, $125; 75S1, $295; HQ-160, $135; 200V, $535; HT-33AB, $390; Regency ATC1, $29; Simpson #479, $185; Eldico TFP1, $45; Facsimile transceiver FX1-B, $150. S. Gogel, W2FUR, 1096 Laux Place, N. Bellmore, N.Y. Tel: 516 SU1-0568.

HALLICRAFTERS SX-117, $375, mint condx. HA-10 LF tuner, $20. Steven Schor, 518 B. 126th St., Rockaway Park 94, N.Y.

SELL: Challenger, $60; Heath HG-10 VFO, $30. Don Mathesen, K7EPP, 110 East Watertown #42, Rapid City, South Dakota.

SX-71, top condx, $100. Outboard selectable sideband detector for same, $30. W7PVF, 16315-45 Pl So., Seattle, Washington.

HEATH HX-11. Perf. condx. Used six months. Manual. $45.00. Will ship. Money order. WA8KUN, Roy, 320 East 235th St., Euclid, Ohio.

FOR Sale: Back issues OST and CQ. Large S.A.E. for list. Will swap. W2TAM, 140 Summit Ave., West Trenton, N.J. 08628.

FOR Sale: HQ-140X receiver with matching speaker, like new condx and DX-100 transmitter, condx also gud. L. J. Smith, K4OOO, 175 Green St., Auburn, Ala.

HEATH HX-30, 6 meter SSB transmitter. In excint condx with manual: $175. Consider trade for quality stereo tape recorder. K3ZIB/6. Littleton, 5635 Anza St., Apt. #4, San Francisco, Calif.

COLLINS 32V-1, excint condx. TV shielded. $125. Hallicrafters SX-28 $75. Will ship. W2AAH, 789 Broadway, Brooklyn, N.Y. HI 3-6500.

SIXER By Heath. $30.00 or will trade for wireless intercom or P-O keyer or ??? SX-117 $250; NC-98, $80. All gear in like-new condition. KØOYD, Box 19, Bismarck, N.D.

MARAUDER Professionally wired. $350; NC-300 with calibrator, matching speaker, $150; Swan SW-175 with SW-12A DC supply, $200; DX-100, $120. All scratchless and Marauder used only 25 hours. Reason for selling: Hv no operts time. Not one log-book filled up since February 1959. Charles E. Minter, W4MNS, 2711 Nottingham Road, S.E., Roanoke, Virginia.

KWM-2, PM-2 p/s, 516E-1 12-volt negative ground p/s, 10-C mike, Johnson low-pass filter, Johnson Matchbox with SWR built-in 275 watt type, set of spare tubes, 30L-1 final, all manuals. $1400 cash. Prepaid in the 48. Bill Searcy, 1821 N. Turnbull Dr., Metairie, La. 70001.

CLEGG Venus with AC supply, never used, to be sold substantially below cost. K7EPD, 4250 East Palo Verde Dr., Phoenix, Arizona. Tel: 947-1518.

KILOWATT Supply: 2500V, regulated screen and grid voltages for AB2; newly completed from new parts, $65.00. New 5D22/4-250A's. Original cartons, with sockets, $55 pair. Bud Deluxe, 6 ft. gray cabinet rack, $35. Will ship. F.o.b. Roy Gillett, 4732 Eastman Drive, Oklahoma City, Oklahoma 73122.

COLLINS 51S1 receiver wanted. State condition, price and serial number. Write O. K. McCullough, 1029 North First St., Phoenix, Arizona, 85004.

SELL: BC-348, in ex. condx: $65.00. SASE for details. John Dee, 620 Park Dr., Rome, N.Y.

WANTED: Instructograph. Give details. Wilbur Clark, W3HZ, 207 Fourth Ave., Newtown Square, Penna.

TRADE Rifles, shotguns for ham equipment. Higgins 100 12 gauge, Winchester Model 70, 257 Roberts and cal. 270; Mannlicher Schonauer 270, Remington Model 722 Cal. 22, Weatherby, 300 Magnum (Silver inlay). All rifles with 'scopes. New condition. Price range $200 to $1200 new. K1WRA or W1DGJ, 143 Richmond Road, Ludlow, Mass.

SENECA A-1 condition, $150; Globe King 400, $125. K3-WMH, Akron, Penna.

WANTED: Millen Grid Dip, model #90651 or B&W model #600. W4TAK, 712 Botts Ave., Woodbridge, Va.

FOR Sale: Hammarlund SP-600JX14 receiver, $350; Knight T-150 transmitter, $80. Ray Robertson, 37 Ogden Pl., Morristown, N.J.

THUNDERBOLT 2000 PEP, $390; HT-32 with xtra xtal, $375; NC-303 with xtal cal. spkr, $275. All mint condx. Sry, no shipping. J. Nobrega, W1LTC, 5 Spruce Hill Rd., Burlington, Mass. Tel: 272-5849.

GOVERNMENT Surplus. Buy costly electronic and mechanical surplus from government agencies and from world-famous, nationally known Surplus Center. Purchase $4.100 electronic amplifiers, $13.91; $500 motor gyroscopes, $12.47; $110 automatic stepping switches, $12.91. Hundreds of other electronic surplus bargains. Send 50¢ (stamps) for list of "where and how to buy" from government sales depots plus our three large illustrated electronic, hydraulic, mechanical sales catalogs. Surplus Center, Box 713 OS-12, Lincoln, Nebraska.

20-Meter beam Telrex wide spaced 6-element with reflectors, list price over $700. Sacrifice for $275. Telrex heavy-duty largest rotator indicator cables, switches and all ready to work. List price over $600. Sacrifice $200. Vesto tower 40 ft. sacrifice $100; Johnson 6N2 xmtr txx Tapetone receiver converters for 6 and 2 meters with power supply list price over $350; sacrifice $195 for all 6 and 2 meter listed above. Viking Ranger late model factory-wired grid block keying, $150. All kinds of tubes, relays, no time to ham. Am selling all but one small rig. Send m.o. first-come-first-served! WA4URQ, Harry Weinberg, Georgetown Airport, Georgetown, S.C.

NATIONAL General coverage NC-190, $170; Heath HG-10 VFO ($25), Heath AM tuner, $25; Heath FM tuner, $25; Argus C-3 35 mm camera ($25); Bolex C-8, 8 mm movie camera, $65; Baun special electronic flash $60 A.ll excint condx. Will consider trade Drake 2-B. Make offer. WA4HAO, 1633 Wakefield Dr., Virginia Beach, Va.

COLLINS: Complete rig, KWM-2, 30L-1, both power supplies, mobile mount and five Hustler antennas with mount. All for $1450. W. Barney, 2622 Bahia Vista, Sarasota, Fla. Tel: 955-6544.

POSITIVE Ground Collins DC supply for KWM-2, Collins part number 522 0846 025. Never installed. $200. B. S. Field, Jr., K3LRV/9, 1842 Grove St., Apt. 8, Oshkosh, Wis. 54901.

HAMMARLUND HQ-170C and matching speaker in excint condx: $220 and you pay shipping. Steve Draper, WA4SBA, 202 Bellefonte Dr., Ashland, Ky.

COLLINS KWM-2, $775; 516F2, $75. High serial. Immaculate condx, original cartons. WA2AVW, 212-BU-70970.

SWAN SW-240, TRiband like new, with Collins KWM-2, mobile power supply, $325.00. Will sell separately. Heath HR-20 sideband receiver $110. W8TOM, 360 Clardell St., Benton Harbor, Mich.

APACHE, $160. Will not ship, sry. Smith, 3849 Cedar, Long Beach, Calif. Tel: HA-4-6477.

NEED Manuals: Weston 978 tube-tester; McMurdo Silver 906 generator, I will copy and return immediately plus $5.00. HT-33, $350; 75A-4, $425; most of Telrex Tribander, $15; Lincoln charger $70. Beautiful geared vernier dials with about 150 pf. transmitting variable in shield, $2.50 each. Tom Perera, K2-DCY, 410 Riverside Drive, New York, N.Y. 10025.

VAN SICKLE has new Clegg 99'rs. $179 value. Sale price $149. W9KJF, Gene, 4131 N. Keystone, Indianapolis, Ind.

WANTED: Collins 302C-3 directional wattmeter. All replies answered. Shook, W6RYO, 7264 Nixon Dr., Riverside, Calif.

SELL: DX-100B, $140; SX-111, $160. In excint condx. R. Fortune, RD #1, Pulaski, N.Y.

KWM-2 with Waters multiplier. Almost new. AC p/s, 30L-1, like new. Best offer takes one or both. K9AGN. Tel: AL 6-1504. S. Derlighter, 403 Sunset Dr., Wilmette, Ill.

PAWNEE Heath 2-meter transceiver, only 6 months old. In perf. condx: $180. K1DYT, 85 Lawler Lane, Norwich, Conn.

WANTED: Small prop pitch motor. Advise condx and price. Sell new Laudenboomer Mark III rotator, $150.00. WØAIH, Bittner, 814 4th St. South, Virginia, Minnesota.

MUST Sell: HT-32A, SX-101 Mark III, 811A's linear. Separately or package discount. Write: David Fraser, K2LAI, 427 E. 69th St., NYC, N.Y. 10021. Tel: 212-TR-9-8087.

HAM Gear built to order. Also transmitters and receivers repaired and kits assembled. Write W4OYE, A. B. Reynolds, 159 Dennis Drive, Williamsburg, Va.

WANTED: Collins 312B-4 or 312B-5; HA-1 keyer, Bandit 2000B, cash. WØDVZ, Box 475, Ottumwa, Iowa.

FOR Sale: Harvey-Wells TBS-50C, 50 watt xmtr, 2-80 mts. w/power supply and mike, $40.00; Hallicrafters SX-25, 10-80 mtr. w/Lafayette 2 mtr. converter, $60. Ideal for Novice. All this for $95.00 or will trade for gud 6 mtr. transceiver. Dick Aufmuth, WN8LYU, 720 Wadsworth Rd., Medina, Ohio 44256.

HEATH SSB transceivers: 20-meter HW-32, $100; 40-meter HW-22, $100; Heath HX-20 80-10 fixed/mobile SSB transmitter with HP-20 AC supply, $175, Model 26 machine, $70; 3/4-wave 6-meter ground plane, $10. Howard Nurse, WB6HQF, Box 6689 Stanford, California.

RANGER II and HQ-145X, less than year old, $200 apiece, or $375 for both. Original carton. WB2FZP, 5 Brookview Terrace, Hillsdale, N.J.

SELL: Hallicrafters FPM 200, new, in original carton, with latest modifications: $900. Harold Bullion, 439 Ave. P, Brooklyn, N.Y. Tel: ESplanade 5-2264.

HAMMARLUND HQ-180 receiver for sale. Two years old, in mint condx, and in original carton: $220. Berk, WB2LCZ, 8 Bassett Ave., Brooklyn, N.Y.

RTTY Gear for sale. Write for list. 88 or 44 mhy Toroids. Five for $1.75 ppd. Elliott Buchanan, W6VPC, 1067 Mandana Blvd., Oakland, Calif. 94610.

APACHE TX-1, like new condx, all Heath modifications, any test. $170. K2EGI, 5 Stratford Pl, N. Babylon, L.I., N.Y.

WANTED: Homebrew, surplus equipment, tubes. Priced. Rotecki, Rochdale, Lombard, Ill.

NCX-3 and NCX-A with mike and headphones. In excint condx. Ship in original cartons: $365. Cole Hendrix, WØFTZ, 4401 E. 48th Terr., N., Kansas City, Missouri 64119.

SWAP Knight VFO, Eddystone Dial, or HB transceiver PS/Spkr in attractive cabinet for compact plate transformer for desktop KW amplifier. WA5ENP, 145 Karen Dr., Lafayette, La. 70503.

JOHNSON Navigator, $65.00. Dick Kelly, K5SOD, 1604 N. Faulkner, Pampa, Texas 79065.

SELL: SX-111, in excint condx. College expenses force this sale. $190 or your best offer. Darrol Lockhart, KØDIE, 8313 Centennial Hall, University of Minnesota, Minneapolis, Minn.

CLEANING House: Best buys of the season: Viking Challenger, new, factory-wired, test: $80; Globe HG-303, new, $25; Globe VFO, Deluxe, new, $25; Tecraft 144 Mc transmitter, new, $25; Johnson Matchbox 275 watt, perf., $25; Millen Transmatch, new, $100; Hammarlund HK-1B keyer, perf., $20; manuals for all. Prefer a pick-up deal, but will ship. Donald L Farrell, WA2WEE, 207 Seneca St., Chittenango, N.Y. 13037.

ESTATE Of W2KHW: NC-300, calibrator, converters, Ranger, mint condx; Hornet Tribander, 60 ft. stainless and aluminum tower (never used); Sixer, beam; 'scopes, meters, tuners, racks, supplies, mobile, etc. What are your needs? Cash and carry deals only. 2 miles exit 4 N.J. Turnpike. Dolde, K2KPF, 403 E. Linwood Ave., Maple Shade, N.J.

SELL: Sola 281250 regulated power supply, 250 volts at one amp. d.c. output. Unused $45.00 F.o.b. St. Paul, or swap for HQ-10. WØDAK, E. W. Farley, 1641 Eleanor, St. Paul, Minn. 55116.

DSB-100, $70; SX-110 with speaker, $135.00; homebrew linear 440W., $70; VF-1 with power supply, $25.00. Mark J. Shurr, WA2UBH, 3900 Kings Highway, Brooklyn, N.Y. 11234.

COMPLETE File of QSTS, run is 1934 to 1964 inclusive. Best cash offer or trade for SB-10. W5HAV.

EICO 720 and 730; HQ-100C, Globe 735A, Lafayette HE-45B. All in perfect condx. Make an offer, individually or entire. K1LJL, Aldrich, 20 Cutler Drive, Springfield, Vt.

HQ-110A, in mint condx: $175.00. W4NFD, 11731 S.W. 168th Terrace, Miami, Florida.

SELL: Johnson Ranger II, Hammarlund HQ-110 AC, antenna relay. Like new. Gud for Novice, Technician or General. Stegenga, K8UPC, 20515, Denby, Detroit, Michigan.

HALLICRAFTERS SX-99, $90: Heath DX-60 xmtr and matching HG-10 VFO, $90. All in A-1 condx. WA5FZY, 1005 Avenue H, Bay City, Texas.

432 Mc. Centimeg converters, brand new. Last model built, with 8058 front end. 5 only: 30.5-34.5 and 50.54 Mc. output $69.50 each. Were $84.50 ppd. E. Lush, (former owner Centimeg), 277 Via Buena Ventura, Redondo Beach, Calif.

SELL Complete station, AM or CW. 50 watts, 80-6 meters, xmtr, rcvr, conv., beam, accessories. Best offer. WA6USU, 1226 East Comstock, Glendora, Calif. 91740.

FOR Sale: Almost new Hallicrafters SX-111 receiver. $175; Vibroplex semi-automatic key, deluxe model, $18. Call or write Jim Dicker, 6 Park Road, Scarsdale, N.Y. Tel: Area code 914-SC5-2378.

BUY Of a lifetime for VHF homebrewers: up to 100 watts output up to 250 Mc. Type 5894 tubes made by Amperex including Johnson recessed ceramic sockets, $14.95 each. Ruggedized for mobile use. Brand new in original cartons. One year replacement guarantee. Shipped postpaid. Cash or money-order. WØFUV, William Duncombe, Box 463, Troy, Ohio.

HALLICRAFTERS SX-115 receiver, in excint condx, original packing, $350.00 F.o.b. Winston-Salem, N.C. W4NI, 3600 Old Vineyard Road.

TRADE: New Viking 250-23-3 Matchbox, for 6/2 receiver, or will sell. Bill Seager, WB2CEK, 43 Sterling St., Rochester 6, N.Y.

DRAKE 2-B, in mint condition, $200. Bill Hein, RFD 2, Box 201, Loveland, Colorado.

INTERESTING Offers galore in the new combined "Equipment Exchange—Ham Trader". Next 12 issues, $1. Free sample. Brand's, Sycamore, Ill.

WANTED: Drake 2B, Hallicrafters or similar type receiver, in gud used condx. Full details to C. E. Schmidt, VK5WG, 362 Chitunga Road, Eden Hills, South Australia.

COMPLETE Knight amateur station for $180. Individual prices: T-60 xmtr, $40; VFO $25; R100A rcvr w/spkr, xtal. cal. S-meter, $100; SWR meter, $12; grid dip meter, $20. R. E. Davis, 10 Phelps Rd., Warehouse Pt., Conn. 06088.

TWO-Meter Tecraft five-tube crystal converter, perfect, $15.00. WA4SBD, 2414 Springhill Rd., Huntsville, Ala.

SELL: Hallicrafters HA-5 VFO. One year old. Excint condx: $55. ppd. F. Eberling, 25-28 Berdan Ave., Fairlawn, N.J.

SELL Perfect HT-32A, $335. W. Hartman, W3JDY, Tel: 215-452-6066.

ALL Collins mobile package: KWM-2 with Waters Multiplier 136B-2 noise blanker 351D-2 mobile mount, MP-1 mobile power supply, MM-1 mobile microphone, Motorola 55 amp. alternator, Webster Bandspanner antenna 516F-2 A.C. pwr supp. Whole package for $1200. W. Szuminski, T-240 1121 Arlington Blvd., Arlington, Va. 22209.

TRANSISTORIZED G-E power supply: 425v at 300; 330v at 110; 200v at 20; -25 @ 10 simultaneously on transmit; 210v @ 100 receive. 12 VDC positive or negative ground. Bench tested, brand new, fabulous heat sink, $55. Budd Meyer, 105-10 65th Ave., Forest Hills, L.I., N.Y.

FREE! Blue Book List. WØGFO, Leo, offers you discounts on hundreds of reconditioned equipment bargains. SX-140, $71.96; AF-67, $49.96; SR-160, $260.10; Warrior, $196.00; NC-109, $89.10; HT-32, $254.40; RME-6900, $180.20; Cheyenne, $49.18; HRO-50, $125.48; Meteor, $59.65; HT-41, $254.20; 51-SB generator, $99.66, and many more. Ask for our new 1965 catalog. Write Leo, Box 919, Council Bluffs, Iowa.

TO Settle estate: $15.00 each: Allied Sky Roamer, Heath VTVM, Howard 4-band receiver, Eico Sig Gen, Philco Bardot. Surplus items: $22.00 each; RBC 18-tube 4-band receiver, PH565 TV camera, AN/TTQ TTY desk, LM-18, AN/GRC9. Order from ad, or write for 4-page listing of many other bargains. SASE appreciated. WA9DYE, 114 Lakeview, Milwaukee 17, Wis.

DX-60, VF-1, DK-60 relay. Also NC-109, spkr, xtal calibrator, make offer. Arthur Olsen, K3YZB, 11 Haven Rd., Levittown, Penna.

THANKS QST! I made my own HBR-11. It's wonderful. Will sell my HQ-170 for $185. W4TZY, 6983 Malaleuca Rd., Cocoa, Florida.

WANTED: Model 28 teletype machines and cabinets. Cash, or trade for new amateur equipment. Alltronics-Howard, P.O. Box 19, Boston 1, Mass. 02101. Tel: 617-742-0048.

HQ-170 with speaker. Excint condx. $250. WA2YAY, Gerry, 11 Stone St., New Brunswick, N.J.

COLLINS KWM-2, $775, serial No. 11811; 516F-2 AC supply, $80; 30L1 final, $375; 212B-4 station control, $125.00; 75S-1 receiver, $290; 312B-3 speaker, $18. Pick-up deal only. W2BIQ, RD #1, New Canaan, Conn. Tel: 914-LE3-2762.

FOR SALE: 60-ft. crank-up tower; Ham-M rotator; Hy-Gain 10, 15, 20 meter 3-el. beam. Come and take away. $115.00. Newtown, Conn. Tel: 203-426-5351.

1964 Callbook, $2.50. 1964 Foreign Callbook, $1.50. 1963 Foreign Callbook, $1.25; 1962 Foreign Callbook, $1.00. Jan-Feb 1955 QST, 25¢ each. W2JBL.

LOOKING? Shopping? Trading? Trying to save money? Write Bob Graham for special deals on new and reconditioned used gear. Cash or Budget. Graham Radio, Dept. A, Reading, Mass. 01867. Tel: 944-4000.

WILL Buy pre-1925 QSTs, etc., etc. State condition and price. W6ISQ, 45 Laurel Ave., Atherton, Calif. 94025.

GRICE Electronics has Elmac A-54, $35.00; AF-67, $60; Gonset G-66B, $60; 77A, $75; 3-Way P/S, $35; Heath DX-20, $20; DX-100B, $125.00; Globe Chief 90, $30; 680, $40; 755A VFO $30; Johnson Viking I, $40; II, $65.00 Valiant, $175.00; Pacemaker, $150. Write P.O. Box 1911, Pensacola, Fla. 32502.

WANTED: Commercial, Military, all types: ARC, ARN, ARM, BC, GRC, PRC, TRC, URN, URM, TS, 618S-1-T, 17L5IR-V-X, others. Ritco, P.O. Box 156, Annandale, Va.

VHF Globe Hi-Bander, 50W 6/2. Dow-Key relay, $75; Ameco 2M Nuvistor converter w/p.s. $35.00. WA2NSJ, Raymond Stern, 200 Cabrini Blvd., NYC 10033.

JOHNSON Desk KW with desk, latest model, last manufactured, serial 100632, pair 4-400As, and all modifications. Absolutely in mint condx, and cannot be told from new. Complete with spare tubes, manuals and cables, $1000 F.o.b. Ranger, PTT, new condx, D-104 mic and relay, with KW as package: $1150. 75A-4 serial 4764 with spkr, 3.1, 6 Kc. filters, vernier knob, manual, mint condx, $450. Complete station: $1500. K4ACJ, Saul Cohen, 4524 Michigan Ave., Miami Beach, Florida.

PRINTED Circuit boards, Hams, experimenters. Catalog 10¢. P/M Electronics, Box 6288, Seattle, Washington 98188.

WANTED: Hammarlund PRO-310 receiver in any condition. Sell or swap: BC-221-AH frequency meter with manual, like new condx, $70; black and Black and Decker Model 80 8" heavy-duty portable saw with ripguide and case $60. F.o.b. K3CFA, Box 327, Lemont, Penna.

LIKE New, still in cartons: Hallicrafters HT-40 trans and SX-140 rcvr, both for $125.00. Also Ranger I in excint condx, $125.00. Lew Bornmann 201 Alameda Ave., Absecon, N.J.

FOR Sale: Hewlett-Packard 524A Frequency Counter. Counts frequency and period to 10 Mc., $350.00. Tektronix 511 oscilloscope, 10 Mc vertical bandpass, $200. Frank W. Adams, WB6EVV, 4895 Deaton Drive, San Diego 2, Calif.

FOR Sale: 75S-1, $295, 32S-1 and 516F-2, $445, GSB 101, $150; Telex Twinset, $8; Heath FM car-radio, $35; all in excint condx. William Madigan, WA4RPA, Apt. 5D, 200 E Lucerne Circle, Orlando, Fla. 425-7930.

ESTERLINE Angus portable 0-5 MADC recorder, spring-driven chart drive, in xcint condx. Will ship in E-A carton, $190. W5IH, Rte. 5, Box 5443, Albuquerque, N.M.

FOR Sale: Health Apache transmitter, in excint condx: $190. Local sale is preferred. Bob Aberle, W2OPP, 33 Falcon Dr., Hauppage, L.I., N.Y. 11788.

HEATH VFO HG-10 for sale, used 1 year. In A-1 condx, $28.00 ppd. WA4CIG, 4055 N.W. 12 Ave., Gainesville, Fla.

VIKING VAliant, in excint condx, professionally wired: $199. Express collect. WA2ISQ, 247-16 82nd Ave. Bellerose, L.I., N.Y.

HQ-129X with speaker, $78. Dick Shideler, 2812 10th Ave., Arcadia, Calif.

GONSET Communicator II, two meter transceiver with compatible Shure T-17 PTT microphone and mobile clip-on antenna with 8 ft. coax; five 2-meter xtals, 4-brand new; 120VAC 50-60 cy/12 VDC; entire package in excint condx, $160 plus shipping or best offer. K9 RHU/8, Apt. 217, 1462 University Terrace, Ann Arbor, Michigan 48104.

SELL Or Swap: 1-75S3 receiver; 1 Gonset G-50 (6 meter comm), 1 Gonset Comm. IV (2 meters); 1 Gonset G-66)115v/12v receiver, all ham bands); many new VHF components (nor surplus!). What do you need? Prices are negotiable. W1DEO, Strout, Box 43, Rte. 2, So. Portland, Maine, Tel: 772-2700.

SELL: Lafayette HE-25 "Voyager" rig, 120 watt c.w./75 watts phone, 80 thru 6 meters. Factory-wired in gud condx: $65.00. W8WFV, 1753 Kensington Ave., Youngstown, Ohio.

OSCAR III schedules anyone? Please write W9VPU or K9-BTB to initiate possible arrangements prior to successful launch.

QSTS 1928 through 1963, complete run. Make offer. Joe Favorite, W8FUM, 1041 W. 6th St., Huntington, W. Va.

FOR Sale: Heathkit Cheyenne and Comanche mobile twins. In excint condx. $99.00. WA2GVJ, Whitney Point, N.Y.

HQ-170 AC in excint condx, less than 2 years old: $240. Hank, K1ZDI, 174 Andover Rd., Billerica, Mass.

SELL Hallicrafters SX-88, $260; Collins 310C-2 exciter, $65; Measurements pulse generator 79-B, $55. Robert Ireland, Pleasant Valley, N.Y. 12569.

SELL: "PC-2" Polycomm 2-meter transceiver in like-new, excint, condx. Quote your best offer. Locascio, 8420 51st Ave., Elmhurst, N.Y.

SELL Johnson Pacemaker transmitter, $175, and Thunderbolt amplifier, $275, both 80 thru 10 meters, all modes. Excint appearance, gud condx, manuals. Recommend pick-up or delivery arrangements. Wayne Hall, W3PBO, 1400 Owens Rd. S.E., Wasington 21, D.C.

FOR Sale: Trade or both. Norelco "400" tape-recorder, both plays and records stereo, four tracks. Complete with eleven rolls Scotch tape. Mylar 1800 feet, double mike, chrome mike floor stand, hi-fi spkrs. Want: TVID transmitter, receiver, or transceiver. Make offer. W2HBV, 654 Freeman Street, Orange, N.J. 07050.

CUSTOM AM-CW xmtr in 6 ft. rack, 600 AM 900 c.w., send for pix if you are interested $550. BC-603 rcvr, BC604 xmtr, with Dynamotors and mounting base, 12 volt operation, converted to AM, covers 20.0 to 27.9 Mc, 80 xtals and manual included, $55. Box of 100 commonly used tubes, all tested: $30. NC-183D receiver, $200. Marty, W2VCG, 418 Hale, Pennington, N.J.

COLLINS Mechanical Filters, 455 Kc either 1 KCBW, $12.00 or 8 KCBW, $14.00 or pair 8 and 16 $23.00. Check with order. Steve Ritter, 1422 Valleycrest Blvd., Annandale, Va.

VIKING Navigator and Courier amplifier wanted. A. Lukach, 295 Fifth Ave., New York City, 16.

COLLINS Owners. AM adapter, $5.00! State model. KWM-2 Kc independent receive adapter, $15. No circuit changes! Soldering! Holes! Easy installation! Kit Kraft, 104 Mound, Harlan, Ky.

New KWM-2, 516F-2 power supply and speaker! Sell best offer. Rev. Lynn White, Harlan, Ky.

SELL 75A4, 3.1 kc. filter, Collins spinner knob, speaker, bottened by 6GM6/12AT7 mod., $385; DX-40, $35; Johnson T/R, $18 ppd. Beautifully manufactured heterodyne VFO, $20; vernier knob for 75A4, $4. Oil capacitors, 2-10 mf, 600-4000V, $1-5. W3AFM, 5800 Hillburne, Chevy Chase, Md.

SELL: Drake 2B, xtal calibr. WA2ZVJ, Ed, SH 3-2525, 2115 E. 27th, Brklyn, N.Y. 29, N.Y.

BRAND New Hallicrafters HT-41 linear amplifiers, $249.00 while our stock lasts. Write for list of other bargains. Henry Radio Stores, Butler, Mo.

CIRCUITS from Handbook, QST, CQ, etc. constructed. All work is guaranteed. Reasonable. Write for free list. WA6-IKV, Whitmore, 3240 Machado Ave., Santa Clara, Calif.

HEATH HR-10 with xtal calibr. In superb shale, factory-aligned, one scratch, $60. WA4TFH, 3 Kimes, Havelock, N.C.

SELL: Lafayette HE-25 Voyager rig. 120 watt c.w./75 w. phone. 80 throu 6 meters. Factory-wired, in gud condx. W8WFV, 1753 Kensington Ave., Youngstown, Ohio.

WANTED: Electronics Instructor. First class commercial. Theory and Workshops. Science Camp, Eppstein, 440 West End Ave., N.Y. 24, N.Y. (212) EN-2-4340.

FOR Sale: Gonset GSB100, Super 6 converter and Super-ceiver 12V: Swan 175, speech amplifier and 350 watt AM modulator complete; Sola 250 watt transformer; RME DB23 preamplifier; Collins 75S-3 and 30 Meg. FM transmitter and receiver (2 each), 6 v. 45 amp. Bosch generator reg. Masco 20 watt speech amp. M. G. Bullock, 745 Rupert, St. Louis 17, Mo.

COLLINS 62S-1 in mint condx, serial 11737. Purchased new, June 1964, factory modified to latest modifications. Best offer over $600. All replies answered. K3BWW, 1518 Collins Rd., Pgh 21, Penna.

STANCOR Plate transformer, 110-200v primary and UTC chokes for 2000 volt, 500 mil. Power supply, $50.00; Stancor Polypedance modulation transformer to match, $40. Also unused original power and modulation transformers for Viking II, $15.00. WØQMM, Herzberg, 1322-14th St., Bettendorf, Iowa.

FOR Sale: Lafayette HE-30, $60; Tecraft 6 meter converter, $20; Tecraft 6 meter transmitter, $45.00; Tecraft Criterion 2m converter, $40; ARC-5 $15.00. Will trade for Clegg 99'er. WA2ZRT, 265 E. 33rd St., Paterson, N.J.

HEATH HX-20, HR-20 with HP-20 power supply and mobile mount, $275. WRL Globe Chief 90, $35.00. 4-1000A, $50. K2SOX, 2217 Cornwall Ave., Northfield, N.J.

MAKE An offer on any or all: DX-100 with external modulation monitor, DX-100B, SX-101, Mark II, RAO-7 receiver. Richard Lamb, 1322 S E Linn, Boone, Iowa, 50036.

75A4, exclnt condx, 3.1 kc and 500 cycle filters, $400. Teletype TD, exclnt, $50. Vanbrunt, 1003 North Belgrade, Silver Spring, Md.

SELL: 75A3 calibrator speaker .8 and 3 kc filters, $325.00. Collins 32V2, $180, in exclnt condx. Ben Hassell, W8VPC, Okemos, Mich.

SWAP HQ-110 for HW-12, HW-32 or other SSB transceiver. Sell HA-4 keyer for $20. W3JGW, 635 Lenker Rd., Harrisburg, Penna. 17111.

SELL: RME-6900 receiver, in original carton. In exclnt condx: $140. Sandstrom, W1BNO, 590 Mount Elam Rd., Fitchburg, Mass.

SX-25 wid spkr and Q-mult., All in gud condx: $45.00. WA8AZL 304 Ravenna Rd., Newton Falls, Ohio.

WANTED: Heath SB-10, in gud condx. Robert Trostle, Avondale, Penna. 19311.

HALLICRAFTERS SX-100 w/R-48 spkr, $160; Central Electronics 20A w/extra anti-trip unit and 458 VFO, $150. Both excellent and w/instruction manuals. Eric Landau, WA2KER, 165 Trinity Place, West Hempstead, L.I., N.Y. 11552.

QSTs, 1932 through 1963; CQ 1946 through 1962; P-E, 1954 through 1963; Radio 1936 through 1941. Best offer. WA4-SAX, 6387 N.W. 24th St., Margate, Fla.

FOR Sale: Collins KWM-2, late serial number with all latest factory modifications. Excellent and clean condition. Price $725.00. Call Bob Anderson, W1LBA, 428 Central Ave., Milton, Mass. Tel: OX 8-9337.

FOR Sale: Health HX-20, HR-20; HP-10, HP-20, AK-7, AK-6, GH-12, used less than 20 hours. $350.00. Duane Patterson, 914 E. Claflin, Salina, Kans.

FOR Sale: Thor 6 with A.C. pwr. supply; Venus SSB with a.c. power, interceptor rec. and 6 meter Ameco Nuvistor converter. WB2AOP, 198 Blvd., New Milford, N.J.

KNIGHT R-100 w/S-meter, phones, $80; 2-meter Nuvistor converter (Oct. 1961 QST), $20; 150 w. final (April 1961 QST) w/plate modulator, mike, l.p. filter, $40. Chuck, WB6IZB, 5508 Connecticut Dr., Concord, Calif.

BRAND New: Eico 460 scope @ $65.00; DB-62, $20 or trade KW Matchbox K9RGH, R. Hayes, 9600 S.W. Highway, Oaklawn, Ill.

HAM License plates wanted for collection. Postage refunded. WA5ERC, 154 Ronald Blvd., Lafayette, La.

SELLING Estate: GPR-90 receiver, mint condx, $250; Sprague Tel100-Mike, Model TO-3, Jackson Audio osc. model 652 new, with manual, Hickok tube-tester model 533 exclnt. Dumont 5" scope. Powerstat 115-V 15 amp exclnt. Make offers. Powell May, W4FX, 4916 Beverly Rd., Knoxville, Tenn.

FOR Sale: Thunderbolt F/W mod. to G/G. Like new condx, $300. K2KRF, J. Chooljian, Tel: (201) CO-1-5971.

HEATH DX-60 and HG-10 VFO, like new, reasonable. WB2-MOI, 16 Raynor Ave., Mt. Vernon, N.Y.

TRADE: Rolleiflex camera—accessories, etc. for Apache and SB-10 or what have you? Sam Melworth, WA4LGZ 7221 W. Broad St., Richmond, Va.

SELL: HT-37, in mint condx, vy few operating hours. Deliver within 150 miles radius. Bill Payton, W5OGO, P.O. Box 10100, San Antonio, Texas.

SELL: 400 watt Globe King 400B. All band, AM, C.W. In exclnt condx. $160. W1KKF, Bill Wawrzeniak, 595 Bee St., Meriden, Conn.

SELL: Elmac AF-68A, in immaculate condx, $99.00. J. Churchill, 2076 Bronx Park E., N.Y., N.Y. 10462.

SELL: Knight T-60, homebrew plate modulator, Meissner VFO, $80. WB2HCY, 7012 Rogers, Pennsauken, N.J.

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75A-4, serial No. 5104. In like new condx: $475. CE, 200 V. like new, $450. Plus shipping charges. James Kalasky, 738 Truesdale Rd., Youngstown, Ohio 44511.

WANTED: Collins KWS-1 power supply part #668-0153-00, L-501, high voltage filter choke, 55 ohms—120 cps, made by Electro Engineering Works, Oakland, Cal. Sale or swap: "Blue Racer" chrome Vibroplex, as new, $10; Model 191 Mastercrafters 24-hour clock, new, $5.00. Rally set-up for Porsche 356 series—Veeder-Root Counter with gearing and mounting, plus sports Halda, including gear drives. Cost over $200. For an ardent rallyist. $75. E. S. Grainger, W2NXZ, Box 186, Brightwaters, N.Y.

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FOR Trade: Kodak retina reflex S camera, w/case: Xenar 2.8/50 mm and Xenar 4.0/135 mm lenses. Built-in coupled light-meter. In perf. condx. Need: LM or BC-221 freq. meter with original calibr. book. Also Collins mech. filters F455 Y 2.1. Rev. C. O'Connor, Box 936, Lusk, Wyoming.

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SELL: NC-300, excellent condx: $1.90. W8PIC, 4385 Beckett Place, Saginaw, Mich.

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SB-33, perfect, new SF-1 series. Still in warranty: $295. Don, K4DBH, 702 N. Myrtle St., College Park, Georgia.

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SELL: Hallicrafters HA-6, new with power supply, $125.00. W3RWZ, 844 Academy Pl, Pittsburgh, Penna. 15216.

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GONSET Communicator III 6 meters, $135.00; Gonset aircraft receivers 108-135 Mc, $25.00; Grimson color TV camera, EIA sync generator, 21 in. monitor cables, Vidicon, lense, new, $399. Motorola FMTR80D 12V 50 Mc, $50; FMTR41V, $25. Antenna Specialists 6 meter vertical, $15. Looking for 51J3-4 SP-600, GPR 90-91-92. State condition and price. WA2VNR, 34 Vanderlyn Dr., Manhasset, N.Y.

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THUNDERBOLT, Factory sealed carton, $490. Without final tubes, $400. Organs & Electronics, Box 117, Lockport, Ill.

MAGAZINES: 1934-1964. "Short Wave Craft", "QST", "Radio", "CQ", others. 10¢ up. Stamp for list. WØPKP, 9111 Moritz, Brentwood, Mo.

40 Kc. transformers, new, same as used in teletype converter AN/URA-6, with schematic, 3 for $4.00. Power transformers, 850 volt 225 Ma. new, $2.00. Write for list of other bargains. Bobco Electronics Co., P.O. Box 4133, Lynchburg, Va.

SELL: Hy-Gain 40-meter beam with Hy-Gain balun and RG-8/U, cost $140, will sell for $75 (never loaded up). Heath Twoer, with Heath vibrator supply, Turner mike, 10 element beam and halo with mount: $75. Heath WA-P2 pre-amp, $10. K6ILM, 835 Valencia St., S. F., Cal. Tel: 415-AT2-3201.

FOR Sale: Johnson Thunderbolt, $300; walkie-talkie BC-611 pair, $80; Hammarlund SP-600-JX rack, $415; recvr VHF ARC-5 100-156 Mc cont. tuning 115 AC, $30; tube-tester I-177B, $15; Saref 2-meter xmtr w/ps, $50; Packard Bell p/s, input 115-230 AC, output 830-250-70 dc, $35. All in excint condx; Geno-Drive, new, $30. Gerard Bunge, Box 4099, Tucson, Arizona, Tel: 623-1278.

SELL: Heath MT-1 (mint condx) $55 (microphone, $5.00); Heath 14 watt amp., $20; BC-221, orig. calibration, new xtal, $39. (plus shipping). Want: audio generator. Robert Franck, 12280 Wilfred, Detroit, Michigan 48213.

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UNUSED Telrex 500RIS rotator indicator, 100 ft. cable, cost $485. Will sell for $200. William Culpepper, 503 Boundary Road, Pitman, N.J.

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SELL: SX-111, in A-1 condx. Your best offer. Eric Johnson, ex KN9VUM, Knox College, Galesburg, Ill.

RECEIVER BC-779 and p/s, $65; Elmac A54H, $30; GDI, $12; I+30 mic, $7; 15W modulator, $12. Matchbox 275W, $35. Kakstys, 18 Hillcrest Terr., Linden, N.J. Tel: HU 6-6917.

HE-80, like new condx, $95. Steve Ellington, 110 Bellefonte Dr., Ashland, Ky.

GONSET 900A, 2 mtr. transceiver, $340; Finco A62GMC 6 and 2 mtr. ant., $29; Belden 8214 50 ohm coax, 150 ft., $15; 450 Mc. 5894A trip-amp w/t, $20; Dow-Key DK2-60B relay, 115v, new, $18; Heath IT-11 R-C bridge, $24; 2 mtr. transistor conv., $12; 813 multiband c.w. Handbook xmtr. Make offer. Ferrite 1" toroids, mu 2200, 90¢. W4GIM, 1500 Simpkins St., Raleigh, N.C.

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SELL: Communicator III (six meters), P.T.T. mike, mobile cable and manual, $139.00; Gonset two meter linear, extra tubes and manual, $80; six meter Vanguard converter, $7.00; Instructograph with tapes, $12.50; Bliley 100 kc. xtal, $2.50; three 6146 tubes, guaranteed good, $5.00. Write for list of other tubes and parts. KØMVR, 424 Twentieth St., N.E., Cedar Rapids, Iowa.

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COMPLETE 6-band mobile station. AF68; PMR8 M1070 p/s. Not 2 years old. Will sell for $370.00 or trade on good fixed station. Write or call L. G. Rupp, 115 Lawndale Drive, E. Greenwich, R.I. 401-884-4161.

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HQ-110A, clock calibrator, $180.00. WB6AHJ, Donald Greenwood, 5782 Ludlow, Garden Grove, Calif.

DRAKE 2B, 2BQ, and xtal calibrator. In excint condx. $215.00. Will deliver in Ohio or Eastern Kentucky. W8ZER, 1105 Virginia St., Martins Ferry, Ohio.

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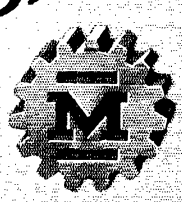

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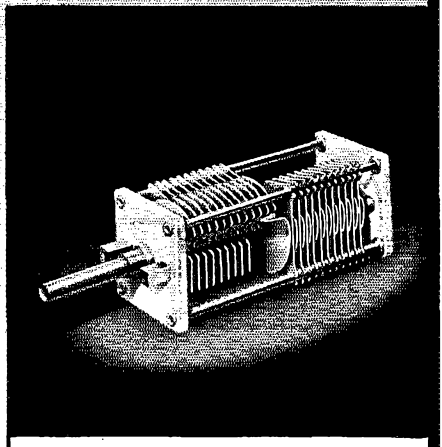

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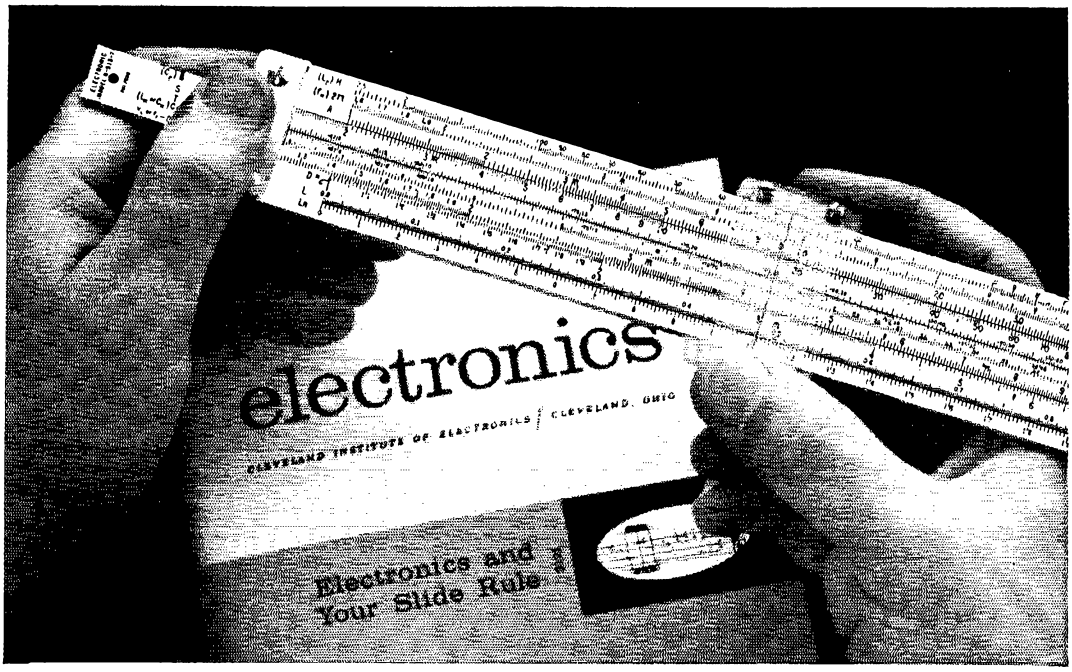

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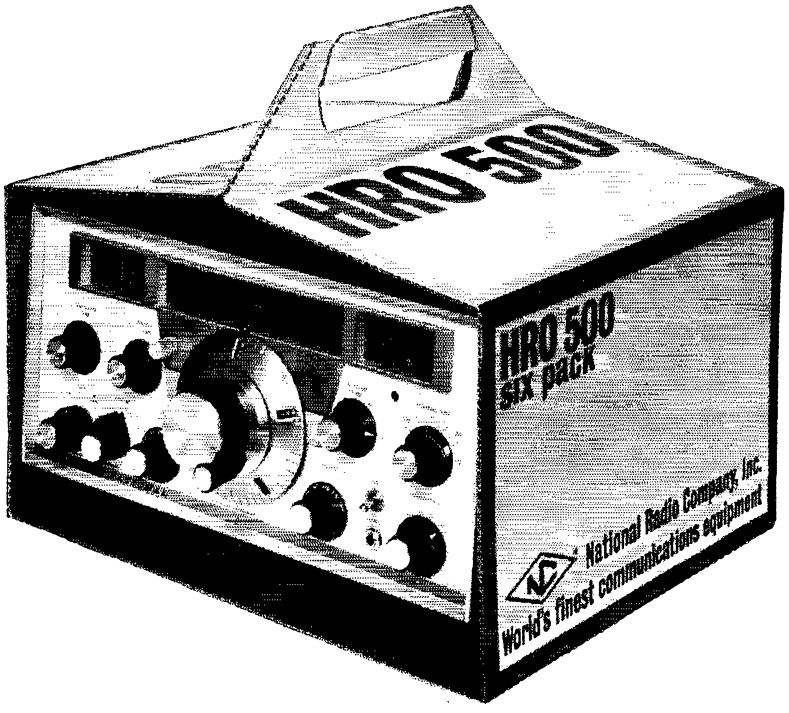

National offers six of the world's finest receivers to meet *your* particular requirement.

Receiver number one provides greater amateur band performance and features than any amateur receiver ever built. ■ Receiver number two has the widest frequency range (from 5 Kc to 30 Mc) of any general coverage communications receiver ever built for lab or commercial application. ■ Receiver number three is *completely* solid-state for high reliability, versatility and portability. It operates from 12/24 V.D.C. or 115/230 V.A.C. This receiver draws less current than a couple of dial lamps (when its dial lamps are switched off), and provides instant-on operation. ■ Receiver number four incorporates specific features for high selectivity and has a six-pole filter to provide built-in steep-skirted 500 cps, 2.5 Kc, 5.0 Kc, and 8 Kc bandwidths with *passband tuning* for CW and SSB. Also *AGC threshold control* to knock out background QRM. Also a 50 db notch filter. ■ Receiver number five has a phase-locked frequency synthesizer to replace conventional high frequency oscillator crystals for superior stability and over-all calibration. ■ Receiver number six offers frequency meter performance with 1 Kc dial calibration and accuracy over its entire tuning range, 24 feet of bandspread per megacycle, and 10 Kc per turn tuning rate.

Each of these receivers is called the HRO-500. National's new HRO-500, at $1295, is the finest *total* receiver you can buy . . . at any price. Interested in trying out National's new sixpack? See your National dealer for an opener.

NATIONAL RADIO COMPANY, INC. 37 WASHINGTON STREET, MELROSE, MASS. 02176

World Wide Export Sales: Auriema International Group, 85 Broad St., N. Y. C.; Canada: Tri-Tel Assoc., 81 Sheppard Ave. W., Willowdale, Ont.

RCA High-Perveance Beam Power Tubes

For the mobile man who wants a hefty signal from a compact rig, RCA High-Perveance Beam Power Tubes are the answer.

High-Perveance design enables you to get the power you want at lower plate voltages—making it easier to work with practical values of pi-network components, use more compact tank circuits and lower voltage-rated filter capacitors, simplify rf and dc insulation problems.

Another feature of RCA Beam Power Tubes for mobile service is their special heaters—designed to withstand the strain of repeated on-off operation and to operate efficiently over the wide range of voltages encountered in car electrical systems.

At "cruising" speed or engine "idle", RCA Beam Power Tubes have the ruggedness and performance capability it takes for mobile service. Check the Power Chart for the types you need.

Available through your RCA Industrial Tube Distributor.

Select your Power and Tube Number

Plate Input Watts			RCA Tube Type
CW	AM	Conditions	
9.9	–	CCS Max.	8077/7054
17	15	CCS Max.	6417
24	17.5	ICAS Max.	7551
40	27	ICAS Max.	6893
85	55	ICAS Max.	6850*
120	85	ICAS Max.	6883B/8032A/8552
210	175	Typical	8072

*Twin Type (total for both sections)

For more technical data on any of these RCA Beam Power Tubes, write: Commercial Engineering, Sect. A-37-M, RCA Electronic Components and Devices, Harrison, New Jersey.

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