July 1966
60 Cents

QST

devoted entirely to

amateur radio

OFFICIAL JOURNAL OF THE ARRL

hold your ears. hallicrafters has unleashed another brute

SR-2000 "Hurricane"

5-band amateur transceiver

SPECIAL FEATURES: Patented Receiver Offset Control (RIT) permits ±2 ks adjustment of receiver frequency, independent of transmitter, for round-table, net or CW operation. Hallicrafters exclusive Amplified Automatic Level Control.

FREQUENCY COVERAGE: Full coverage provided for 80, 40, 20, 15 and 10 meters. All crystals provided for 28.0 to 30.0 mcs.

GENERAL: Dial cal., 1 kc. Linear gear drive with less than 1 kc readout. Adjustable IF noise blanker. Provision for plug-in external VFO/DX adapter. Built-in VOX plus break-in CW and PTT. Built-in CW sidetone. Hi-Low power switch useable in CW or SSB.* 2.1 kc crystal lattice filter. S-meter-RFO-AALC and final screen metering.* Two-speed blower, 100 kc crystal cal. VFO covers 500 kc.

TRANSMITTER SECTION: Two 8122 output tubes. Variable Pi network. Power input, 2000 watts P.E.P. SSB; 1000 watts CW. Carrier and unwanted SB suppression, 50db; distortion products, 30db. Audio: 500-2600 cps @ 6 db.

RECEIVER SECTION: Sensitivity less than 1 μv for 20 db S/N. Audio output, 2W.; overall gain, 1 μv for ½ W. output.

*Meters for final plate current and voltage built into P-2000AC power supply. Also Hi-Lo power switch.

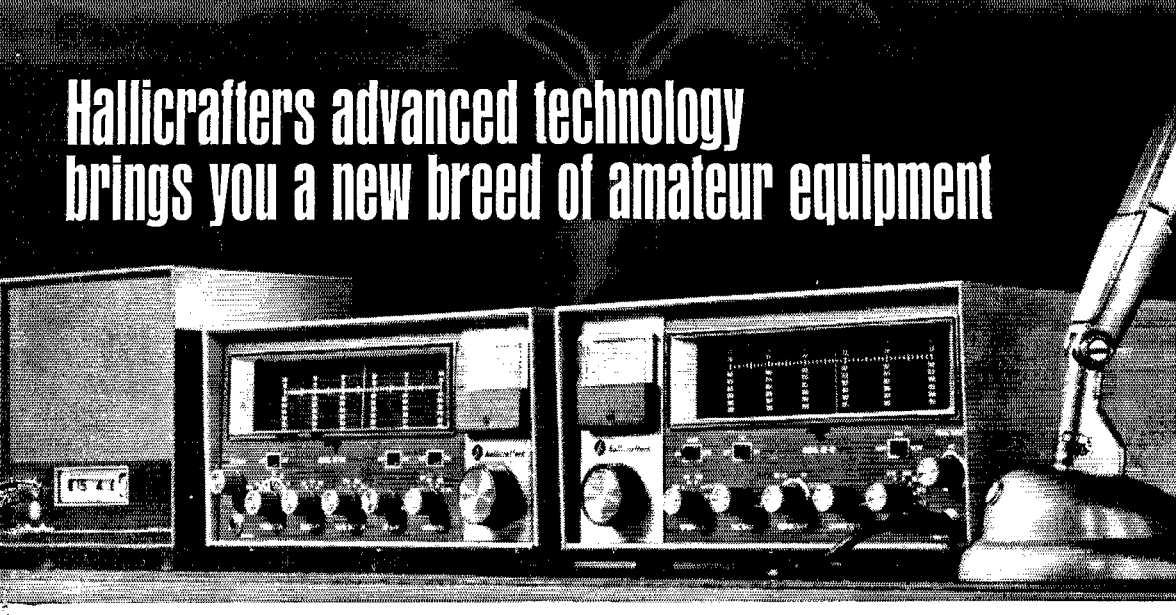
amateur net: $995.00

the wild ideas are tamed at... hallicrafters

5TH & KOSTNER AVES., CHICAGO, ILL. 60624

EXPORT: INTERNATIONAL DIV.—CANADA: GOULD SALES CO.

Hallicrafters advanced technology brings you a new breed of amateur equipment



SX-146 Receiver

This is an amateur band receiver of advanced design employing a single conversion signal path and pre-mixed oscillator chain to assure high order frequency stability and freedom from adjacent channel cross-modulation products. The SX-146 employs a high frequency quartz crystal filter and has provision for installation of two more crystal filters. The receiver may also be used from 2 to 30 mc, with the exception of a narrow gap at 9.0 mc, with the connection of auxiliary oscillators. The highly stable conversion oscillator chain may be used for transceiver operation of the matching HT-46 transmitter.

FREQUENCY BANDS: 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 mc (28.0 to 28.5, 29.0 to 30.0 requires extra crystals at users option).

SENSITIVITY: Better than 1 μv for 20 db S/N.

TUBES AND FUNCTIONS: 6JD6 RF amplifier; 12AT7 Signal mixer and cathode follower; 6AU6A 9 mc IF amplifier; 12AT7 AM detector—AVC rectifier—product detector; 12AT7 USB—LSB crystal oscillators; 6GW8 Audio amplifier and audio output; 6BA6 Variable frequency oscillator; 6EA8 Crystal heterodyne oscillator and pre-mixer; Plus diode power supply rectifier, ANL diode and AVC gates diode; *6AU6A—100 kc crystal calibrator oscillator; *Harmonic generator diode.

PHYSICAL DATA: Size: 5⅞" x 13⅛" x 11". Shipping wt., 20 lbs.

FRONT PANEL CONTROLS: Frequency: Power off CW-upper-lower and AM; Audio gain; Band selector—3.5, 7.0, 14, 21.0, 28.0, 28.5, 29.0, 29.5; Selectivity—0.5, 2.1, 5.0 kc (0.5 and 5.0 kc filters optional extra); Pre-selector; RF gain; AVC on-off; Cal. on-off; ANL on-off; Phone set jack; S-meter.

REAR CHASSIS: S-meter zero adjust; Internal-External oscillator switch; Slave oscillator output; External oscillator input; Antenna socket; Speaker, ground and mute terminals; Grounding stud; AC power cord.

POWER REQ.: 105/125 volt—50/60 cycle AC—55 watts.

I-F SELECTIVITY: Uses a 6-pole crystal filter to obtain a nose-to-skirt ratio better than 1 to 1.8.

Amateur net, $269.95

Model HA-19 plug-in, 100-kc quartz calibrator available as accessory. **Amateur net, $19.95**

**Part of HA-19 calibrator.*

HT-46 5-band transmitter

All new from the ground up! Here's the "new breed" transmitter that matches your SX-146 . . . works independently or may be interconnected for transceiver operation.

FEATURES: 180 watts PEP input on SSB; 140 watts on CW; Frequency control independent or slaved to SX-146 receiver; Upper or lower sideband via 9 mc quartz filter; Built-in power supply; Press-to-talk or optional plug-in VOX; grid block for keying for CW.

FREQUENCY COVERAGE: 3.5-4.0, 7.0-7.5, 14.0-14.5, 21.0-21.5 mc and 28-30 mc in four 500-kc steps. Crystal supplied for 28.5-29.0 mc coverage. Other plug-in crystals at user's option.

TUBES: 6BA6 VFO; 6EA8 Heterodyne crystal oscillator and mixer; 12AT7 Carrier oscillator-third audio; 12AT7 Mic amplifier; 6EA8 9 mc I-F amplifier and AALC; 6AH6 Mixer; 12BY7 Driver; 6HF5 Power amplifier; 0A2 Reg.

FRONT PANEL CONTROLS: Frequency Tuning; Operation-Off, Standby, USB, LSB, CW-Tune, Standby LSB USB; Microphone gain; Driver tune; Carrier level; Band selector; Final tune; VFO selector—Transmitter-Receiver; Dial cal.; Calibrate Off-On; Meter MA-RFO.

REAR APRON FUNCTIONS: AC Cord; Ground lug; Fuse; Key jack; VOX accessory socket; Antenna jack; Receiver input (for transceiver); 11 pin control socket; bias adjust.

PHYSICAL DATA: Size: 5⅞" x 13⅛" x 11". Shipping wt., 26½ lbs.

HA-16 Vox Adapter, **$37.95** **Amateur net, $349.95**

R-51 Speaker,

4 x 6 inch oval speaker and attractive 24 hour clock.

amateur net $34.95

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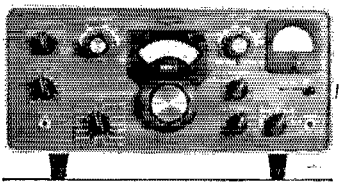
Export: International Division

Available in Canada from Gould Sales Co.

A lot of ham operators just won't go anywhere without the KWM-2 transceiver. Why should they when it's so easy to take along? Just mount it in the car and you're ready to go with the same performance you get in the ham shack. Wherever you take it, the KWM-2 gives full coverage of the popular HF ham bands. Provides ample power on 80 through 10 meters with 175 watts PEP input on SSB, or 160 watts on CW. Before you go on vacation see your Collins Distributor and find out how easy it is to get a KWM-2 for your vacation trip. And, if you're going through Iowa this summer, stop during working hours in Cedar Rapids and visit the plant.



COLLINS

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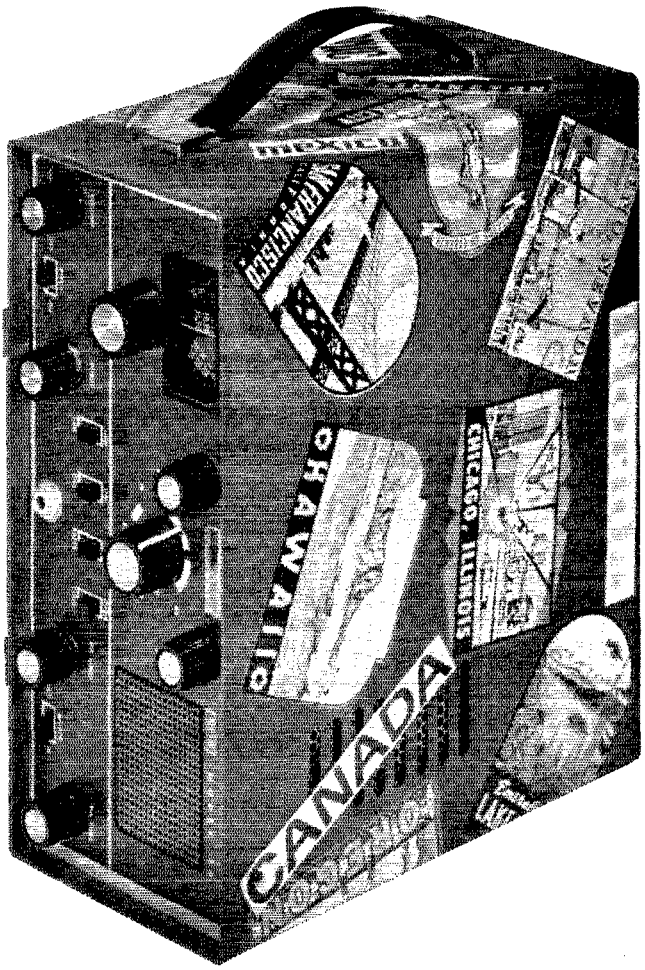
OUR COVER

Transistorized gear comes into its own for hill topping on the v.h.f. bands. The low-drain 12-volt 6-meter receiver in the photograph is described on page 11.

—CONTENTS—



Take Me Along!

A reasonable wife will see the logic of taking **SB-34** along on the family vacation. Particularly when you point out that, with **SB-34** operating from the car, aid can be summoned for any highway emergency. Best to play down the possibility that the aid call may have to be relayed from Puerto Rico—or maybe Korea. These **SB-34's** really do get out! Works fine from a motel or campsite using an improvised over-a-branch dipole or an outside-the-window vertical with insulated wire radials lying on the ground. You can also sit in the car and operate.

As a traveling companion the **SB-34** is unbeatable because of its portability. Lightweight (only 18 lbs.), compact (half a cubic foot) and has a built-in 2-way power supply (12V D.C.-117V A.C.). Your wife will applaud your bargain hunting prowess when you mention these features. **SB-34** contributes so much to the family fun and safety, besides having an attractive low purchase price. The cost is only 395.00. Take **SB-34** along. . . . Write now for colorful descriptive brochure of SBE equipment.

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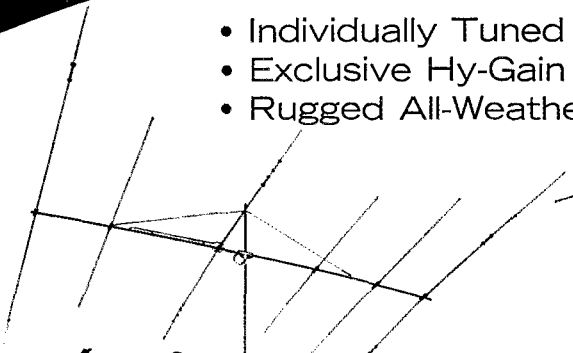
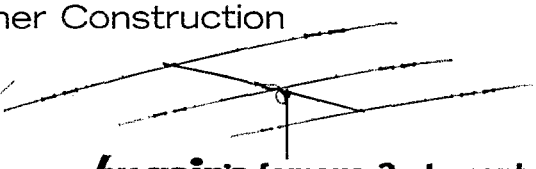


hy-gain's incomparable 6-element DX THUNDERBIRD Model TH6DX

- **Takes Maximum Legal Power**
- **Comes Through Like a Bomb on DX**

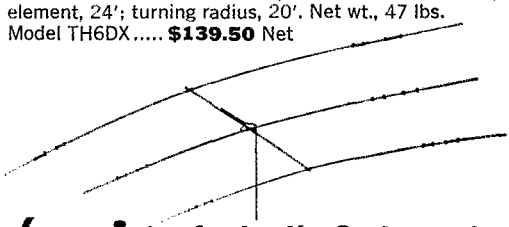
The Hy-Gain 6-element DX Thunderbird is a breed all its own...built to provide the ultimate in total performance on 10, 15 and 20 meters. Individually tuned Hy-Q traps for each band insure peak performance whether working phone or CW. Exclusive factory pre-tuned Beta Match *assures optimum gain and maximum F/B ratio without compromise.* SWR less than 1.5:1 on all bands. Feeds with 52 ohm coax. Ruggedly constructed to survive winds up to 100 MPH. Boom length, 24'; longest element, 24'; turning radius, 20'. Net wt., 47 lbs.
Model TH6DX..... **$139.50** Net



hy-gain's famous 3-element THUNDERBIRD Model TH3Mk2

- **Takes Maximum Legal Power**
- **Delivers Uncompromised Performance**

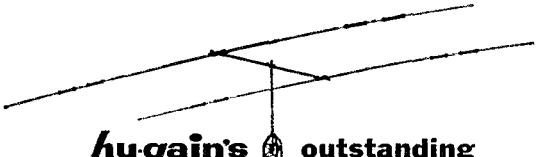
The Hy-Gain Model TH3Mk2 is more than just another 3-element tribander. Individually tuned, large diameter Hy-Q traps provide full-size performance on each band. Factory pre-tuned Beta Match insures optimum gain and maximum F/B ratio without compromise. SWR less than 2:1 on all bands. Heavy gauge seamless aluminum construction survives winds up to 100 MPH. Boom length, 14'; longest element, 28'; turning radius, 15.7'. Net Wt., 36 lbs.
Model TH3Mk2..... **$99.75** Net



hy-gain's fantastic 3-element THUNDERBIRD JR. Model TH3Jr

- **Takes 300 Watts AM; 600 Watts P.E.P.**
- **Rotates with a Heavy Duty TV Rotator**

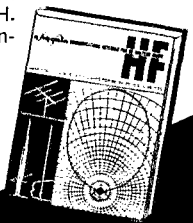
Mounted on a rooftop or a lightweight tower, the compact Model TH3Jr offers amazing total performance to the Ham hampered by severe space limitations. Has individually tuned Hy-Q traps for each band. Is Beta Matched for maximum gain and F/B ratio. SWR is less than 2:1 on all bands. Rugged heavy gauge aluminum construction survives 80 MPH winds. 12' boom. Longest element, 26'. Turning radius, 14.3'. Net Wt., 21 lbs.
Model TH3Jr..... **$69.95** Net



hy-gain's outstanding 2-element THUNDERBIRD Model TH2Mk2

- **Takes Maximum Legal Power**
- **Rotates with a Standard TV Rotator**

The Model TH2Mk2 is a high performance tribander that installs most anywhere. Has individually tuned Hy-Q traps for each band...exclusive Beta Match for maximum gain and F/B ratio without compromise. Feeds with 52 ohm coax. SWR less than 2:1 on all bands. Rugged heavy gauge seamless aluminum construction survives winds up to 100 MPH. Boom length, 6'; longest element, 28'; turning radius, 14.3'. Net Wt., 23 lbs.
Model TH2Mk2..... **$69.95** Net



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Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (or 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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AOM-106	1 cps	19.95
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AOM-202	10 kc and 1 kc	35.00
AOM-301	100 cps, 10 cps, 1 cps	49.50
AOM-100X	100 kc oscillator	32.50
AOM-1000X	1,000 kc oscillator	32.50

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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.

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

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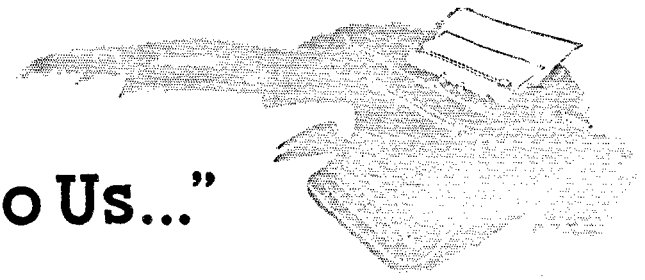


"It Seems to Us..."

FREELOADERS

THE subject of League services to amateurs who are not ARRL members came in for considerable discussion at the recent Board meeting. The Hq. does not reply to inquiries from such persons saying, "Sorry, Bub, you're not a League member so we can't take the time to suggest how to fix that spurious in your v.h.f. amplifier," or, "We don't find you on the ARRL roster, so we are returning unprocessed your application for WAS."

Some directors think perhaps we should. And we've heard the same from members now and then.

They are concerned with the League's burden of serving all of amateur radio, yet supported through membership by less than half the total number of hams. This is one of the reasons the League has been running close to the break-even point financially, and has even lost money in several recent years. Some directors—and again members—suggest the League should charge non-members a fee for direct assistance in a number of fields. For example, thirty per cent of DXCC participants are not members of the ARRL, yet feel free to use League personnel time (and thus expense) in processing their applications and endorsements, and publication costs of listing their calls in *QST*.

There is indeed a touch of irony when a non-member amateur asks us — as happened recently — for technical help in getting his new and unorthodox antenna to work, when we find it was built from a description in another magazine! Another case within the past month demanded our intervention to settle a dispute with an advertiser, which turned out to be a purchase prompted by an ad not in *QST* at all, but in the third amateur magazine; the complainant said he had received no satisfaction from its publisher, yet even though not an ARRL member he felt no qualms about turning to us for help!

There is, we suppose, an inherent compliment in such a feeling on the part of many amateurs. It is, however, an expensive compliment when we are asked to provide assistance apparently lacking in other magazines.

Something on the order of one-fourth of all League expenditures goes for direct assistance to amateur radio generally and to individual amateurs — members and non-members alike — entirely separate from publication activities. Contests, awards, licensing help, technical information service, training aids, club speakers and travel, ARPSC-AREC-NTS-RACES, operating aids, financial support of Project Oscar — are a few examples. A portion of membership dues receipts of course goes for *QST*; the remainder provides services such as those mentioned.

So, fellow-members, we're all underwriting the costs of help to the guy who doesn't support the League through membership. Should we refuse aid — or charge him a fee? A more appropriate solution, we think, is to arm yourself with the coupon on page 159 of this issue (or a facsimile) and canvass your friends to separate five bucks from each of them not an ARRL member — and start them paying their own way. Aside from the principle involved, it may avoid — or at least postpone — an eventual rise in dues to cover the League's burden of responsibility to all of amateur radio.

QST CHANGES

YOU may notice a couple of new column heads this month. The "Recent Equipment" department isn't new, but Gil, W1CJD, has provided us a decorative title designed to remind the reader that the text is not a consumer's report, nor a carbon copy of what can be found in the manufacturer's catalogs, or instruction manuals. Our technical crew strives to make the write-ups strictly technical descriptions highlighting interesting and novel circuits and approaches.

A brand-new column is introduced this month titled "Gimmicks and Gadgets," and it's just what the name implies. Turn to page 20 and see for yourself. We'll try to keep this in the class of week-end projects with a soldering iron, and minimum parts and expense.

A brand-new feature (page 10) will bring to you each month news highlights, last-minute flashes, and comment on current items of general interest. Other departments and full-fledged articles will still contain the "meat," but often nutshell versions will appear in "League Lines" to aid the busy reader.

Please let us know how you like these new changes, along with suggestions for others.

QST

League Lines . . .

The League is embarked on an engineering study of the prospects of more privileges on 160 meters. Evaluations are being made of the interference potential of various modes of emission—c.w., sideband, a.m. phone, RTTY—to determine whether either more kilocycles or more power (or both) can be made available for amateur activity without endangering the Loran service.

Docket 15928, FCC's proposal in the field of incentive licensing, unfortunately remains dormant; substantial changes in Commission staff personnel have put this, among many other things, behind schedule. Other than "some time this year," there is no reliable prediction for FCC action.

Under provisions of our By-Laws, Canadian and U. S. hams temporarily residing outside these countries have in the past been classified as associate members. Understandably, they have been unhappy at the inability to vote in the director elections in their home divisions. The Board of Directors has now remedied this difficulty by an amendment of the By-Laws. Thus holders of VE or W/K licenses temporarily overseas are invited to advise Hq. of their home divisions—and call signs, if not already on our records. We'll issue Full Membership certificates and see that you get director ballots henceforth.

Project Oscar has a number of irons in the fire—a 2-to-10-meter package underway, as well as some 432 and 1296 Mc. beacon modules, and a unit similar to Oscar 4 hopefully for another synchronous orbit attempt. A group in Germany is actively working on an Oscar-3 type setup; other groups in Australia and Canada are proposing additional items. The next launch is indeterminate at this point, being—as always —on a space-available basis.

"Why can't I get a multiple year membership?" You can, OM. There is no bar to paying dues in advance as many years as you wish. In an extension of this concept, the Board of Directors has requested a study and report on the possibility of a life membership arrangement. If those likely to take up such a membership—for a guess, at $100 dues—could drop Hq. a postcard, it would help indicate the extent of interest.

Visiting New England this summer? Stop in and pay us a visit; we would like to meet you, too. The Newington Headquarters is just a few minutes off the New York to Boston turnpike (Route 5 and 15). The office is open from 9:00 A.M. to 4:00 P.M., and W1AW hours are shown on page 103.

As this page is being readied for press, the League's President and General Manager (WØNWX and W1LVQ) are in Yugoslavia attending a Region I meeting of the International Amateur Radio Union. Also present, as an observer from Region II, is Canadian Division Director VE3CJ. The Region I representatives from the various European and African IARU member societies are reviewing past progress of IARU and planning for the future, particularly for any eventual ITU conferences.

The 6 Meter "Rushbox"

Five-Transistor Superregen Receiver for the Experimenter

BY DOUG DE MAW,* W1CER

If you like to experiment with transistors, and enjoy short-term construction projects, this simple 6-meter receiver may be just what you've been looking for.

To keep the total cost within easy reach of the experimenter, low-priced RCA transistors are employed in the 5-stage "Rushbox." An additional shaving of expense results from the use of bargain-house components in part of the circuit. The electrolytic capacitors and some of the smaller bypass units are low-cost imports. The interstage transformer, slide switch, antenna jack, and transistor sockets are of similar origin.

The receiver is sensitive, and will copy a.m., m.c.w., and wide-band f.m. signals. As with other superregen receivers, c.w., s.s.b., and n.b.f.m. cannot be copied, and strong signals will appear to be broad-tuning. By way of bonus features, however, the a.g.c. action of the Rushbox will compare favorably to that of many expensive superhet receivers. Additionally, the noise-limiting characteristics of the superregen make it a desirable circuit for mobile use, or in noisy areas.

Although the receiver was designed to operate from 12 volts d.c., the performance remains good when the voltage is lowered to 9 volts, or even to 6 volts. Operation from a 6-volt source makes it practical to use the Rushbox in foreign cars having 6-volt ignition systems. The total current drain of the receiver when operating from a 12-volt power supply is approximately 300 ma. The low drain is desirable for portable operation where extended periods of listening will take place, and where the auto battery is to be used as a power source.

The Circuit

As shown in Fig. 1, the receiver consists of an r.f. stage, Q_1, a superregenerative detector stage, Q_2, and three audio stages. Although Q_1 aids receiver sensitivity somewhat, its primary purpose is to isolate the antenna and detector from each other. The tuned circuit between the antenna and the base-emitter circuit provides ample selectivity to prevent cross-modulation except from the very strongest of signals. The collector circuit of Q_1 is parallel-fed through a resistor, and output to the detector is taken through C_1, a 1-pf. capacitor, which couples the signal into the detector tank, L_3.

Audio output is taken from the collector of Q_2 through a quench filter consisting of a 2.5-mh. choke, a 0.001-μf. capacitor, and a 0.01-μf. capacitor. Transformer T_1 couples the audio from the detector to Q_3, and R_2 serves as the

audio gain control. R_3 is used to set the collector voltage of Q_2 for best superregeneration. A 1000-ohm resistor and a 50-μf. electrolytic capacitor are connected between R_3 and T_1 to form an audio decoupling network which prevents motor-boating at the higher settings of R_2.

Transistors Q_3, Q_4, and Q_5 are used in an audio channel having a rated output of 2 watts. This simple circuit was filched from one of the *RCA Application Notes*.[1] The circuit has negative d.c. feedback which results in stable operation of the circuit despite variations in temperature and power-supply voltage. The output transformer, T_2, should match the 24-ohm collector load impedance to that of the speaker used. An 8-ohm speaker is used in this model.

Building the Receiver

The unit is housed in a 4 × 5 × 6-inch utility cabinet. The chassis is formed from 16-gauge aluminum stock bent in a vise to dimensions that permit it to fit nicely into the cabinet. The rear apron of the chassis, a 1½-inch lip, contains the power receptacle, J_2, and the antenna jack, J_1.

Transistor sockets are used for mounting Q_1 through Q_4. Q_5 is mounted on the chassis with insulating hardware. Silicone grease is used between the transistor and its mica insulator and between the mica insulator and the chassis. This permits better heat transfer between Q_5 and the chassis, enabling the chassis to serve as a heat sink.

* Asst. Technical Editor.

[1] RCA publication No. ATC-401.

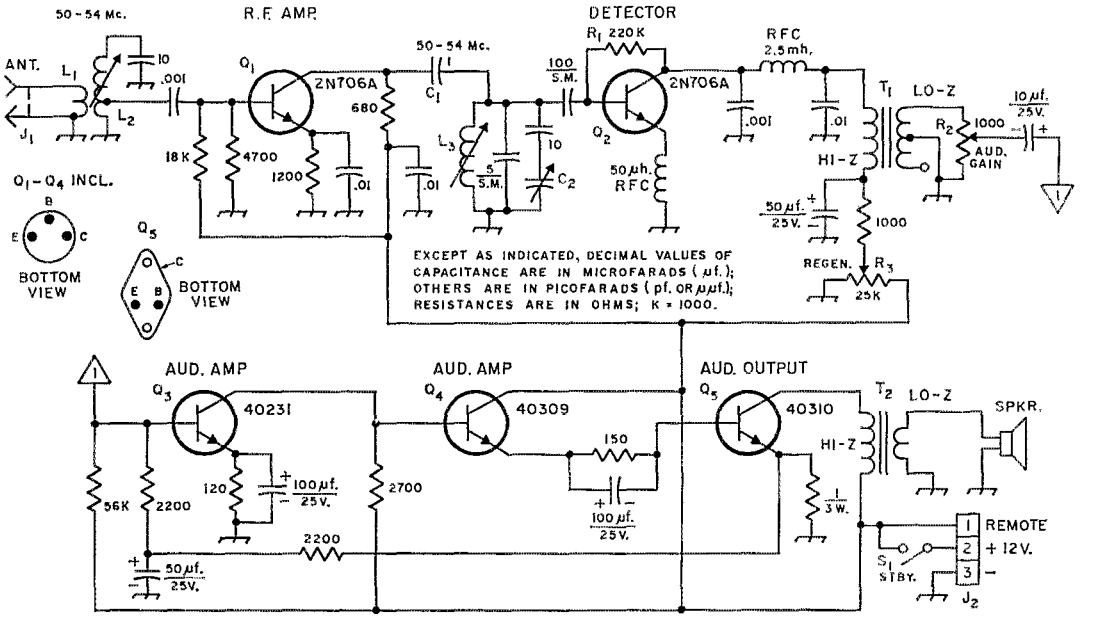


Fig. 1—Circuit of the 6-meter Rushbox. Fixed capacitors with polarity indicated are electrolytic; SM = silver mica; others are disk ceramic. Fixed resistors are ½-watt composition unless otherwise specified.

C_1—Gimmick capacitor (see text).
C_2—12-pf. miniature variable (Millen 25012-E).
J_1—Phono jack.
J_2—3-terminal connector (Millen E-303A).
L_1—2 turns No. 22 insulated wire over cold end of L_2.
L_2—12 turns No. 24 enam., close-wound on ¼-inch diam. slug-tuned form (Miller 4500). Tap 4 turns from ground end.
L_3—9 turns No. 24 enam. wire, close-wound on Miller 4500 form.
R_1—See text.
R_2—Audio-taper control.
R_3—Linear-taper control.
S_1—S.p.s.t. slide switch.
T_1—Audio transformer, 20,000 to 2000 ohms c.t.; use one-half secondary winding (Argonne AR-103 or equivalent).
T_2—Output transformer, 24 ohms to 8-ohm voice coil (Poly Paks 34B643, Lafayette 33R7501, or equivalent).

Fig. 2—Top-chassis view of the 6-meter receiver. Antenna and power receptacles are on the rear apron. R.f. and detector stages are at the upper right of the chassis. The audio transistors and output transformer are parallel to the rear edge of the chassis.

To facilitate mounting T_1 on the chassis, a strip of brass, ¼ inch wide and 1¼ inches long, was soldered to the transformer frame's top section. Mounting holes were then drilled in the brass strip and T_1 was bolted upside down to the chassis as shown in Fig. 3.

Perforated aluminum is used as a speaker grille and is held in place between the speaker and the panel by the speaker's mounting screws.

The regeneration control, R_3, could be mounted on the rear apron of the chassis rather than soldered to a terminal strip under the chassis as shown in Fig. 3. By having it accessible from outside the cabinet, it could be adjusted more rapidly when the operating voltage of the receiver is changed.

Capacitor C_1 is a gimmick made from two 1-inch lengths of insulated hookup wire twisted together. Too much capacitance at C_1 will cause the receiver to have dead spots in its tuning range because of too tight coupling to the antenna tuned circuit. Too few twists of C_1 will reduce the sensitivity of the receiver. The best gimmick setting should be determined experimentally. If trouble is experienced with dead spots despite adjustment of C_1, try adding a

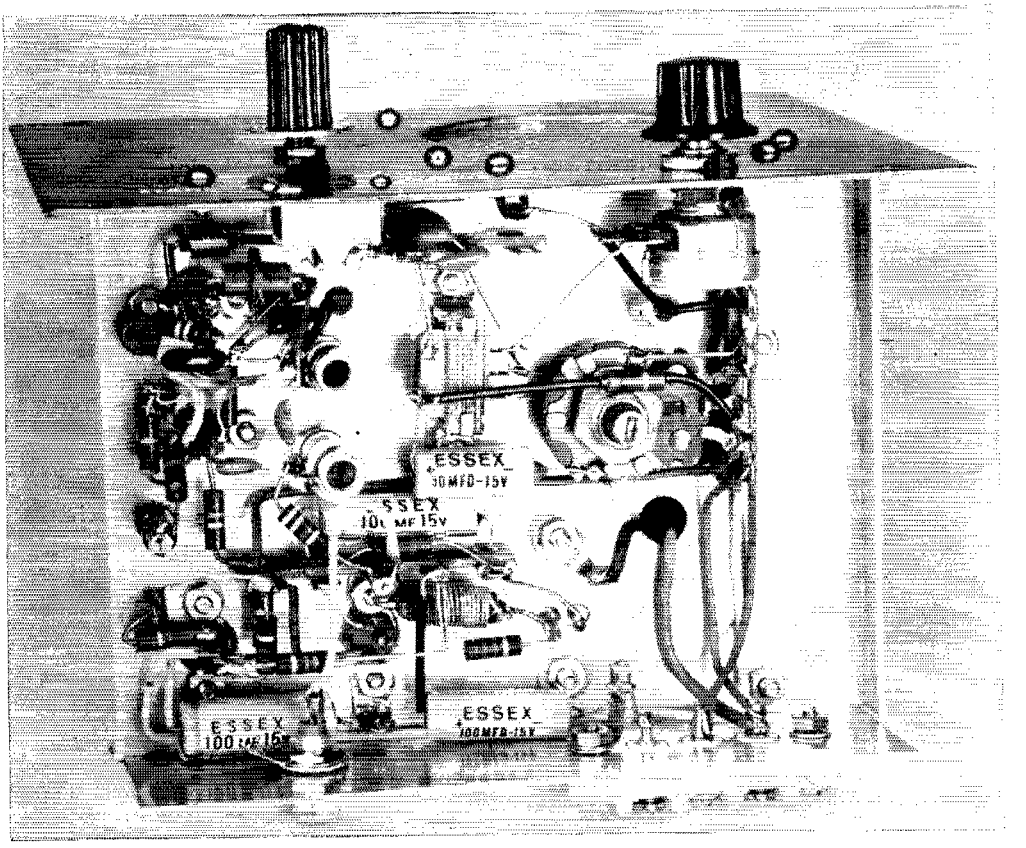


Fig. 3—Bottom view of the Rushbox chassis. The audio interstage transformer is at the upper center of the chassis. The regeneration control is just to the right of the audio transformer. All circuit wiring is as short and direct as possible.

4700-ohm resistor across L_2 to broaden the circuit. Slight detuning of L_2 may also help.

It may be necessary to experiment with the value of R_1 to secure smooth regeneration. Normally, the 0.22-megohm value will serve nicely if RCA 2N706As are used. This value may have to be juggled until satisfactory superregeneration results, if other types are used for Q_2.

Final Checkout

When the wiring has been completed and rechecked for possible errors, connect the power supply to J_2 and close S_1. If no hiss noise is heard, advance R_3 until the detector breaks into superregeneration. Next, set C_2 so that the plates are fully meshed. If a signal generator is available, connect it to J_1 and set it to 49 Mc. Adjust the slug in L_3 until the 49-Mc. signal is heard. With C_2 at minimum capacitance, the receiver should now tune to approximately 55 Mc. L_2 can be adjusted for maximum receiver sensitivity by peaking it while a 50.2-Mc. signal is being received. If a signal generator is not available, the receiver can be rough-tuned by using a grid-dip meter, or by listening to 6-meter ham signals.

The receiver can be controlled from a remote point by connecting a switch between terminals 1 and 2 of J_2, and leaving S_1 in standby.

Some Final Remarks

The audio channel is capable of delivering 2 watts of output when operated from 12 volts. The large output is desirable when ambient noise levels are high, making it ideal for mobile use.

The sensitivity of the Rushbox is such that a 2-microvolt signal, 30-per-cent modulated, is plainly audible when R_2 is set at mid range.

The 6-meter Rushbox can be used for portable, mobile, or fixed-station operation. Despite its simplicity, it will give a good account of itself in any non-stringent receiving application. You won't be the "weak-signal king" in your community, but you'll hear darned near as much DX as the fellows with the sophisticated receivers.

If you've had the yen to try your hand at building a simple 6-meter receiver, and are interested in transistor circuits, try the Rushbox. It represents a good starting point for the beginner. QST

The method of filter design known as "modern network synthesis" leads either to simpler circuits for a given performance or improved performance for a given degree of circuit complexity, as compared with the longer-established design procedures. Here the author uses the system to come up with a simplified "Filterfier" plus a design for an accompanying high-pass filter.

An Amateur Application of Modern Filter Design

Low- and High-Pass Audio Filters for Shaping Response

BY EDWARD E. WETHERHOLD,* W3NQN

OVER the past several years, there has been a major revolution in the design of electric wave filters. The old image-parameter approach developed by Campbell and Zobel [1] in the early 1920s with the now-familiar terminology of "characteristic impedance," "constant-k section," and "m-derived section" has finally been superseded by a vastly superior filter-design method generally known as "modern network synthesis." Although this method is not new, having been first mentioned in 1929 and later expanded during 1940–1950,[2] it was not practical to apply it to practical filter problems until the digital computer became available as a design tool. The recent publication of two texts [3,4] with design tables derived by the computer now makes it possible for the progressive radio amateur to take advantage of this most recent development in filter design.

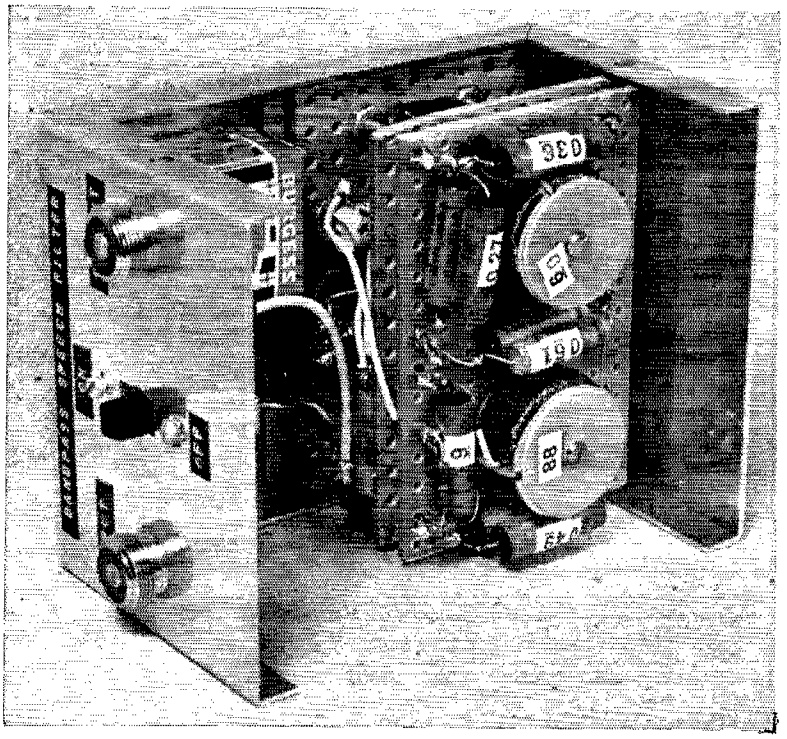
* Dept. 2N, Electro International, Inc., Box 391, Annapolis, Md. 21404

[1] Zobel, "Theory & Design of Electric Wave Filters," *The Bell System Technical Journal*, January, 1923.

[2] Zverev, "Introduction to Filters," *Electro-Technology*, June, 1964.

[3] Geffe, *Simplified Modern Filter Design*, John F. Rider Publisher, Inc., New York City, 1963.

[4] *A Handbook on Electrical Filters*, published by White Electromagnetics, Inc., Rockville, Maryland, 1963.



Completed speech filter, less cover, showing the component mounting boards and front panel with bypass switch and microphone connectors. The low-pass filter components, marked with the 3-kc. cutoff values, are mounted on the top phenolic component mounting board. The transistor amplifier is mounted on the bottom phenolic board, the high-pass filter with the resistor pad on the middle board. Note the phenolic washers used to hold the 60- and 88-mh. toroids firmly in place.

The fact that many radio amateurs apparently are not yet aware of the advantages of modern filter design techniques is indicated by recent articles[5,6] in which the now-passé image-parameter design approach was employed. The purpose of this article is to illustrate an application of modern design to a simple filter problem already "solved" by the image-parameter filter. By comparing the performance and components of the filters that result from these two different approaches, the degree of superiority and advantages of the modern filter over the image-parameter filter should be evident.

The most recent image-parameter design conveniently accessible to *QST* readers is the "Filterfier,"[6] a low-pass filter designed to be used with s.s.b. phasing-type exciters to restrict the speech frequency range to that at which the phasing network performs best (approximately 300–3000 c.p.s.), to reduce the possibility of generating unwanted side frequencies in excess of 3 kc. This was accomplished by choosing a cutoff frequency of 2.40 kc. and designing an *m*-derived, constant-*k* image-parameter filter which produced 37 db. of attenuation at 3.0 kc. At higher frequencies, the attenuation in the stop band was never less than 39 db. The filter required four readily-available inductors and seven capacitors and was designed to be terminated in equal resistances of 1106 ohms.

Desired performance requirements for the comparative low-pass modern filter design therefore were as follows:

1) A cutoff frequency of 2.4 kc. to permit ease of performance comparison with the image-design filter.

2) An attenuation of at least 37 db. at 3.0 kc.

3) A minimum attenuation in the stop band of approximately 39 db.

4) Equal source and load resistances of approximately 1000 ohms.

It was also desirable to utilize the currently-available 88-mh. toroidal inductors because of their high Q and very low cost.[7]

Modern Filter Design Applied to the Filterfier

With these thoughts in mind, a filter type classified by the filter theorists as a "dual-section elliptic function" was chosen as being most suitable for this particular application. From the many possible variations available in the computer-derived tables of Geffe's book[3] for the elliptic-function type, one was chosen which best approximated the desired performance requirements. The tabulated computer-derived design parameters, all normalized for a cutoff frequency of 1 radian/sec. and 1-ohm resistance terminations, were scaled to the desired levels simply by multiplying all normalized values by the proper factors. Normalized frequencies were scaled by multiplying them by the cutoff frequency in kilocycles. Component values were scaled by multiplying all capacitances by $1/R\omega$ and inductances by R/ω, where ω is $2\pi f_{co}$. The source and load resistances, R, were specifically chosen to assure that the higher inductance required by the filter would be 88 mh. The lower inductance came out to be 60.3 mh. The filter values associated with cutoff frequencies of 2.40 kc. and 3.0 kc. are presented in Table 1. The second cutoff frequency of 3.0 kc. is presented as an alternate for those who may prefer a wider passband for their particular application. Note that the same inductance values are required, but the source and load values are different as are also the capacitance values.

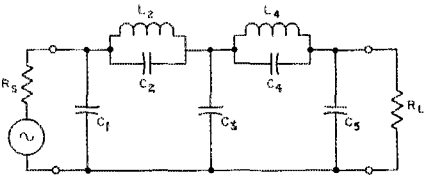
The toroidal inductor used has two separate 22-mh. windings on a toroidal core. When the windings are connected in series aiding, the total inductance is 88 mh. with a Q of 45 at 1 kc. One of these inductors is used in its unmodified form for L_2. A second 88-mh. toroid is modified by removing 62 turns from *each* 22-mh.

TABLE I

Dual-section elliptic-function low-pass filter

Maximum attenuation in passband (A_p) = 0.5 db.
Minimum attenuation in stopband (A_s) = 40 db.

Element or Frequency	*No. 1*	*No. 2*
Cutoff frequency, f_{co}	2.40 kc.	3.00 kc.
Lowest frequency for A_s	3.05 kc.	3.81 kc.
Resonant frequency, section 4	3.14 kc.	3.92 kc.
Resonant frequency, section 2	4.51 kc.	5.63 kc.
C_1	.0761 μf.	.0487 μf.
C_2	.0142 μf.	.00908 μf.
C_3	.0957 μf.	.0613 μf.
C_4	.0427 μf.	.0274 μf.
C_5	.0568 μf.	.0363 μf.
L_2	88 mh.	88 mh.
L_4	60.3 mh.	60.3 mh.
R source & load	1305 ohms	1630 ohms
ω	15.05 K	18.84 K



[5] Genaille, "Low-Pass Audio Filters for Increased Talk Power," *Electronics World*, September, 1963.

[6] MacCluer and Thompson, Jr., "The Filterfier," *QST*, November, 1965.

[7] For example, 88- and 44-mh. toroids are available 5 for $1.75, postpaid, from Buchanan & Associates, 1067 Mandana Blvd., Oakland, California 94610.

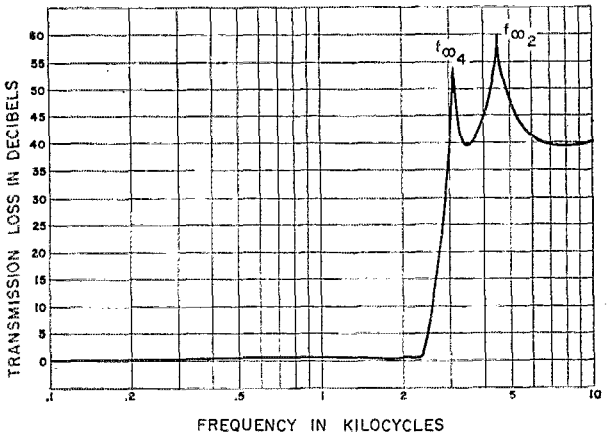


Fig. 1—Transmission loss vs. frequency, low-pass filter with 2.4-kc. cutoff using the values shown in Table I. Peak rejection frequencies are 3.14 kc. (f_{004}) and 4.51 kc. (f_{002}).

winding so that when the modified coils are connected in series aiding, the resulting inductance is 60 mh., which is the amount of inductance required for L_4.

Mylar capacitors were used because of their small size, low loss and excellent capacitance stability relative to change of temperature and time. The capacitances of a large number of mylar capacitors were measured with an impedance bridge and the true value marked on each capacitor case. Appropriate values were then selected and paralleled to produce the capacitances of C_1 through C_5 to within ±2 per cent of the value specified in Table I. The two toroids and associated capacitors were mounted on a phenolic board 2 7/16 by 3 5/8 by 1/16 inch thick and wired according to the low-pass filter schematic of Table I. This completed the filter construction.

Filter Response Evaluation and Performance

The completed filter was subjected to a transmission-loss response evaluation, the results of which are shown in Fig. 1. Transmission-loss response is defined as the ratio of the voltage amplitude V_1 of the load signal before filter insertion to the value of load signal V_2 at the filter output terminals after insertion of the filter. This ratio is generally expressed in decibels.

A Heathkit Audio Generator, Model AG-9 (step-frequency type) was calibrated against a digital frequency counter to provide known test frequencies to better than 1-per cent accuracy. Input and output voltage amplitudes were measured with a Heathkit a.c. v.t.v.m., Model AV-2. Resistive terminations, as specified in Table I, were provided for the filter input and output.

The response curve shows two "ripples" in the filter passband of less than 1 db., which is sufficiently in accord with the expected maximum passband attenuation of 0.5 db. The two passband ripples are typical of the dual-elliptic-type filter. The measured cutoff frequency occurs at 2.40 kc. where the response curve continues rising above the level of the maximum passband attenuation. The remainder of the filter performance is equally in accord with the design specifications.

Comparing the response curve of the modern filter with that of the image filter (Fig. 3, page 33, November 1965 *QST*), no outstanding differences are noted above 1 kc. However, in comparing the two filter circuits, the modern filter

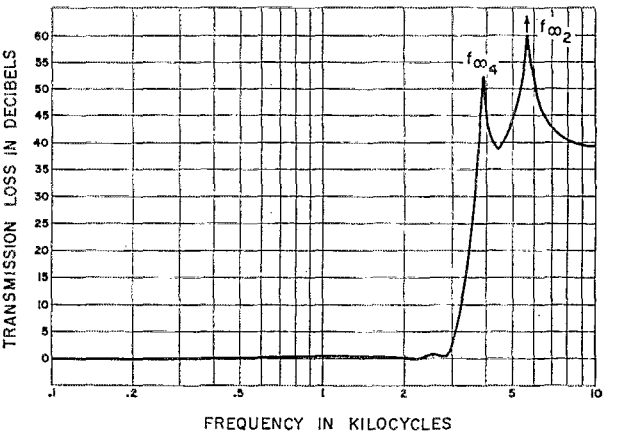


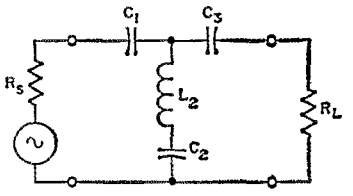
Fig. 2—Transmission loss vs. frequency, low-pass filter with 3.0-kc. cutoff using the values shown in Table I. Peak rejection frequencies are 3.92 kc. (f_{004}) and 5.63 kc. (f_{002}).

TABLE II

Single-section elliptic-function high-pass filter

Maximum attenuation in passband (A_p) = 0.5 db.
Minimum attenuation in stopband (A_s) = 20 db.

Element or Frequency	
Cutoff frequency, f_{co}	294 c.p.s.
Highest frequency for A_s	208 c.p.s.
Resonant frequency, section 2	186 c.p.s.
C_1	0.10 μf.
C_2	0.235 μf.
C_3	0.10 μf.
L_2	3.11 henrys
R source & load	4260 ohms
ω	1.85 K

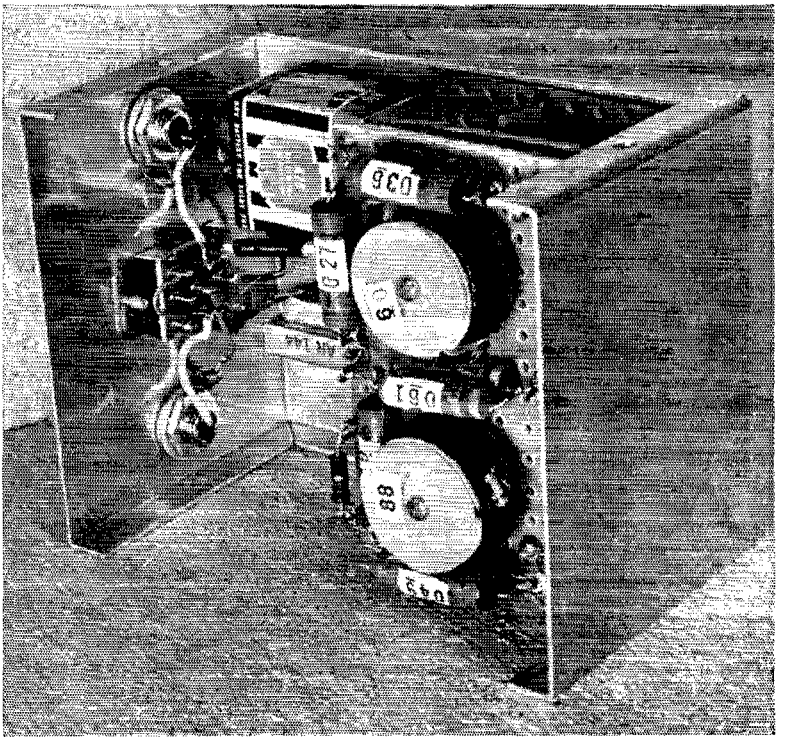


design requires significantly fewer components — only two inductors and five capacitive elements compared to four inductors and seven capacitive elements. Another advantage of the modern design not immediately obvious is the fact that the transmission loss in the modern filter passband is less than 1 db. whereas the image design used in the Filterfier has a loss in excess of 6 db. as a result of the 660 (640)-ohm resistor separating the *m*-derived section from the constant-*k* section. If it is desired to install the modern filter in the Filterfier circuit, it is only necessary to provide the required filter source and load resistances of 1305 ohms or 1630 ohms, depending on whether the 2.4-kc. or 3.0-kc. cutoff filter is used.

Bandpass Speech Filter Using Modern Filter Design

Because the results of applying modern filter design techniques to the low-pass filter application were so successful, it was decided also to design and construct a high-pass filter so that, in combination, the two filters would provide a bandpass of 300–3000 c.p.s. The bandpass filter is intended to be used with an active device that will be inserted between a microphone and speech input amplifier so as to provide approximately unity gain. The component values and other associated information for the 3.0-kc. low-pass filter are presented in Table I. The transmission-loss response curve is shown in Fig. 2.

Considerations for the design of the high-pass filter were that, for simplicity, only one toroid



Another view of the filter, showing the back side of the front panel. The input transformer is clearly visible in this view.

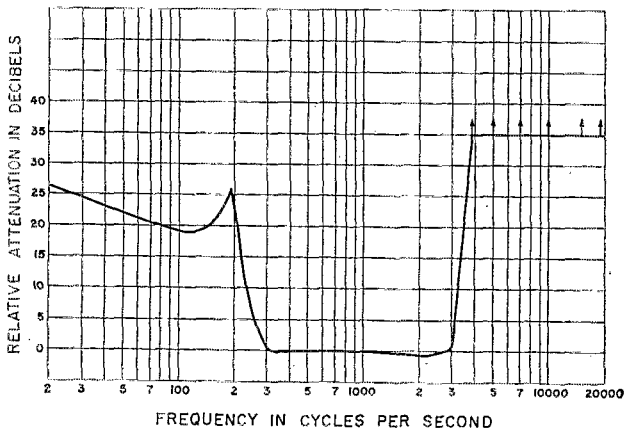
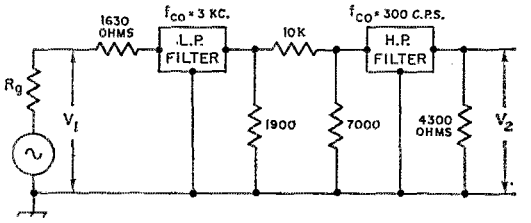


Fig. 3—Relative attenuation vs. frequency, cascaded low-pass and high-pass filters. Insertion loss due to matching pad is 13 db. Arrows indicate attenuation in excess of measurement capability of equipment.



be required, the minimum attenuation in the stop band be 20 db., and that maximum passband ripple be 0.5 db. The most suitable compromise appeared to be a design which required two 0.1-μf. capacitors, one 0.235-μf. capacitor and one 3.11-henry toroid for source and load impedances of 4260 ohms. See Table II for filter parameters and schematic. With these component values, the cutoff frequency was 294 c.p.s. and the resonant frequency of the series-tuned circuit was 186 c.p.s. The cutoff frequency and impedance level were deliberately juggled to make C_1 and C_3 come out to a nice even 0.10 μf. The 3.11-henry toroid uses a core of permalloy and has a Q of 50 at 1 kc., or approximately 15 at the f_{co} of 294 c.p.s. The filter was assembled, evaluated and found to perform satisfactorily in every respect. The next step was to cascade the low-pass and high-pass filters to form the desired bandpass filter.

Cascading the Low-Pass and High-Pass Filters

A 13-db. pad was installed between the high- and low-pass filters to provide impedance matching and also some degree of isolation. The cascaded filters and pad were then evaluated for relative attenuation *vs.* frequency, using the test circuit shown in Fig. 3. The response curve is also presented in Fig. 3. The high-pass filter was purposely placed after the low-pass filter so as to attenuate any 60-cycle hum that might be picked up by the low-pass filter. The output of the high-pass filter is terminated in its specified load impedance of 4300 ohms. Since the filter is designed to work into the input resistor of a microphone preamplifier, which is generally in excess of 1 megohm, the filter load termination of 4300 ohms will be relatively unaffected by connection to the speech preamplifier. In fact, if a volume control is desired a 5000-ohm potentiometer shunted by 30,000 ohms could be used as the high-pass filter load with the potentiometer arm wired to the output connector.

Transistor Amplifier Design

To overcome the losses in the resistive filter matching pad and input matching transformer, an amplifier voltage gain of approximately 40 db. was required. Also, a low-impedance source was required to drive the filter input for best results. The required gain was obtained from a common-emitter transistor stage with a voltage gain of between 100 and 150. Using the input transformer specified in Fig. 4, an input impedance of about 300,000 ohms is anticipated, which should be sufficient to assure a flat response down to 300 c.p.s. even if a crystal microphone is used. The low-impedance signal source for the filter is provided by a common-collector stage which is direct-coupled from the common-emitter amplifier stage, thus eliminating the necessity for a coupling capacitor and bias resistors. The output impedance of the common-collector stage is approximately 40 ohms. Placing a 1600-ohm 5 per cent resistor between the emitter follower and low-pass filter very nicely solves the matching problem.

The transistors, manufactured by General Electric and available from Allied Radio Corp. for about 80 cents each, are n-p-n silicon planar passivated types specifically designed for low-level audio applications. The input transistor, a 2N3391A, has a controlled noise figure and high beta and so is very well suited to its application in this design. The 2N3392 is similar but has a lower beta and no specification regarding noise figure.

Several combinations of parallel resistors were installed for R_1 until a Q_1 emitter current of 1.3 ma. was obtained. In this particular case, the

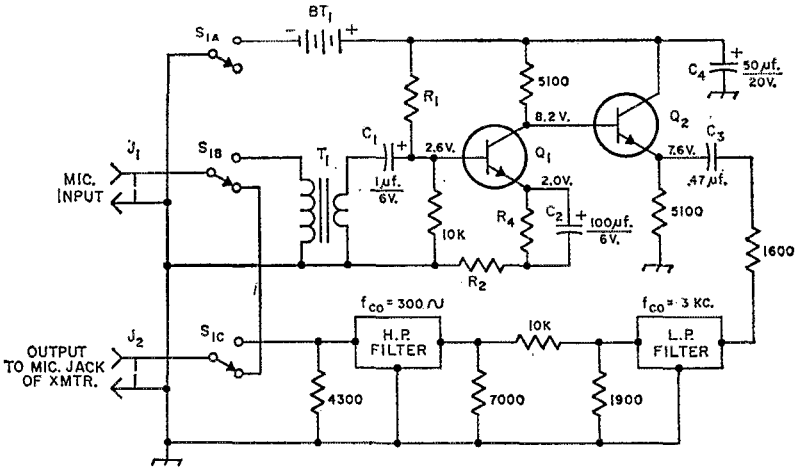


Fig. 4—Circuit diagram of the bandpass speech filter. Resistances are in ohms, K = 1000; resistors are ½-watt, 5 per cent tolerance.

BT_1—15-volt battery (Burgess K10).
C_1, C_2, C_4—Electrolytic.
C_3—Paper, 200 volts.
J_1, J_2—Microphone connector (Amphenol 75-PC1M
Q_1—2N3391A.
Q_2—2N3392.
R_1—See text.
R_2—15 ohms, 10 per cent (adjust for unity gain,.
R_4—1500 ohms, ½-watt (see text).
S_1—3-p.d.t. slide switch (Lafayette 99R6166).
T_1—Input transformer, 200K/1500 ohms, c.t. (Argonne AR-144).

required resistance for R_1 was 44,000 ohms. Switch S_1, which simultaneously bypasses the entire circuit and also switches out the battery, was provided as a convenient means to permit comparison of the modulated transmitter output with and without the bandpass speech filter. With an operating duty cycle of 2 hours per day, the useful life of the 15-volt battery may be expected to be in excess of one month. If it is desired to omit the resistive pad and the high-pass filter, simply terminate the low-pass filter with a 1600-ohm resistor, change R_4 to 1300 ohms, and if R_2 is made 220 ohms unity gain should be approximated.

Components

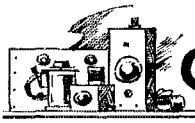
The desired filter performance will be assured if reactors with a ±2 per cent tolerance, resistive terminations with a ±5 per cent tolerance, and inductors with as high a Q as practical are used. There will be relatively little difficulty and expense in obtaining the 88- and 60-mh. inductors. However, obtaining the 2 per cent capacitors will require some extra effort. Also, the 3.1-henry toroid may prove to be more expensive than anticipated. This toroid is available from the Allen Organ Co. (3.11 henry, ±2 per cent, $Q = 50$ at 1 kc.) at a cost of $1.43 each with a minimum billing charge of $20. An alternate source is Newark Electronics Corp. (Stock No. 39F2806, Collins toroid type MP-930-37B, 3.0 henry, ±1 per cent, $Q = 58$ at 1.5 kc.) at a cost of $7.23. The author employed the following procedure: Mylar capacitor and Allen toroid data sheets were requested from the Components Division of Allen Organ Co., Macungie, Pa., and $20 worth of mylar capacitors and permalloy toroids was selected and ordered. The capacitor cost ranged from 13 cents for 0.007 µf. to 17 cents for 0.10 µf., and about fifty capacitors of mixed values were obtained for $8. The remainder of the $20 was invested in toroids, one of which was the 3.11-henry value. An impedance bridge was borrowed and all the capacitors were measured to an accuracy of 2 per cent or better and the values marked on the capacitor cases. Appropriate values were then selected and paralleled to produce the desired filter capacitance values.

Performance of the Completed Unit

When first tested, the gain of the bandpass speech filter was found to be greater than unity by 4.5 db. R_2 was added to the circuit and adjusted until the desired unity gain was achieved. The 3.1-henry toroid in the high-pass filter was found to be sensitive to hum pickup, and therefore the filter should not be placed in the immediate vicinity of power transformers. The overall frequency response of the entire unit was found to be essentially the same as that of Fig. 3 except that the attenuation was greater than indicated by the response curve at frequencies below 100 c.p.s., because of the roll-off effects of C_3 and possibly T_1. An operational check of the filter on the air was satisfactory in every respect.

Acknowledgments

The author wishes to thank John Brennan, Jr. for providing the photographs, Tom Miller, W7QWH/3, for performing the operational checkout, and Millicent Schaffer for typing the manuscript. QST



Gimmicks and Gadgets

A READOUT A.C.-Line Voltmeter

Monitor Your Line Voltage At A Glance

THE inexpensive gadget shown in the photographs can be built in a few hours and will relieve your regular workbench voltmeter for other jobs. Simply plug it in the a.c. line and observe the neon-lamp indicators on the panel. If the 105-volt and 110-volt lamps are lit while the 115-, 120-, and 125-volt lamps are not, then the line voltage is 112 volts, plus or minus 2 volts. Of course, the device can be designed for finer or coarser voltage resolution.

Construction

Built in a 4 × 2 × 1⅝-inch Minibox (Bud CU-2102A), the readout voltmeter consists of neon lamps and resistors. Almost any neon lamp can be used; the ones shown in the photographs were found in a "bargain barrel" at a local radio and TV parts supplier. The lamps are part of a complete molded neon-indicator assembly which snaps into the panel holes.

The voltage-dividing resistors are all ½ watt and are mounted on two lug-type terminal strips (H.H. Smith type 870). Fig. 3 shows the general construction and layout of the unit.

Because of variations in the neon lamps and because of resistor tolerances, resistor values must be arrived at empirically, although simple Ohm's Law calculations will get the values in the ball park. Since the neon lamps will fire somewhere around 65 volts or so, the lamps are connected across resistors that will have a drop of 65 volts when the line voltage reaches the desired value. In the case of a 1/25-watt lamp (such as the NE-51), a line voltage of 130, and a total resistance across the line of 30,000 ohms, the lamp will fire when connected across 15,000 ohms.

Because of capacitance and unbalances in the a.c. line, it is necessary to maintain electrical and mechanical symmetry in the resistor network. This is the reason, as shown in Fig. 1, for splitting the resistance into equal segments on either side of the lamp and its parallel resistor. For example, in Fig. 1, I_4 (120-volt indication) is across 15,000 ohms, R_4. R_{14} and R_9 should add up to 12,800 ohms, or 6400 ohms each.

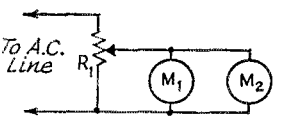


Fig. 2—Circuit for calibrating the readout meter.
R_1—50,000 ohm potentiometer (see text).
M_1—Readout a.c. voltmeter.
M_2—Calibrating meter (v.o.m., v.t.v.m., etc.).

For an NE-51 and a shunt resistor of 15,000 ohms, the total calculated dropping resistance ($R_6 + R_{11}$, etc.) for various line voltages is: 105 volts — 9300 ohms, 110 volts — 10,500 ohms, 115 volts — 11,600 ohms, 120 volts — 12,800 ohms, 125 volts — 14,000 ohms, and 130 volts — 15,000 ohms.

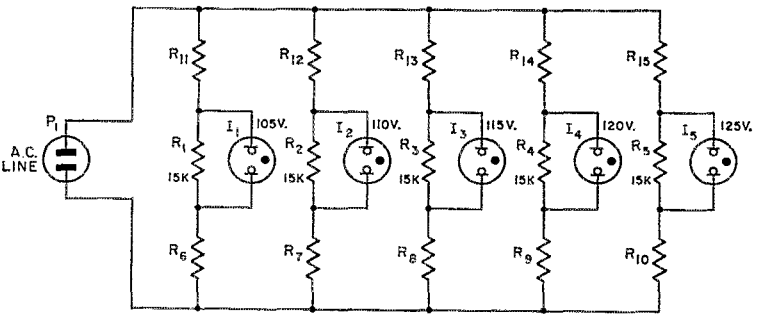
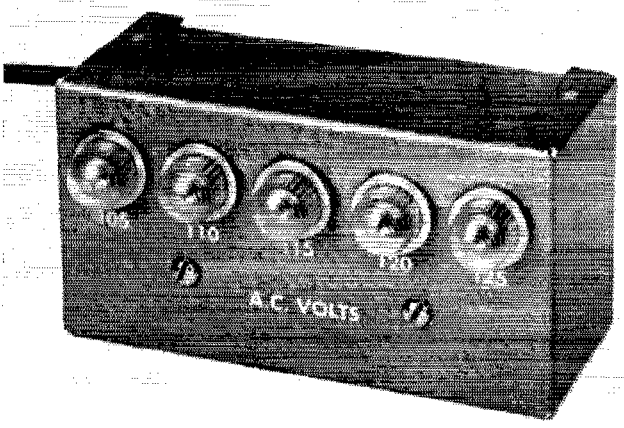


Fig. 1—Diagram of the readout voltmeter.

I_1–I_5 inc.—Neon lamps (NE-51, etc.).
R_1–R_5 inc.—15,000 ohm ½-watt resistors.
R_6–R_{15} inc.—Values depend on neon lamps used. See text.



The readout a.c.-line voltmeter.

Calibration

Calibrating the readout voltmeter can be done with a Variac and the shack voltmeter. Place the calibrating voltmeter and the readout voltmeter across the line from the Variac. As the Variac is advanced, note and record the voltage at which the various neon lamps fire. If a specific voltage indication is desired, it will require some filing of "V" notches in the resistors to change their values to give the required resistance. This filing technique works only with composition resistors and always *increases* the resistance.

If a Variac isn't handy for the calibration procedure, a potentiometer of 50,000 ohms or so will do just as well. Connect the pot as shown in Fig. 2 and carry out the calibration as described above. *Caution — high voltage:* use an insulated knob on the control and be careful of your "grounds."

Variations

The readout a.c.-voltmeter need not be constructed exactly as shown in this article. A single indicator model could be used to set the line voltage to some specific value. For instance, if your bench signal generator is calibrated for an input voltage of 115 volts and you can adjust the line voltage to the bench, construct a single-lamp readout meter adjusted to fire at 115 volts. Bring up the line voltage until the lamp just fires. The same device could be used for setting the voltage on the emergency power plant or field-day generator.

Another variation: A maximum and minimum voltage model using two indicators. If equipment is designed for operating between 110 and 120 volts, the two-readout voltmeter indicators are adjusted to fire at these voltages. Ideal operation of the equipment would be when the 110-volt lamp has fired and the 120-volt lamp has not.

Whatever the application, the readout a.c.-volt-meter is fun to build and should satisfy one's itch to just "build something." — *W1CUT*

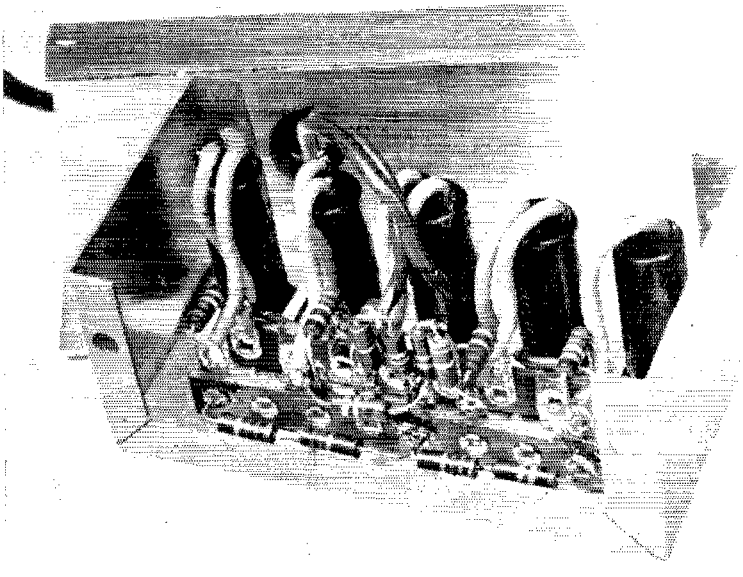


Fig. 3—View inside the Minibox shows the terminal-strip mounting of the resistors. The neon-lamp indicator assembly is a one-piece molding.

180-WATT D.S.B. TRANSMITTER

A V.F.O.-Controlled Compactron Rig for 80 through 10

BY J. W. RUSH,* W4EWL

THE writer received his ticket after s.s.b. became popular among ham-radio operators. There was a strong desire to build a transmitter but after reviewing the recommended techniques for sideband generation, and becoming aware of the complexities that were common to the s.s.b. mode, the author's enthusiasm became somewhat subdued. It was decided that a compromise was in order and that a double-sideband transmitter would be built. The choice was made because no expensive i.f. filters would be required, and if high-level modulation were used there would be no need for using linear amplifiers in the basic unit. The acceptance of these compromises, and a lot of trial and error, yielded the transmitter that is described in this article.

The transmitter is v.f.o. controlled, operates from 80 through 10 meters and is capable of producing a 280-watt p.e.p. signal on d.s.b.

V.F.O. and R.F. Circuits

To reduce v.f.o. drift, the frequency-sensitive components are mounted on, and thermally coupled to, a piece of aluminum plate which measures 4 × 5 inches and is ⅛ inch thick (Fig. 5). The plate is warmed by a heating element which is comprised of four 1-watt 3300-ohm resistors and an 8-watt 115-volt incandescent lamp. By applying 115 volts to the resistors and the bulb through a thermal switch, the v.f.o. plate is heated and in turn heats the grid-circuit components of the v.f.o., establishing a reasonably constant operating temperature. The thermal switch is a bimetallic device which was taken from a portable electric heater and no attempt will be made to describe it in detail. The builder may choose to use the heating unit without benefit of a thermal switch, or if such a switch is desired, he may remove one from any one of a variety of heat-controlled appliances and modify the layout of the v.f.o. plate to accommodate it.

The four 3300-ohm resistors are inserted into a brass block; their pigtails protrude from the block, making connection to the pigtails an easy matter during the wiring process. The 8-watt lamp is mounted under the v.f.o. plate

The home builder who shies away from the complexities of a complete s.s.b. transmitter may find this d.s.b. rig to be the simple stepping-stone he needs to get started on "sideband." W4EWL offers some novel circuit ideas for v.f.o. stabilization, and for tube-complement reduction through the use of Compactrons.

*2123 Fieldcrest Drive, Owensboro, Kentucky.

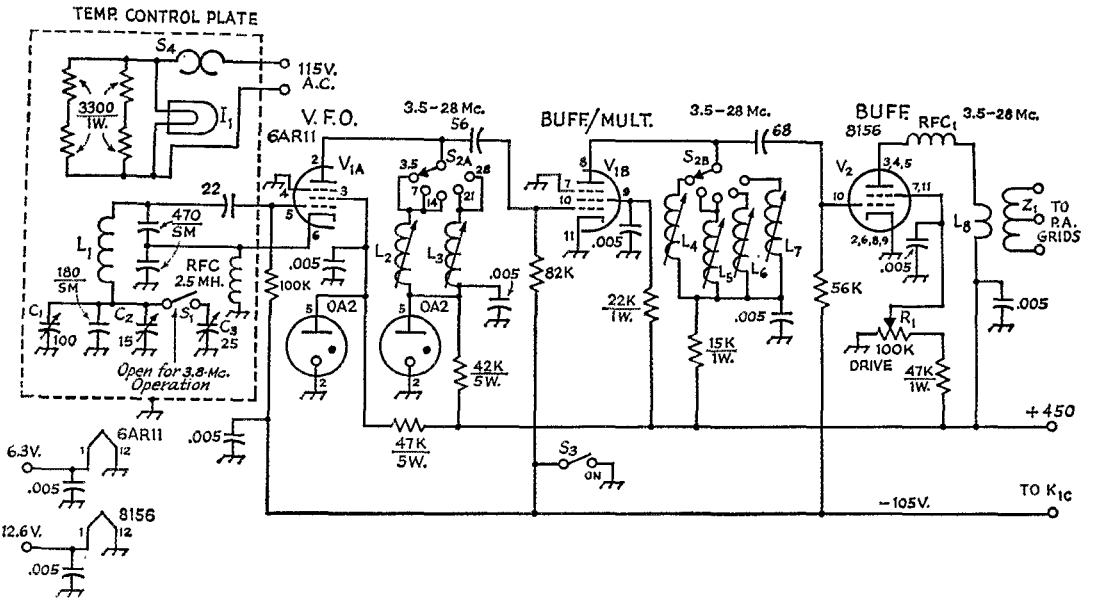


Fig. 1—Schematic diagram of the exciter section of the transmitter. Fixed capacitors are disk ceramic, except SM = silver mica. Resistors are ½-watt composition unless otherwise noted.

C1—100-pf. variable (E. F. Johnson 149-5).
C2—15-pf. variable (E. F. Johnson 148-1).
C3—25-pf. variable (E. F. Johnson 148-2).
I1—7-watt 115-volt lamp.
L1—20 turns No. 24 enam., close-wound on 1-in. dia. ceramic form.
L2—110- to 200-μh. adjustable coil (J. W. Miller 4512).
L3—16 turns No. 30 enam., close-wound on ⅜-inch dia. slug-tuned ceramic form (J. W. Miller 4400 form).
L4—Same as L2.
L5—55 turns No. 30 enam., close-wound on same type form used for L3.
L6—20 turns No. 30 enam., close-wound on same type form used for L3.
L7—13 turns No. 30 enam., close-wound on same type form used for L3.
L8—6 turns No. 16 enam., self-supporting over center of Z1. (See text and Fig. 2.)
R1—0.1-megohm 2-watt wire-wound linear control.
RFC1—0.84-μh. choke (Ohmite Z-235).
S1—S.p.s.t. slide switch (mounted on v.f.o. enclosure).
S2—2-pole 5-pos. single-wafer ceramic switch.
S3—S.p.s.t. (normally open) microswitch. (Switchcraft 951 pushbutton switch usable as substitute.)
S4—Thermal switch. (See text.)
Z1—See text and Fig. 2.

(Fig. 6) and requires no further discussion.

The frequency stability was further improved by supplying regulated voltage to both the plate and screen elements of the v.f.o. tube (6AR11), by the use of small-value coupling capacitors, and by rigid mounting of all v.f.o. components. Capacitor C_3 (Fig. 1) is switched out of the circuit during operation on 75 meters.

The remaining r.f. circuitry is of conventional design. Coil data for the v.f.o. and buffer stages are given in the parts list of Fig. 1. Band switches S_2, S_8, and S_9 are ganged together by means of brass drums which are driven by brass straps (See Fig. 6). The straps are anchored to the brass drums with 4-40 screws to prevent slippage.

Suppressed-carrier operation (Fig. 2) is effected by applying the r.f. signal to the grids of the 7984 balanced modulator tubes (in push pull), applying audio to the 7984 screen grids in push-pull, and parallel-connecting the plates of the balanced modulator stage. A pi-network tank circuit is used at the output of the transmitter for matching into low-impedance loads.

Audio Circuit

Three stages of speech amplification are used between the microphone and the 6JZ8 driver stage (Fig. 3). A triple-triode 6D10 compactron is used in the speech amplifier, making the layout of that section of the modulator a bit more compact. More than enough audio gain is available with this lineup. The amplified audio is fed into the grids of the 6JZ8 driver stage by means of an interstage transformer, T_5. The pentode sections of the 6JZ8s serve as the modulator tubes and are operated as Class B triodes by connecting their screens to their control grids through two 22K-ohm resistors. The modulation transformer is a Stancor A-4752. Although it was not designed to be used as a modulation transformer, but as a Class B driver transformer instead, it provides a suitable impedance ratio for use in this circuit.

An audio feedback control, R_3, is included in the modulator circuit and should be adjusted for best waveform linearity at high audio levels. The feedback path is between the secondary winding of the modulation transformer and the cathode of the third speech amplifier, V_{3c}.

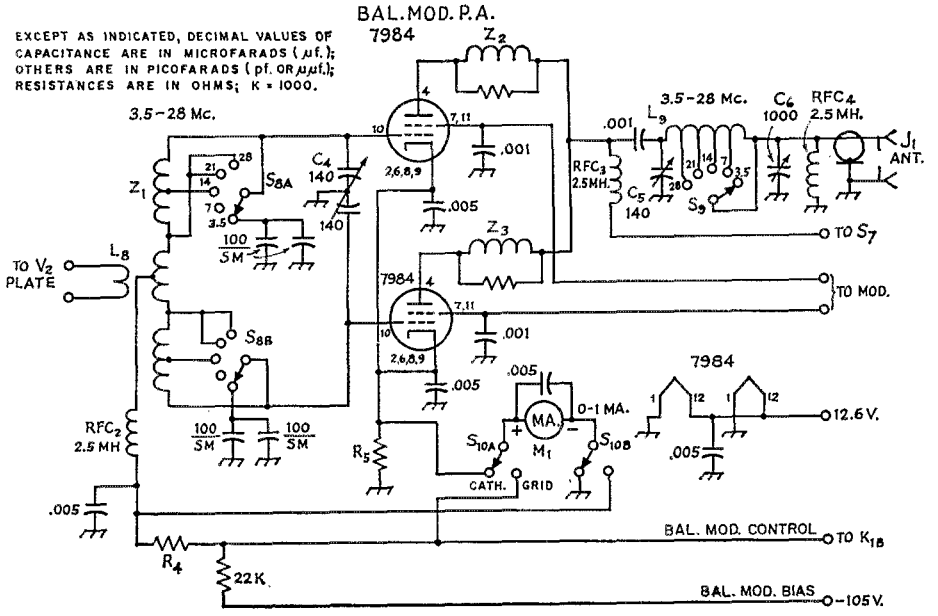


Fig. 2—Circuit diagram of the balanced modulator output section of the d.s.b. transmitter. Capacitors are disk ceramic except those marked SM, which are silver mica. Resistors are ½-watt composition unless otherwise noted.

C4—Dual 140-pf. variable (part of Z1).
C5—140-pf. variable (E. F. Johnson 149-6).
C6—3-section broadcast variable, all sections in parallel.
J1—Coax receptable (Type SO-239).
L8—See text and Fig. 1.
L9—Illumitronics 1608D6 (See text).
M1—0-1-ma. meter.
R4, R5—See text.
RFC2, RFC4—2.5-mh. 125 ma. (National R-50).
RFC3—2.5-mh. 375 ma. (National R-300).
S8—Part of Z1.
S9—Single-pole, 5-pos. single-wafer ceramic rotary switch.
S10—D.p.d.t. toggle switch.
Z1—Harrington GP-50 assembly (see text).
Z2, Z3—Parasitic choke (6 turns No. 20 enam. wound on, and connected across a 51-ohm 1-watt resistor).

Balanced-Modulator Output Stage

So that compactron tubes could be used throughout the r.f. section of the transmitter, two 7984s were selected for use in the balanced-modulator output stage. The electrical characteristics of the 7984 are similar to those of the 6146 tube.

The grid circuit of the balanced modulator contains a Harrington bandswitching turret assembly (GP-50) [1] to which has been added a 6-turn air-wound primary winding. The original primary winding was removed and the new one was mounted in its place as shown in Fig. 6. The new winding, L_8, serves as the plate inductor for the buffer stage, V_2. No difficulty was experienced in securing adequate carrier suppression when using this assembly. About two or three

[1] Harrington Electronics, Box 89, Topsfield, Mass.

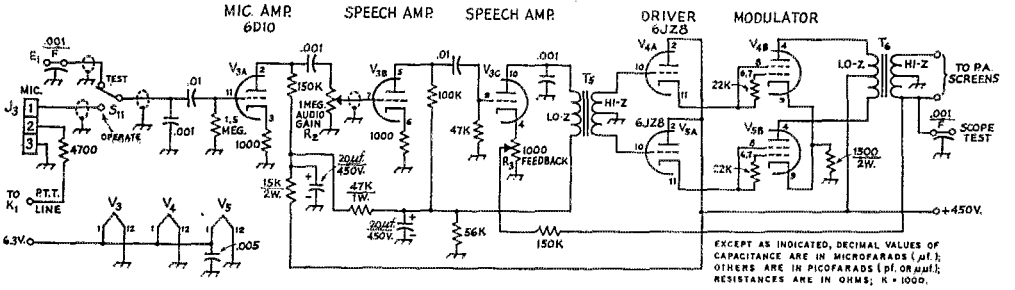


Fig. 3—Schematic diagram of the modulator portion of the d.s.b. transmitter. Capacitors are disk ceramic except those bearing polarity markings, which are electrolytic. F = feedthrough type. Resistors are ½ watt composition unless otherwise noted.

E1—Feedthrough capacitor used as terminal.
J3—3-terminal microphone connector.
R2—1 megohm control, audio taper.
R3—1000-ohm carbon control, linear taper.
S11—S.p.d.t. toggle switch.
T5—Interstage transformer 3:1 sec./pri. (Stancor A-53-C).
T6—2:1 driver transformer (Stancor A-4752).

per cent of the peak sideband level was noted as carrier level when observing the output of the transmitter on a Heath HO-10 monitor scope. An adjustable drive control, R_1, is contained in the screen-grid circuit of the buffer stage to enable the operator to set the grid current of the balanced modulator at 6 ma.

The plate tank of the output stage contains a pi-network circuit and uses an Illumitronics Vari-Pitch inductor (1608D6). The 10-meter tap is positioned 1¼ turns from the high-Z end of the coil. The 15-meter tap is located 2¼ turns from the high-Z end and the 20-meter tap is 5¼ turns from the same end of the coil. The 40-meter tap is placed 9 turns away from the 20-meter tap (toward the low-Z end of the inductor). The entire coil is used during 75-meter operation.

Power Supply

The power supply (Fig. 4) delivers 900 volts d.c. (450 volts d.c. for tuneup or low-power operation) at 200 ma., −105 volts d.c. (regulated), 6.3 volts a.c., and 12.6 volts a.c. The voltage from the secondary winding of the Stancor P-8040 plate transformer is rectified by four 6AX3 TV damper tubes, bridge-connected. A choke-input filter section is used in the 900-volt line and contains a swinging choke, a smooth-

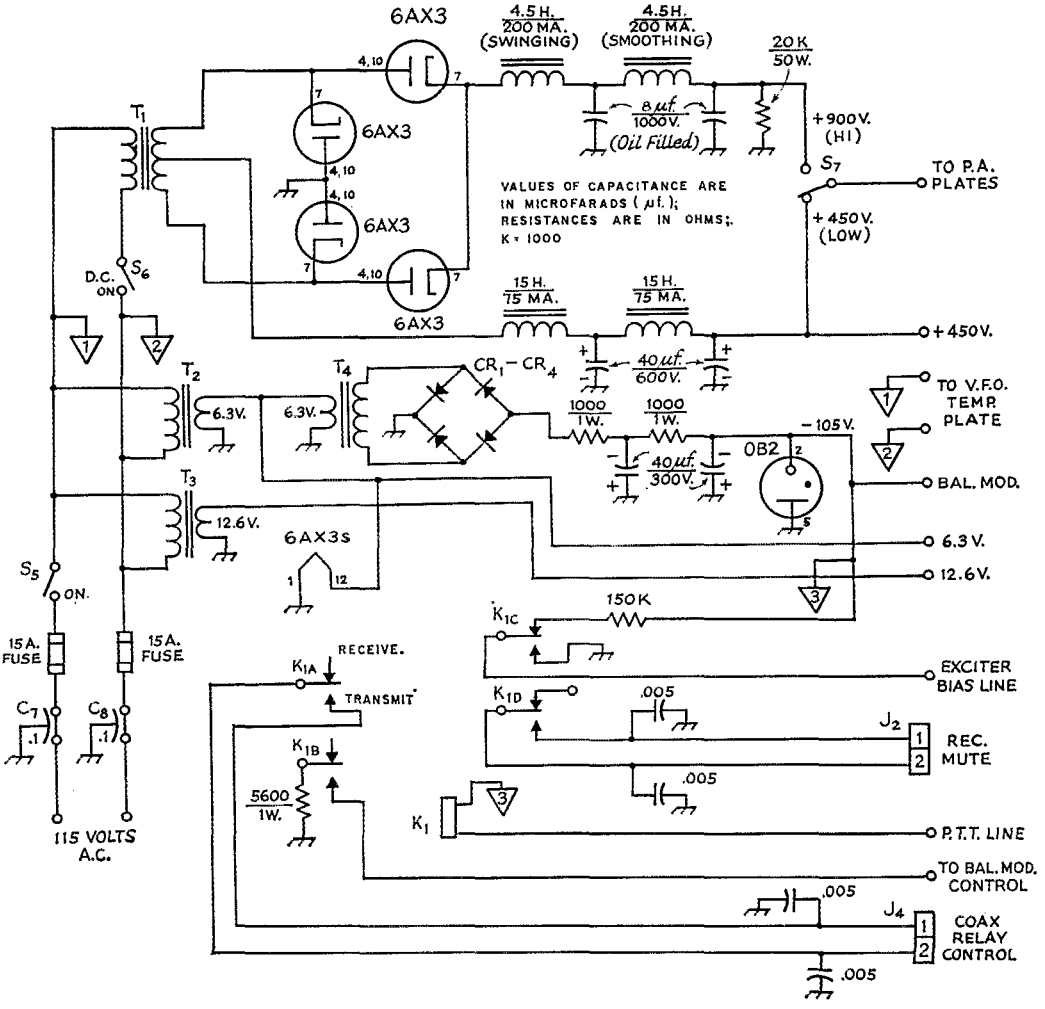


Fig. 4—Diagram of the power supply and control circuit. Capacitors are disk ceramic except those bearing polarity marking which are electrolytic. Oil filled capacitors are so indicated. Resistors are ½-watt composition unless otherwise noted.

C_7, C_8—0.1-μf. 600-volt feed-through capacitor (Sprague 80P3).
CR_1–CR_4 inc.—400 p.i.v. 200 ma. silicon diodes.
J_2, J_4—2-terminal male chassis connector.
K_1—4-pole double-throw 110-volt d.c. relay. (Potter and Brumfield KHP17D11.)
S_5, S_6—S.p.s.t. toggle switch.
S_7—S.p.d.t. ceramic switch. (Toggle switch shown in panel view not recommended for use in this circuit.)
T_1—Plate transformer 500-0-500 volts at 300 ma. (Stancor P-8040.)
T_2—Fil. transformer. 6.3 volts at 10 A.
T_3—Fil. transformer. 12.6 volts at 3 A.
T_4—Fil. transformer. 6.3 volts at 1.5 A.

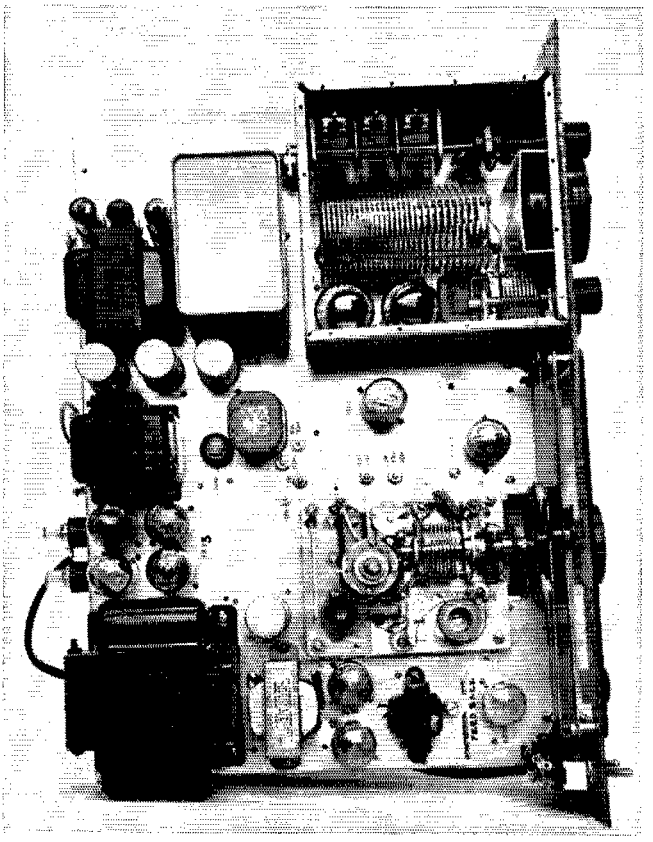


Fig. 5—Top-chassis view of the d.s.b. transmitter. Modulator section is at lower right, p.a. compartment at upper right and v.f.o. assembly at bottom right, above modulator section. The power supply is assembled along the rear edge of the unit.

ing choke and two 8-μf. 1000-volt oil-filled capacitors. The 450-volt bus is taken from the center tap of the plate transformer and filtered with a choke-input network. A switch, S_7, makes possible the selection of either of the two B-plus voltages.[2]

The bias transformer, T_4, is a 6.3-volt 1.5-ampere unit and is connected back-to-back to the 6.3-volt filament line. A silicon-diode bridge rectifier is used across the 115-volt winding of T_4 to secure the -105 volts of bias which is regulated by a VR-105 tube (0B2). Separate transformers (T_2 and T_3) provide the necessary filament voltage for the transmitter.

Control Circuit

A 4-pole double-throw relay, K_1, is used for changing over from transmit to standby. During the standby period, the v.f.o. and balanced-modulator stages are biased off. For "zero beating", a microswitch (S_3, Fig. 1) (S_3) is mounted on the front panel of the transmitter to permit shorting out the bias line to the v.f.o. and buffer-multiplier stages. By using a microswitch, there is no chance for the v.f.o. to be left on inadvertently during the receive period. The microswitch has a momentary action.

When the transmitter is activated by K_1, one set of relay contacts mutes the receiver by shorting out the voice coil of the speaker. An additional set of relay contacts is available for activating an antenna change-over relay. Control voltage is supplied to the relay through the push-to-talk switch on the microphone. The field-coil voltage for K_1 is taken from the -105-volt line.

Construction Details

Fig. 6 shows a certain amount of component crowding in power supply. Since d.c. voltages are dealt with, primarily, the exact placement of parts is not a vital matter. The photographs should serve as a guide to the builder when laying out the chassis.

The entire transmitter is assembled on a $10 \times 17 \times 3$-inch aluminum chassis. The panel is a 19×7-inch aluminum unit and fits into a Bud rack cabinet whose front opening matches the panel size. It was necessary to file clearance slots in the upper lip of the cabinet's front opening so that the plate transformer and oil-filled capacitor would pass through the opening when installing the assembly in the cabinet. The chrome strip on the front of the cabinet was removed during this operation and serves to conceal the slots once it is back in place. If size is not an important consideration to the constructor, an 8¾-inch panel can be used in combination with a cabinet whose front opening matches the size of the larger panel.

Since the meter used with the author's transmitter is of the "surplus" variety, the values for the shunts are not applicable to other types of

[2] A standard toggle switch of the type used by the author is not rated for the high voltage levels in this circuit. A ceramic wafer switch should be used as a substitute. *Editor.*

meters. Therefore, it will be necessary to "tailor make" R_4 and R_5 (Fig. 2) to work with whatever meter is used. A 1-ma. meter was used by the author and is shunted to read 10 ma. full scale for grid-current monitoring. A full-scale reading of 200 ma. is used to read total cathode current. Data for selecting meter shunts is given in Chapter 21 of the ARRL *Handbook*.

The v.f.o. shaft coupling between the Eddystone dial mechanism and capacitor C_1 (Fig. 5) should be of stiff design to prevent backlash. A flexible shaft coupling was tried but proved to be unsatisfactory. An aluminum cover is placed over the completed v.f.o. assembly and can be fashioned from 1/16-inch thick stock. In the author's model, the 75-meter switch, S_1, is mounted on the v.f.o. cover. As is the case with the v.f.o. assembly, a cover is placed over the balanced-modulator output stage. The top cover for the enclosure should be made from perforated stock to permit adequate ventilation.

Alignment

To obtain the desired dial calibration it will be necessary to switch the v.f.o. padder, C_3, into the circuit with S_1. Adjust C_3 to about 90 per cent of full capacitance. Next, with the v.f.o. operating, and while monitoring its 8th harmonic on a 10-meter receiver, adjust padder C_2 so that the 10-meter band calibration occupies about 80 per cent of the dial scale. After the initial calibration is completed, the dial scale can be plotted for the 40-, 20-, and 15-meter bands and will fall into position as shown in the photograph. To calibrate the dial for 75-meter operation, switch C_3 out of the circuit and establish calibration points while listening to a 75-meter receiver, or for more accurate calibration, a BC-221 frequency meter can be used in lieu of the receiver. If the desired dial calibration cannot be secured on the four higher bands, it may be necessary to juggle the settings of C_2 and C_3 until proper coverage is obtained.

The coils for the multiplier and buffer stages can be adjusted for resonance at the centers of their respective bands by checking them with a grid-dip meter. It was found that sufficient grid drive was available across each band by adjusting the coils in this manner. If the operator wishes to have a flatter response across the tuning range of the transmitter, the buffer-multiplier coils can be stagger-tuned.

No special attention was given to the balanced-modulator output stage of the transmitter in that the grid circuit can be tuned to resonance for the frequency of operation by adjusting C_4 for maximum grid current as indicated by M_1. The output tank is tuned in a conventional fashion, using C_6 as a loading control and C_5 to tune the circuit to resonance. In order to cause plate current to flow during the tuneup process, an audio tone must be applied at E_1 (Fig. 3). If a tone generator is not available, a sustained tone can be applied to the microphone by whistling into it.

The output stage should be adjusted for best waveform linearity by observing the output energy at the scope testpoint with an oscilloscope. The author uses the bow-tie pattern while setting the unit up for best linearity. Feedback control R_3 should be adjusted for best audio waveform linearity.

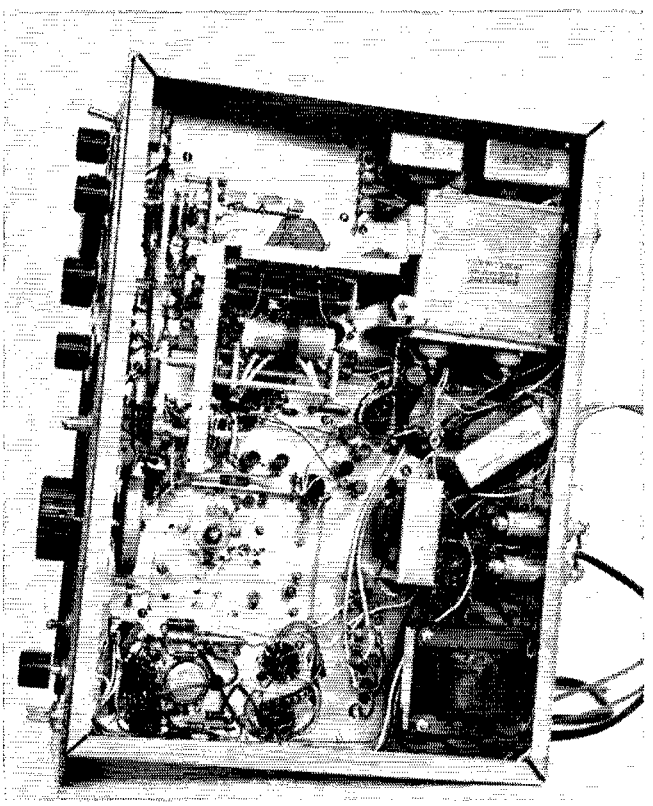


Fig. 6—Underside of the W4EWL transmitter. Audio section is at lower left. The 7-watt lamp, I_1, is above the audio section. The Harrington grid-circuit assembly (Z_1) is at the center of the chassis inside the L bracket. The exposed terminals of the Sprague feed-through capacitors (outside the chassis) should be covered with insulating material to prevent accidental contact with the 115-volt a.c. line.

Performance

The final stage produces a linear waveform when loaded to approximately 200 ma. of cathode current. The d.c. input at this level ranges between 150 and 180 watts, resulting in a p.e.p. input power as high as 280 watts. During on-the-air tests, and when compared against a s.s.b. transmitter of comparable power, the stations being worked could not discern any significant difference in the strength of the signals from the two transmitters.

There were no exacting measurements made concerning the amount of v.f.o. drift on the different bands. Whatever drift does exist is not noticeable under normal operating conditions.

Almost without exception, stations contacted with the d.s.b. transmitter were not aware that two sidebands were being transmitted. In a few instances, once the other party was informed that d.s.b. was being used, better reception was reported on one sideband than on the other, because of QRM problems. Most sideband receivers are capable of rejecting the unwanted sideband, making the reception of d.s.b. signals no different than the reception of s.s.b. signals. The audio section of this transmitter was designed to attenuate those frequenthat lie below 250 c.p.s. and above 4000 c.p.s. This method helps to reduce the problems that make it difficult for some receivers to separate the two sidebands.

Since the on-the-air reports have indicated good speech quality, signal "punch", and natural voice characteristics, no attempt has been made to include an a.l.c. circuit or speech compression.

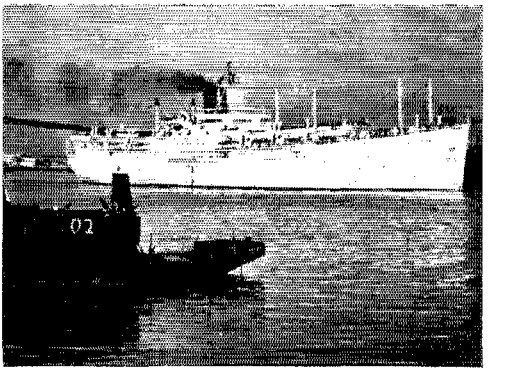
If you haven't tried suppressed-carrier operation, this transmitter may lead the way to a new adventure in ham-radio. It is a short step, indeed, from d.s.b. to s.s.b. operation. The d.s.b. technique will help you to "get your feet wet" in this interesting field. QST

Amateur Radio On The *Seven Seas*

Some of us can recall operating a college amateur radio station which, typically, was allocated space in a broom closet on the top floor of the engineering building. While the space may not be much more elegant at the University of the Seven Seas, the location of the campus is considerably more exotic. On February 10, the M.S. *Seven Seas* sailed from Los Angeles carrying students of the Seven Seas Division of Chapman College to Tahiti, first stop on their round-the-world spring semester. On board is undergraduate Mike Wolfe, K1OMD, of Boston who will provide amateur radio communications back to the main campus at Orange, California as well as to the families of the students on board.

The Itinerary of the *Seven Seas* will include, after Tahiti, such choice DX ports as Sydney, Singapore, Dar es Salaam, Suez, Beirut, Athens, Rome, and Casablanca, among others, with the close of the semester scheduled for June 17 in New York. Chapman College, which conducts curriculum leading to degrees in music, science, and the arts, introduces its students, via the Seven Seas Division, to a number of different cultures and continents during the learning process. Extensive field trips at the various ports of call are part of the sea-going student's studies.

Operating position of K1ODM/MM aboard the Seven Seas. *(Photo by Orange Photo Service).*



The M. S. Seven Seas steams out of Long Beach harbor *(Photo by Orange Photo Service).*

Amateur radio traffic for the Seven Seas will be handled primarily by the DARF (Disciples Amateur Radio Fellowship) Net with WB6ENC, of San Diego as net control. The DARF Net operates on twenty meters.

A new ship has been chartered by Chapman College for the Seven Seas Division and it will go into service at the start of the fall 1966 semester. This new vessel is larger, more modern, and has an abundance of a.c. power distributed throughout. Plans call for installing tri-band beam on top of one of the ship's masts to supplement the vertical antenna. In addition, the station will be equipped with the new Heathkit SB-line transmitter, receiver and linear amplifier. This new installation will insure a signal back into the states from anywhere in the world.

Oh, for the life of a sea-going ham student!

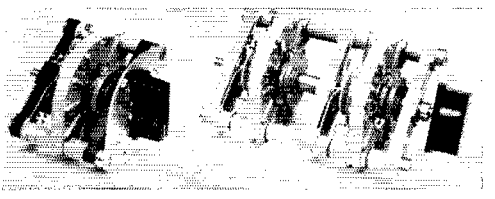
— *C. A. Robertson, K8BLL*

• New Apparatus

Millen R.F. Switches

THE James Millen Manufacturing Co., Inc. has introduced a series of r.f. switches which should solve most high-power switching problems found in an amateur station. Known as the 51000 series, these switches are rugged, well-constructed units with high voltage ratings and large current-handling capabilities. Four varieties of the 51000 series are presently available; the 51001, a single-section, one-pole, 2- to 6-position unit; the 51001D, a single-section, 2-pole, 2- to 3-position switch; the 51002, a two-section, 2-pole, 2- to 6-position unit; and the 51002D, a two section, 4-pole, 2- to 3-position switch. All models have a 20-ampere current rating. Switches 51001 and 51002 are rated at 15,000 volts d.c.; models 51001D and 51002D are rated at 10,000 volts d.c. The switches are designed to be used from d.c. to higher than 30 Mc.

Switch bodies are molded from low-loss arc-resistant plastic (Glaskyd Type 4000) and contacts are silver plated. Switching is quite positive and requires a considerable amount of torque to accomplish. Indexing is 60 degrees. The shaft protrudes far enough from the rear bearing so that another rotary switch may be ganged to the shaft extension for, as an example, switching the input and output circuits of a linear amplifier. Included with each



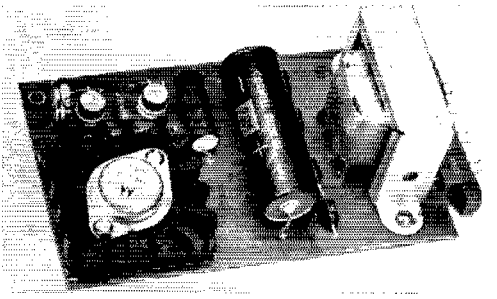
switch are an optional mounting plate, several 8-32 flathead stainless steel screws and two plastic stop buttons for selecting the number of positions. Two mounting schemes are provided. In either case, a ½-inch or larger hole must be drilled to clear the shaft bushing. For direct panel mounting, two countersunk holes 2⅞ inches apart are also required. If the mounting plate is used, it is bolted to both the body of the switch and the panel. A choice of six holes on a one-inch radius circle is available on the plate; this is useful where the position of the mounting holes is important for appearances' sake. The single-section switches measure 3⅜ inches in diameter by 2 21/32 inches deep; the two-section models are about twice as long.

Model 51001 is in the $9.00 price class, 51001D in the $10.00 range, 51002 in the $17.00 price class and 51002D in the $18.00 price range. All four models are available from the James Millen Manufacturing Company, Inc., 150 Exchange Street, Malden, Massachusetts 02148.

— *W1YDS*

Essco PS-3

THE unit shown in the photograph is a solid-state electronically regulated power supply with an adjustable output of 5 to 10 volts d.c. at 500 ma. Regulation is rated at 3 per cent and ripple should not exceed 0.05 per cent at full load. The power supply tested in the ARRL laboratory showed only



a 0.1 volt difference between the no load and full load voltages (better than 2 per cent regulation). Input for the supply should be between 105 and 130 volts a.c.

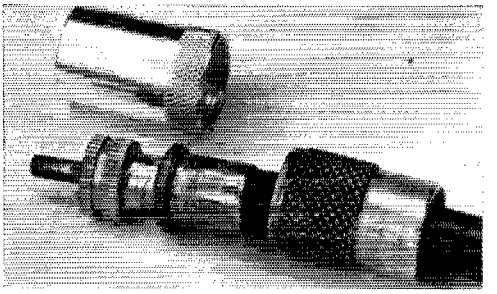
A 3 × 5-inch printed circuit board serves as a chassis and a "no-wire" connector for the various power-supply components. The desired output voltage is selected by adjusting a screwdriver slotted potentiometer at one end of this board. Not furnished with the supply is a fused line cord which must be supplied by the user.

The power supply can be purchased either as a kit or an assembled and tested unit. Both are available from Essco, 324 Arch Street, Camden, New Jersey 08102. The kit, model PS-3K, sells in the price class of $17.00 and the wired version, model PS-3, in the price class of $27.00. — *W1YDS*

Quick On-off PL-259 Adapter

THE PL-259 and SO-239 connectors are probably the most popular coaxial fittings found in today's ham shacks. But they are tedious to use when circumstances require the frequent connecting and disconnecting of mating fittings.

An adapter is now available that converts the standard PL-259 screw-on plug to a push-on connector. The coupling ring of the PL-259 is unscrewed from the plug, as shown in the photograph, and the adapter is screwed on in its place.



A modified PL-259 plug can be quickly pushed on a SO-239 receptacle; the adapter offers sufficient tension to make good contact with the receptacle but not so much as to damage the threads of the SO-239 when pushed on. When the quick-disconnect feature is no longer desired, the adapter can be readily removed and the fitting used normally.

The adapter is available for less than $1.00 from large New York City ham distributors including Arrow Electronics and Harrison Radio. — *W1YDS*

25 to 25,000 Cycles

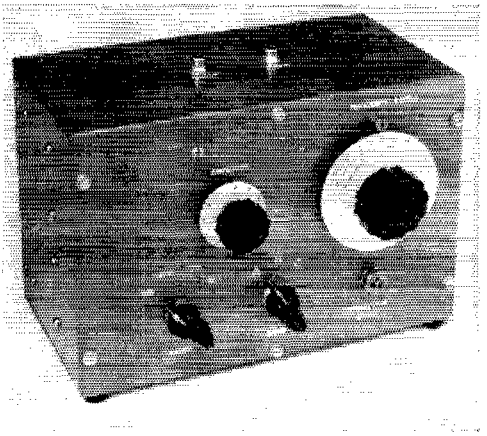
THE variable-frequency audio oscillator is a useful accessory in the ham shack for checking modulator and audio-amplifier stages. A self-contained unit is even more valuable because of its portability and freedom from line-voltage variations and power-supply ripple. Unfortunately, conventional transistors perform poorly at the low end of the audio spectrum in simple Wien-bridge and bridged-T variable-frequency audio oscillators, because their low input impedance loads down any frequency-determining element that uses reasonable component values. This makes it difficult to use capacitive tuning below a few hundred cycles, with the usual 10 to 1 frequency range.

However, this is not true of the field-effect transistor (FET) now available at a reasonble cost. The FET has the high input impedance of a vacuum tube without any corresponding filament drain, making it the ideal choice for a portable variable-frequency audio oscillator.

The generator to be described uses one FET and four conventional transistors in a bridged-T circuit. Its three bands cover respectively 25 to 250, 250 to 2500 and 2500 to 25,000 cycles. Three variable output ranges are provided (0.01, 0.1 and 1 volt r.m.s.) for resistive loads of 600 ohms or more.

The Circuit

The oscillator circuit, shown in Fig. 1, consists of a Siliconix type U112 FET voltage amplifier, Q_1, and two 2N404's, Q_2 and Q_3, in a Darlington-configuration emitter follower. Two feedback paths are provided. Lamp I_1 and capacitor C_3 form a positive feedback path between the source electrode of Q_1 (marked S) and the emitter of Q_3. The bridged-T network consisting of R_2, R_3, C_1 and C_2 completes a negative-feedback loop between the gate electrode of Q_1 (marked G) and the emitter of Q_3. Oscillations occur at the null frequency of the bridge, where degeneration is at a minimum (*i.e.*, the degenerative feedback becomes slightly less than the regenerative feedback). R_1 adjusts the degree of positive feedback for minimum waveform distortion. Lamp I_1 tends to keep the output voltage constant throughout the oscillator range by regulating the amount of positive feedback. Any increase in regeneration will cause the lamp to heat and increase in resistance, thereby reducing the higher feedback level to normal. Various lamps were tried, but a 6-watt 120-volt bulb regulated best. It holds the output voltage constant to within 1 db. over the range of 60 to 25,000 cycles.



Front view of the FET audio oscillator. The generator is completely self-contained. Battery drain is only 16 ma. The large tuning dial is a modified Johnson type 116-262.

A double emitter follower, Q_2Q_3, is used because it offers a higher impedance load to the FET than a single stage would. Depending upon the characteristics of the particular transistor used, a single emitter follower might load Q_1 enough to prevent the oscillator from starting.

Trimmer C_2 balances the capacitance of one side of the bridged-T with that of the other for proper tracking of the tuning capacitor, C_1. Switch S_1 selects the desired audio band by changing the resistive elements in the bridged-T network.

The oscillator is coupled to an amplifier stage, Q_4, through a coupling capacitor and R_4. R_4 attenuates the input signal enough to prevent overdriving Q_4. An emitter-follower isolation stage, Q_5, completes the all-transistor line up. A 10,000-ohm control, R_5, in the base lead of Q_5 varies the overall output level. Switch S_2 turns the unit on and off and selects (from a resistive attenuator network) one of three output levels (1, 0.1 or 0.01 volts).

Construction

The FET oscillator is constructed in a 5 × 6 × 9-inch utility cabinet as shown in the photographs. Output connectors J_1 and J_2 are mounted on top of the box. Three double battery holders are on the right side, rear view. A Jackson Brothers type 4511DAF 6:1 planetary drive is

* Technical Staff, *QST*.

A Variable-Frequency Audio Oscillator Using the Field-Effect Transistor

BY WALTER F. LANGE,* W1YDS

mounted on the front panel along with both potentiometers and both switches. Switched resistors are mounted directly on S_1 and S_2. C_1 is insulated from the cabinet with ceramic pillers and from the planetary drive by a Millen type 39016 insulated shaft coupling. Trimmer C_2 is fastened to the rear of C_1 with two 4-40 machine screws and hex nuts. The 6-watt lamp holder is bolted to the left side of the cabinet below the tuning capacitor. All of the remaining components are mounted on a $6\frac{3}{4} \times 4\frac{13}{16}$-inch sheet of prepunched terminal board (Vector 85G24EP) with push-in terminals (Vector T-28). Six $\frac{1}{2}$-inch 6-32 threaded spacers support the terminal board above the base of the cabinet. For neatness and ease of wiring the parts arrangement on the board more or less resembles the circuit diagram; however, any reasonable layout should work without difficulty.

Care ought to be taken while soldering the various components, as too much heat can damage a transistor or permanently change the value of a composition resistor. A heat sink should be used wherever necessary.

The tuning dial as received from the manufacturer consists of a knob, a phenolic skirt and an etched satin aluminum calibrated dial scale. Disassemble the unit and discard the skirt. Bolt a small plate of aluminum to the vernier drive assembly. Attach the dial scale to this

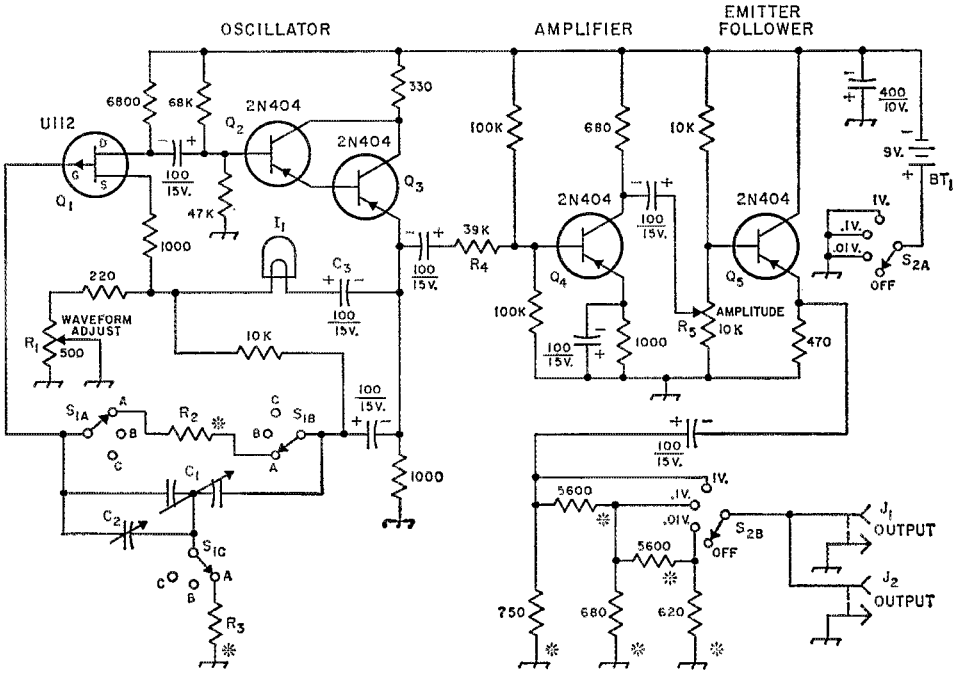


Fig. 1—Circuit diagram of the transistor audio oscillator. Unless specified otherwise, all capacitors are miniature electrolytics, all capacitances are in microfarads (μf.) Resistors marked with an asterisk are ½ watt ± 5 per cent, others are ± 10 per cent, resistances are in ohms.

BT_1—Six 1.5-volt flashlight batteries (size D) in series.

C_1—Dual variable, 365-pf. per section, compression trimmers removed (Miller 2112).

C_2—8-50-pf. ceramic-disc trimmer (Erie 557-000U2PO-34R).

I_1—6-watt 120-volt lamp (GE 6S6).

J_1, J_2—Phono jacks.

R_1—500-ohm control, linear taper (Ohmite CLU5011).

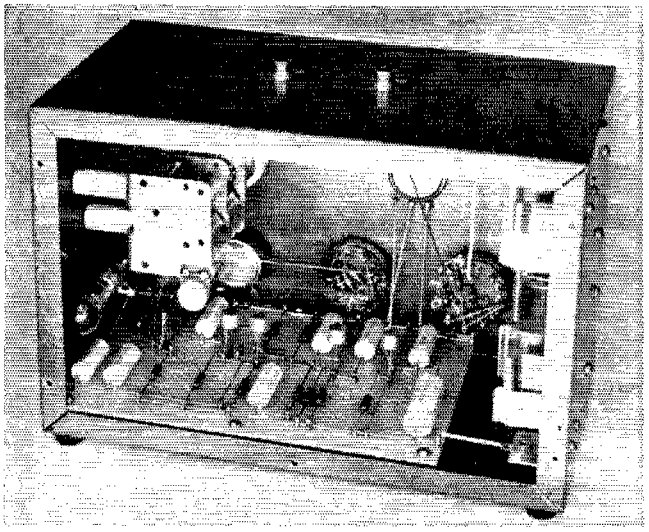
R_2, R_3—See resistor table.

R_5—10,000-ohm control, linear taper (Ohmite CU1031).

S_1—Phenolic rotary, 1 section, 4-poles (3 used) 3-positions non-shorting type (Mallory 3243J).

S_2—Phenolic rotary, 1 section, 3-poles (2 used) 4-positions shorting type (Mallory 3134J).

Field-effect transistor U112 is available from Siliconix Incorporated, 1140 West Evelyn Ave., Sunnyvale, Calif. 94086.



Interior view of the audio generator. Three 1-inch ceramic stand-offs insulate the tuning capacitor from the side of the cabinet. The amplitude control is to the right of the large variable. From left to right, along the lower half of the front panel, are the waveform-adjust control, the band switch, and the attenuator switch. Parts are arranged on the terminal board in a manner similar to the schematic diagram. Oscillator components are on the left, amplifier parts in the center and emitter-follower circuitry is at the right. The two double side-to-side battery holders nearest the front of the cabinet are Keystone type 176. A Keystone type 186 double end-to-end holder is at the rear.

plate and the knob to the tuning shaft. Later, a calibrated paper scale can be pasted on the aluminum dial.

Testing

Once the unit has been constructed and the wiring checked, install the six flashlight batteries in their holders. Connect a length of shielded cable between either J_1 or J_2 and the vertical input terminals of an oscilloscope. Set C_1 at maximum capacitance and R_5 full on (arm of R_5 at maximum resistance to ground). With the band switch in the "C" position (see resistor table), set the range switch at maximum output (1 volt). Adjust R_1 for good output waveshape at an amplitude of about 1 volt r.m.s. Tune C_1 to the high end of the band and adjust C_2 for the same output level as on the low end. Output should now be constant within 1 db. across the band, with good waveshape. It might be necessary to readjust R_1 and C_2 a few times before this is achieved. Check the other two bands for purity of waveform and constant output. Note that on the lowest-frequency band the output level drops off below 60 cycles, being 3 db. down at 30 cycles and 6 db. down at 25 cycles (0.5 volts r.m.s. output). Also note that because of the thermal delay in J_1 and the circuit time constant, it takes a few seconds for the output amplitude to settle down after a frequency change.

All transistors of any one type aren't necessarily uniform, and it may at first appear to be impossible to get a full 1 volt r.m.s. of undistorted output on any of the bands. In this case, a slight change of a bias or load resistance will put the circuit in working order. For instance, if the base-to-ground resistor of Q_4 is too small, there will be distortion on the negative half of the cycle. If Q_4's base-to-negative-supply resistor is too low in value, there will be distortion on the positive half cycle.

Any individual band of frequencies ("A," "B" or "C") might be distorted or not present at all if the correct R_2-to-R_3 ratio for that band is not maintained. If the output waveforms throughout any one range are distorted, slightly decrease R_2 or increase R_3. If the oscillator will not oscillate on any one band, slightly increase R_2 or decrease R_3. Once the correct relationships are established, R_1 should not have to be reset upon changing bands.

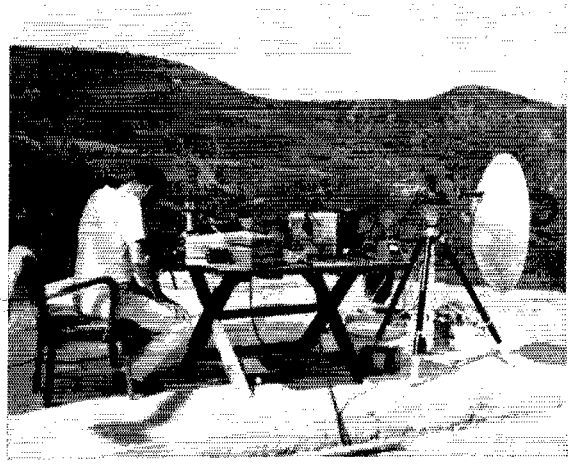
Resistor Table

Band	Range (c.p.s.)	R_2	R_3
A	25–250	40 Meg. (22 Meg. & 18 Meg. in series)	8.2 Meg.
B	250–2500	3.9 Meg.	750 K
C	2.5K–25K	390 K	68 K

Calibration

Once the unit performs satisfactorily, the audio oscillator may be calibrated using Lissajous patterns. Connect the generator to the vertical input terminals of a scope and a source of 60 cycles to the horizontal input terminals. Several calibration points between 30 and 600 cycles in both bands "A" and "B" can easily be found using this method. Calibration frequencies between 300 and 6000 cycles in bands "B" and "C" can be located using the 440- and 600-cycle tones transmitted by WWV. Just connect the audio output of a receiver tuned to WWV to the horizontal input terminals of the scope. Above 6000 cycles (and also below) hi-fi and stereo test records will prove useful. Of course if you can borrow a calibrated oscillator, calibration will be relatively simple.

Once enough calibration points have been located, make a three-band paper scale as shown in the front view. Spray the paper with clear acrylic plastic (to protect it from finger marks) and cement it to the aluminum dial scale. QST



Glenn Tomlin, WA6KKK, with his C-band setup during an attempt to break the existing DX record. This installation was atop Loma Prieta Mountain near San Jose, California. The attempt failed because line-of-sight conditions were not established between the site shown and opposite end of the circuit—Yosemite Park, 135 miles distant.

Stable Microwave Oscillators

BY WILFRED JENSBY,* WA6BQO

The author of this article discusses, in general terms, the evolution of microwave stabilizing devices and offers some interesting advice on circuits for improving the effectiveness of the amateur microwave system.

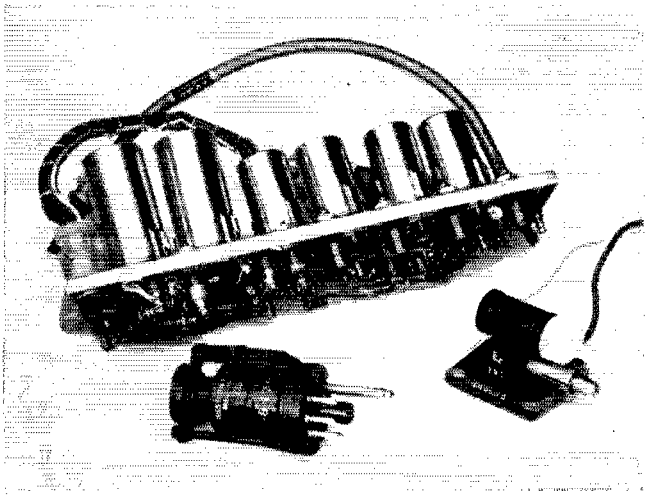
BEING interested in the microwave frequencies for a number of years, and desiring to extend one of the microwave-band distance records, I chose the 5600-Mc. band for my experiments. In 1959, using 2K26 klystrons and the polaplexer system,[1] a 3-mile contact was made between Jack Taylor, W7VCM, and myself. Since then, equipment problems and lack of time have prevented me from establishing any DX records.

In 1960 I had the opportunity to accompany Len Garrett, W7JIP, while he and W7LHL extended the X-band distance record to 265 miles. Because of transportation problems to the tops of the mountains, exotic equipment was not used. In the case of W7JIP and W7LHL, 3- and 4-foot dishes were used, 1-watt klystrons provided the signal, and receiving i.f. strips with a 1-Mc. bandwidth were used. Waveguide balanced mixers were used ahead of the i.f. strips and cavity wavemeters were used to monitor the frequency of the klystrons.

It is not an easy matter to set up a portable microwave link because considerable effort is required in aiming the parabolic antennas. Then, too, the transmitter frequency and power must be monitored, to say nothing of actually establishing the contact. It would appear, nevertheless, that a 250-mile distance record should be attainable on any of the microwave bands below X-band.

* 3878 Melody Lane, Santa Clara, California.

[1] Prechtel, "Experimental Transceivers for 5650 Mc.," *QST*, August, 1960.



The tools of a microwave enthusiast. Shown here: a typical i.f. strip, an old-style klystron at the left, and a modern klystron tube at the right. The newer unit is an Eimac 1K20XE.

Improving Present Techniques

Most microwave enthusiasts have been working with klystrons that deliver 100 milliwatts of r.f. power output.[2] Other operators have purchased 1-watt klystrons from war-surplus dealers. This power limitation suggests the need for improved techniques in the transmission and reception of microwave signals if greater coverage is desired.

A significant improvement can be realized by switching from the more common wide-band i.f. system to narrow-band receiving techniques. Many i.f. strips being used have bandwidths on the order of 1 Mc., or more. By using a communications receiver with an i.f. bandwidth of 10 kc., a gain in sensitivity of approximately 20 decibels is possible — a gain which is not easily achieved by working with transmitters or antennas. (In microwave work, the antennas are usually limited in size to dishes that are between 4 and 6 feet in diameter because of transportation problems to mountain tops.) With increased i.f. selectivity, the microwave transmitter will require a frequency stability that is common to crystal-controlled transmitters designed for low-frequency use. If the polaplexer approach is not used, the receiver's local oscillator must also be quite stable.

There are several ways to achieve signal stability at microwave frequencies. For future experiments, W7JIP plans to use a u.h.f. crystal-controlled transmitter which drives a klystron multiplier for X-band use.[3] I have tried replacing the klystron multiplier with a varactor diode multiplier at 5600 Mc., but have had limited success to date. Perhaps if I were to mount the varactor diode directly in the waveguide the efficiency of the multiplier would be improved because of the excellent bandpass filter characteristics of the waveguide.

Automatic Frequency Control

By applying automatic frequency control (a.f.c.) to a klystron oscillator, a stable microwave signal can be secured. Methods for applying a.f.c. date back to World War II with information describing typical circuits and techniques being available in the *M.I.T. Radiation Lab Series*, Vol. 11, p. 58. One method developed then was to compare the klystron frequency with that of a high-Q microwave cavity which had a high short-term stability, and used a servo loop to control frequency drift. A frequency-sensitive device or discriminator was used to obtain the error voltage. One type of microwave discriminator developed was the 'Pound' discriminator[4] which is effective but sensitive, and is difficult to adjust because of possible drift in the diodes and in the d.c. amplifier used in the system. Fig. 1 shows a simple block diagram of this scheme. The amount of stabilization obtained is dependent upon the voltage sensitivity of the klystron and the gain of the d.c. amplifier. The typical performance of a system such as this (at X-band) would be a center-frequency drift of about 10 kc. per degree C of the reference cavity because of temperature. A frequency drift as much as four times greater than this would result from d.c. drift in the a.f.c. system. To obtain better performance requires the use of expensive and bulky equipment. For this reason this system was not often used outside of microwave laboratories.

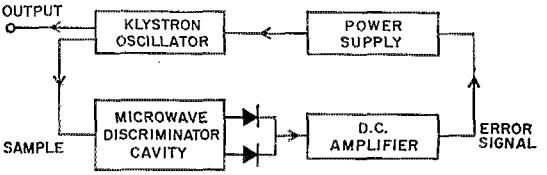


Fig. 1—Block diagram of the cavity-stabilized automatic-frequency-control system.

Crystal Stabilized A.F.C.

The system shown in Fig. 2 provides increased stability at a fixed frequency by mixing a sample of the klystron's output with the harmonic of a crystal oscillator-multiplier. This produces a low-frequency signal which might be 60, 30 or 10 Mc. The resultant signal is amplified by an i.f. strip and fed into an f.m. discriminator. The d.c. output from the discriminator is amplified and used to stabilize the oscillator frequency. The hetero-

[2] Peterson, "Practical Gear for Amateur Microwave Communication," *QST*, June, 1963.

[3] Garrett and Manly, "Crystal Control on 10,000 Megacycles," *QST*, November, 1963.

[4] Pound, "Frequency Stabilization of Microwave Oscillators," *Proc. IRE*, December, 1947.

Benjaminson, "Phase Locking Microwave Oscillators To Improve Stability and Frequency Modulation," *The Microwave Journal*, January, 1963.

Peter and Strandberg, "Phase Stabilization of Microwave Oscillators," *Proc. IRE*, July, 1955.

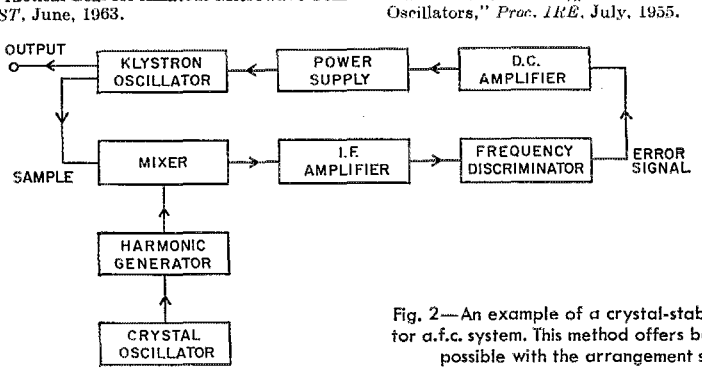


Fig. 2—An example of a crystal-stabilized i.f.-discriminator a.f.c. system. This method offers better stability than is possible with the arrangement shown in Fig. 1.

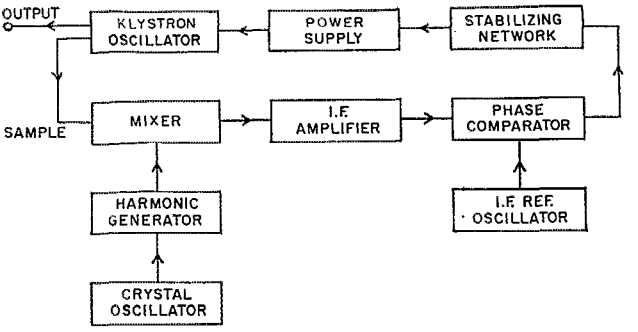


Fig. 3—A crystal-stabilized i.f. phase comparator system of the a.p.c. variety. This has become a popular system among amateur microwave groups.

dyne method is capable of higher accuracy and stability than the direct comparison method provided the crystal oscillator is well designed and is temperature controlled. Generally, crystal-controlled v.h.f. oscillators provide a short-term stability of better than 1 part in 10^8 and aging rates of less than 1 part per million per week. Commercially available crystal and oven combinations provide temperature coefficients as low as 1 part in 10^8 per degree C. The stability of the i.f. discriminator is often the limiting factor in this system. As low an i.f. frequency as possible should be used in combination with good electrical and mechanical design to minimize drift of the discriminator center frequency. An f.m. superhetrodyne receiver can be used with the added advantage, if tunable, of being able to move the klystron frequency while 'locked'. Fig. 4 contains a block diagram of a complete microwave transmitter-receiver using automatic frequency control. The system was developed by the San Bernardino Microwave Society, Inc.

Automatic Phase Control

The a.f.c. systems just described have never become too popular because they were never available as complete units, ready to connect to a klystron and power supply. Several years ago the Dymec Division of Hewlett-Packard Co. introduced an oscillator synchronizer which was designed for the purpose of phase-locking a klystron oscillator to a crystal-controlled reference signal and achieving a short-term stability of 1 part in 10^8/second. This unit eliminates all long-term drift with klystrons and minimizes the incidental f.m. caused by klystron noise, power-supply ripple, and mechanical shock. It can also be used for frequency modulation of the klystron by replacing the i.f. crystal-oscillator reference with a v.f.o.

The automatic-phase-control system (a.p.c), shown in Fig. 3, is similar to the heterodyne a.f.c. technique, shown in Fig. 2, except that the discriminator and d.c. amplifier are replaced by a phase comparator and i.f. reference oscillator. The a.p.c. system is an electronic servo system which does not permit a steady-state frequency error to be developed between the controlled oscillator and the reference frequency. This improvement results from the integration of frequency change by the phase comparator, which produces an error proportional to phase, rather than frequency difference. The comparator out-

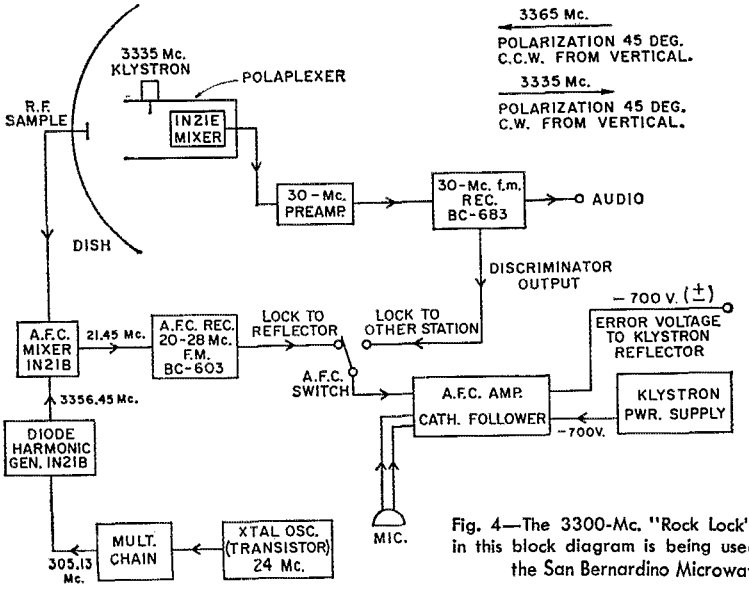


Fig. 4—The 3300-Mc. "Rock Lock" arrangement shown in this block diagram is being used at W6IFE-W6OYJ, the San Bernardino Microwave Society, Inc.

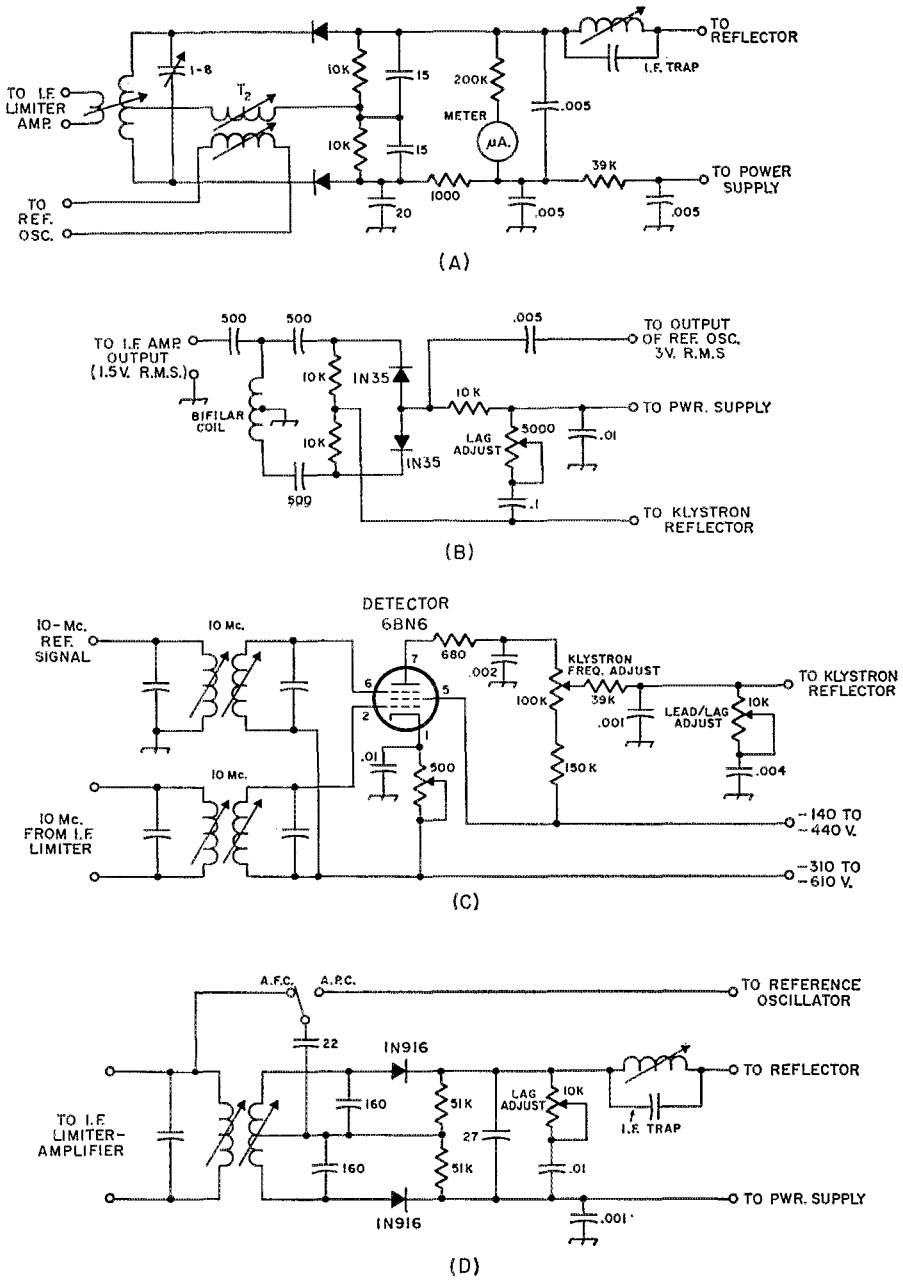


Fig. 5—Some phase detection and stabilization circuits for microwave systems. The circuit at A is a balanced-input, diode phase detector and stabilizer (*DYMEC Oscillator Synchronizer Handbook*). At B, the circuit of an unbalanced-input, diode phase detector and stabilizing network (*Microwave Journal*, Sept. 1964). At C, a gated-beam tube phase detector and stabilizer (*Electrical Design News*, March 1962). Shown at D, a switchable discriminator or phase detector circuit. In all circuits, resistors are in ohms, K = 1000. Decimal value capacitors are in μf., others are pf.

put is passed through an *RC* stabilizing network and added in series with the normal reflector supply voltage to the klystron. The stabilizing network is essentially a simple low-pass filter which stabilizes the loop gain of the phase-lock system and prevents an oscillatory condition from developing.

The phase comparator has a higher gain and larger voltage swing than the i.f. discriminator, which eliminates the need for d.c. amplification. This simplifies the circuit and also makes it easier to couple the control signal into the reflector circuit of the klystron, which may have a potential as high as −2000 v.d.c. However, klystrons used

by hams, such as the 723A/B-2K25 series, use a reflector voltage between −300 and −700 volts which is not difficult to handle. The voltage swing available from a phase comparator can reach ±20 volts, providing as wide an electronic locking range as most klystrons can handle. For a typical klystron reflector tuning sensitivity of 1 Mc. per volt, this means a locking range of ±20 Mc. Once an oscillator is captured, or locked, the klystron reflector voltage can actually vary through a range of ±20 volts without changing klystron frequency or losing phase lock.

If phase lock is lost, because the klystron shifted phase beyond the control range of the phase-comparator error voltage, the klystron jumps to the frequency to which it would normally have drifted had it not been locked. To return the klystron to a phase-lock condition it is necessary to retune it to a point within the locking range where the difference frequency at the phase comparator falls within a smaller range, known as the capture, or pull-in range. This capture range is determined by the locking range, but because the loop stabilization network controls the bandwidth of the system, the capture range is smaller than the locking range. For a locking range of ±20 Mc., the capture range is typically ±2 Mc. Most commercial equipment incorporates an automatic search oscillator which sweeps the klystron frequency near its natural frequency until it is captured by the phase-lock loop. This can be simply a 1-kc. sine wave or sawtooth signal which is added to the reflector voltage.

Circuits

Most of the parts of a microwave system are familiar to a v.h.f. amateur. Such circuits include i.f. amplifiers, discriminators, crystal oscillators and multiplier chains. The output frequency of the multiplier chain should be 200 Mc. or above, with a power output of about 1 milliwatt. This means that the design should be similar to that of a 432-Mc. converter's local oscillator. The multiplier energy drives a harmonic diode, or in some designs may drive the mixer diode directly. The r.f. power to the mixer diode from the klystron can be from 0.1 to 1 milliwatt. The output of the microwave mixer drives an i.f. amplifier which should have 50- to 70-db. gain and a bandwidth of 10 to 20 per cent of center frequency. Surplus i.f. strips should be entirely satisfactory and can be modified, if necessary, to include one or two stages of limiting. Conventional discriminator and f.m. detector circuits are used in a.f.c. circuits.

Typical phase-comparator detector circuits are shown in Fig. 5. The circuit of Fig. 5A can be used either as a discriminator or phase comparator and is found in some v.h.f. telemetry receivers. The circuit shown in Fig. 5C was used in a National Bureau of Standards X-Band receiver which had an i.f. bandwitdh of 45 c.p.s. — illustrating the capability of the system, and the stability requirements of the reference oscillators. Additional information can frequently be obtained by writing to the manufacturers of microwave equipment and requesting instruction books with schematics. These can usually be purchased at a reasonable price.

A possible future article will describe a complete C-Band microwave link with more details concerning construction. In the meantime, I hope that others will be making use of our amateur microwave bands.

Strays

I would like to get in touch with . . .

. . . amateur radio operators who are also Masons. Charles Baer, J.D., P.O. Box 104, Lincolnwood, Ill. 60645.

. . . Radio amateurs using ham-gear for cave exploration and survey. Robert V. Crowe, VK6CG, 23 Rosser Street, Cottesloe, Western Australia.

. . . Those interested in education, especially adult education, for the purpose of forming an educator's net. Marvin Sitts, W8DXV, 923 E. Kearsley St., Flint, Michigan.

. . . Radio amateurs who are teachers. I hope to organize a teachers' net. Dick Kesler, K9BTU.

. . . Amateurs who have old ham-call license plates, all states, all years. Dave Heller, W5NFJ/K3HNP, 14 Darkleaf Lane, Levittown, Pa.

. . . Clergy and religious amateur radio operators. A sixth edition of the *Clergy and Religious Radio Operators* callbook is now being prepared for publication. No cost or obligation. Over 1200 calls are now included. Fr. Rayner Small, K1QFT, Capuchin-Franciscans, St. Anthony Seminary, Hudson, New Hampshire 03051.

. . . high school amateur radio clubs interested in exchanging ideas, equipment, etc. Contact Zach Bruce, Rowan County High Amateur Radio Club, WB4BRZ, Morchead, Kentucky.

. . . college radio clubs interested in establishing a national weather net. The Kansas State A.R.C. has helped the University's sports car club to gather information on road conditions to give to the student body before each vacation, when students travel homeward. If interested, write Kansas State A.R.C., WØQQQ, Military Science Building, Manhattan, Kansas 66504

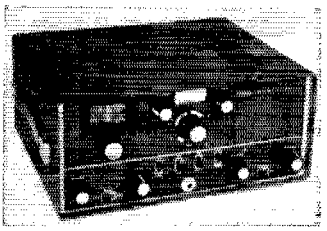
. . . those who have contacted St. Joseph's Preparatory School station, K3CLA. A major fire at the school at the end of January destroyed all of the equipment and QSL cards. Please send duplicate QSL cards to Rev. Francis R. Carmody, S.J., K3GYH, St. Joseph's Preparatory School, 18th and Thompson Streets, Philadelphia, Pa. 19121.

. . . Scouts interested in forming a North American Scout Net. Members of any one of the scouting sections such as Cub Scouts, Rover, Explorer, Girl Guides, etc. are welcome, including those from Canada, Alaska and Hawaii. If interested, write Allan Cole, VE3GBC, Box 37, Nobleton, Ont. Canada.

Recent Equipment

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

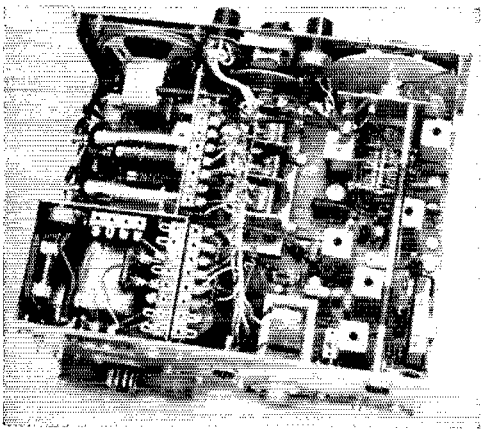
SB-34 S.S.B. Transceiver



THE SB-34 is a modernized version of the SB-33 which was described in detail in an earlier issue of *QST*.[1] Since the two models are similar, this article will cover only the significant changes which are found in the SB-34.

Like its older brother, the SB-34 transmits s.s.b. only; there is no provision for c.w. or a.m. The receiver section is designed to cover, primarily, just the phone portion of each of the bands, from 75 through 15 meters. The manufacturer's decision to dispense with full-band coverage and all-mode emission, and to offer lower p.e.p. input than is featured in many transceivers, made possible the compactness and true portability of this unit. The SB-34 appears to have been tailor-made for the phone man wanting a small self-contained station.

Measuring only 5 × 11⅛ × 9½ inches, and having a built-in power supply that operates from either 117 volts a.c. or 12 volts d.c., the transceiver is handy for portable, mobile, or fixed-station use. The rated p.e.p. output is 60 watts on 80, 40 and 20 meters and 50 watts on 15 meters. These power figures make the unit attractive not only as a self-contained station, but as a driver for a high-power linear amplifier.



Top view of the SB-34 chassis. Power-supply compartment is at the lower left. The high-level r.f. circuit (V_1, V_2, and V_3) is in the upper-left area of the chassis. The v.f.o. and i.f. section is along the right side of chassis with the v.f.o. dial and tuning capacitor at upper right.

Some of the Changes

A keying circuit which electronically switches the SB-34 from receive to transmit is shown in Fig. 2. The base of Q_{16} is connected to the cathode of V_1 through current-limiting resistor R_1. When V_1 is cut off during receiving (S_2 open) its cathode is at ground potential, causing Q_{16} to be reverse-biased and preventing current from flowing through the transistor. While cut off, the voltage at Q_{16}'s collector is +12 volts. This voltage is then available to the receiver bus, A, and is applied as bias to the bases of several of the transistors in the receiver circuit, permitting them to conduct. At the same time, the +12 volts is applied to the base of Q_{17}, causing it to conduct and saturate. With Q_{17} at saturation, its collector and transmitter bus B are at ground potential, thus removing the operating voltage from some of the transmitter stages in the SB-34.

When transmitting, S_2 is closed and the cutoff bias is removed from V_1, enabling it to operate. Its cathode potential rises to +6 volts, which biases Q_{16} into saturation. This grounds the collector of Q_{16}, removing the +12 volts from bus A, and the receiver is cut off. Simultaneously, the base of Q_{17} goes to ground potential, cutting off the collector current, and the voltage at its collector rises to +12 volts. This applies operating voltage to the portions of the transmitter circuit that were cut off during receiving.

The SB-34 power supply permits operation from either 117 volts a.c. or from a 12-volt d.c. source. Two power cords are provided with the unit, and with the plug arrangement shown in Fig. 3 the proper jumpers are connected across J_1 when either P_1 or P_2 is plugged in.

During 12-volt operation, transistors Q_{21} and Q_{22} perform as a common-emitter power oscillator supplying an a.c. voltage to the primary of T_7. A voltage tripler, using silicon diode rectifiers, boosts the secondary voltage of T_7 to 450 volts d.c. An additional secondary winding provides 70 volts (negative) for the bias circuits of V_1, V_2, and V_3.

When the transceiver is connected up for 117-volt operation, the line voltage is applied to a second primary winding of T_7. Under this condition the collector and feedback windings of T_7 are effectively in series and the voltage from

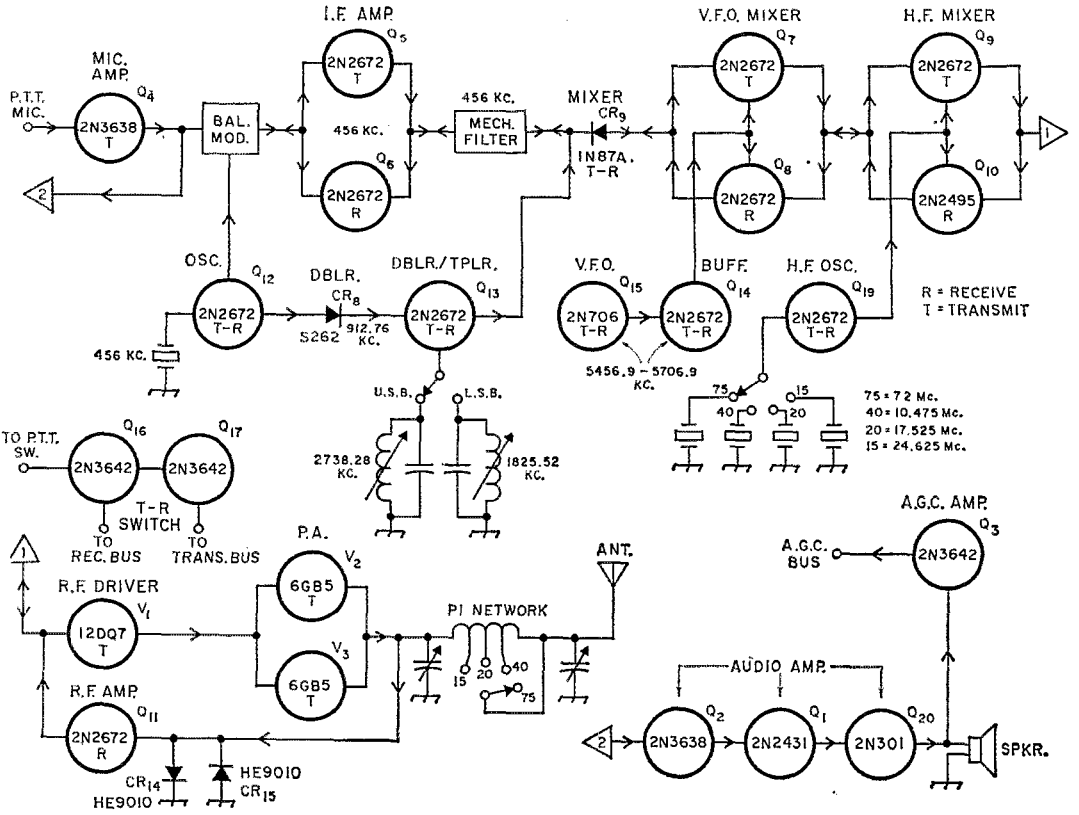
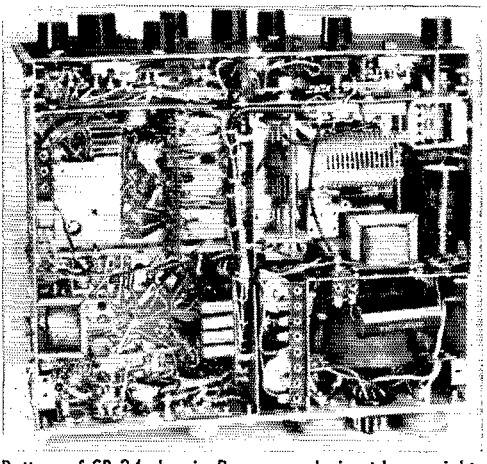


Fig. 1—Block diagram of the SB-34. Bilateral circuits are used throughout, as was done in the earlier model, the SB-33. CR_{14} and CR_{15} are used as protective diodes while transmitting, to prevent damage to Q_{11}. Transistor and tube types differ, in the main, from those used in the SB-33.

them is full-wave rectified by the collector-base diodes of Q_{21} and Q_{22} to produce a high-current +12-volt bus for the transceiver. This voltage operates the transistors and is applied to the filaments of V_1, V_2, and V_3.



Bottom of SB-34 chassis. Power supply is at lower right; amplifier tank coil and band switch are in upper-right area. The left-hand section of the chassis contains printed circuit boards for the low-level stages of the transceiver.

A panel-mounted pitch control is used in the SB-34. This control enables the operator to adjust the receiver tuning slightly to either side of the transmitting frequency without disturbing the transmitting frequency. The pitch control makes minor tuning adjustments possible while receiving, so the other fellow's voice can be made to sound best.

A number of physical revisions have been made to the newer-model transceiver. Most significant is the changeover from an all-metal chassis to a metal framework and printed-circuit boards. The circuit boards are made from high-quality glass-epoxy material and are securely mounted in the chassis.

The power supply is contained in a separate compartment and the high-level r.f. section of the transmitter (V_1, V_2, and V_3) is also separated from the rest of the unit by shield partitions.

The main tuning control uses a two-speed vernier mechanism. Rapid dial coverage is possible with the fast tuning, and by taking advantage of the slow tuning rate, "on-the-nose" adjustment is an easy matter.

Other Features

In this writer's opinion, the SB-34's cabinet color is more attractive than that of the SB-33.

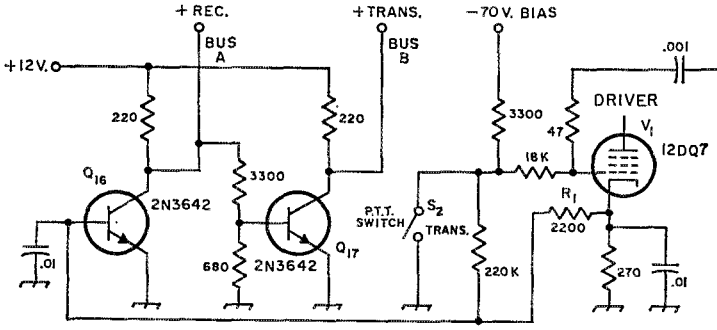


Fig. 2—Schematic diagram of the t.r. circuit. Resistances are in ohms, K = 1000. Capacitances are in μf. and capacitors are disk ceramic. S_2 is the microphone switch.

Also, the panel layout is more up-to-date in appearance, offering slightly more appeal.

The SB-34 covers four ranges: 3775 to 4025 kc., 7050 to 7300 kc., 14.1 to 14.35 Mc., and 21.20 to 21.45 Mc. Upper or lower sideband selection is made possible by a panel-mounted switch that controls that part of the circuit.

Accessory sockets on the rear of the transceiver provide the necessary connections for an external VOX unit, an outboard calibrator, and an external speaker. A jack is also available for securing a 12-volt output which can be used to operate the control relay of a linear amplifier when the SB-34 is serving as an exciter.

Accessories

A Model SB2-VOX adapter can be purchased and plugged into the rear of the SB-34. This voice-control unit has controls for gain, anti-trip, and delay. — *W1CER*

SBE SB-34 Tranceiver

Height: 5 inches
Width: 11¼ inches.
Depth: 10 inches.
Weight: 19 pounds.
Power Requirements: 117 volts a.c.; 35 watts receive, 165 watts transmit (single tone). 12 volts d.c.: 0.5 amp. standby, 3.6 amp. receive, 16 amp. transmit (single tone).
Price Class: $400.
Manufacturer: Raytheon Company, 213 East Grand Ave., South San Francisco, California.

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

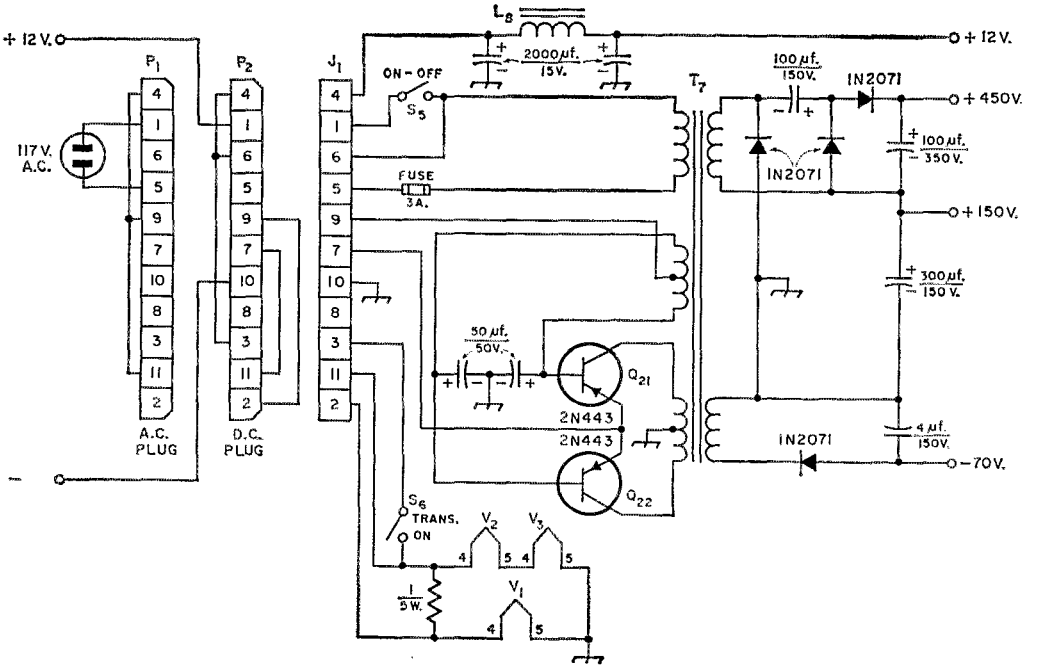


Fig. 3—Power-supply section of the SB-34. P_1 and P_2 are plugs on the ends of power cords. The jumper arrangement sets up proper connections at J_1 for 12-volt d.c. or 117-volt a.c. operation of the transceiver. Resistances are in ohms. Capacitors are electrolytic.

FEC Model 1200 F.S.K. Demodulator

THE variety of frequency shifts and transmission rates used in radioteletype today demand versatility in the circuits used for converting the f.s.k. signals into pulses that will operate a Teletype machine. The Frederick Electronics Model 1200 Demodulator offers enough options to cover practically any existing situation, and no doubt new ones that may come up in the future will be equally well handled. The secret is a series of interchangeable modules that can be plugged in as needed, an operation that takes only a couple of minutes.

The demodulator has been designed for both commercial and amateur use, so the amateur who gets one is equipping himself with professional-type gear. Semiconductors are used throughout, a fact which explains the unusual shape factor of the equipment; when mounted in a standard rack it takes up a height of only one rack unit, 1¾ inches. The panel has the standard rack width, 19 inches, and the chassis is 18 inches deep. All connections are made through the rear wall of the chassis.

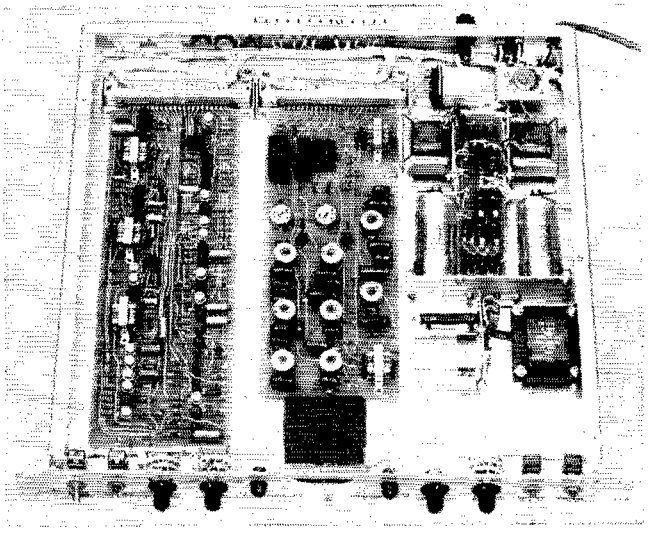
An outstanding feature of the demodulator is its use of the decision threshold computer (DTC) circuit, a tube version of which was described in *QST* some months ago.[1] Combined with optimum filters for f.s.k. reception, this offers a marked improvement over other demodulator circuits when the incoming signal suffers from selective fading. The demodulator can be used with any good-quality receiver, preferably one that has a bandpass just wider than the shift in frequency of the keyed signal being received.

Fig. 1 is a block diagram of the demodulator. The input, audio from a communications receiver, should be at about 0 db. level (1 milliwatt) for the demodulator's 500-ohm input circuit. An input-level control allows adjusting the signal to the proper level, although the receiver's audio gain control can be used for the same purpose. The audio goes through a bandpass filter which in the standard model of the demodulator is optimised for 2125-cycle mark and 2975-cycle space frequencies (850-cycle shift) and for a keying rate of 45 to 50 bauds. The receiver, of course, must be tuned so that these two tones are supplied to the demodulator with about equal amplitudes.

Following the bandpass filter is an amplifier-limiter which can be switched either in or out of the circuit as may be required. The limiter is useful for initial tuning and for helping suppress certain types of noise and fading effects, but ordinarily is not essential. The two tones, limited or not, are next separated by the mark and space channel filters, which have 200-cycle bandwidths in the standard model, and are then separately detected. The detected outputs (d.c. pulses of opposite polarity) are next combined and then passed through the post-detection filter, which reduces the overall bandwidth to the minimum necessary for optimum f.s.k. reception. The post-detection filter is a low-pass of 3-pole Butterworth design.

The DTC circuit is a d.c.-coupled device which senses the relative amplitudes of the mark and space pulses and automatically establishes the "threshold", or average point of departure for the mark and space signals, midway between the extremes of amplitude. If both signals are the same strength, this threshold is at zero voltage. If one signal fades down while the other remains at a high level, the DTC shifts the threshold toward the stronger signal so that the "plus" and "minus" pulse amplitudes are equal in the

[1] — Hoff, "The Mainline TT/LF.S.K. Demodulator," *QST*, August, 1965.



The principal circuits in the Model 1200 are mounted on two etched circuit boards, both of which plug into multiple straight-line connectors at the rear of the chassis pan. The board at the left contains the detector circuits, while the filters are on the shorter board in the center. The dual power supply is along the right side toward the chassis rear. The small supply on the aluminum bracket at the right front is an optional loop-current supply.

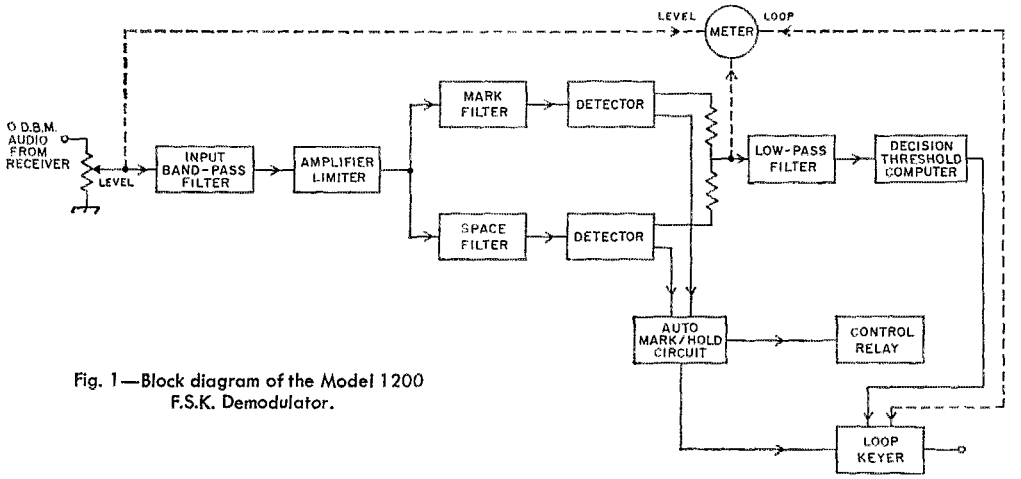


Fig. 1—Block diagram of the Model 1200 F.S.K. Demodulator.

output. To take a numerical example, if the mark signal is normally 1 volt negative and the space signal 1 volt positive, the threshold would be at zero volts. If the mark signal fades to, say, −0.25 volt while the space signal remains at +1 volt, the DTC will shift the threshold to +0.375 volt, so that the space-signal output now swings to +0.625 volt from the threshold and the mark signal swings −0.625 volt from the same point. Equal-amplitude mark and space signals, therefore, are applied to the output amplifier that operates the printer. The process is equivalent to making use of the better of the two signals — mark or space — when they fade independently, and is feasible because both signals contain exactly the same information. In practical tests, improvements of 10 to 16 db. in signal detectability have been observed with this system in comparison with older methods of demodulating the f.s.k. signal.[2]

As shown in Fig. 1, the outputs of the two detectors also go to an automatic mark/hold circuit. This circuit, which may be switched in or out as desired, automatically goes to mark hold when no f.s.k. signal is being received, or when the desired signal drops into the noise level. It thus prevents the machine from running wild when there is nothing intelligible to be printed. It distinguishes f.s.k. from other types of signals and noise, and works both ways — that is, it will open the printer when an f.s.k. signal appears in the channel, remaining impervious to noise and interference in the meanwhile, in addition to shifting to mark hold when the f.s.k. signal disappears. The amateur will find this "autostart" feature useful when tuning around the band for an RTTY signal, once he realizes that it takes a few seconds for the circuit to make up its mind before allowing an f.s.k. signal to operate the printer. It is also obviously useful for unattended automatic operation.

Among the miscellaneous features of the Model 1200 are detector outputs for tying into a diversity system, provision for metering various circuits, and provision for connection to an auxiliary unit (Model 1250) which gives an oscillographic display of the f.s.k. signal. There are four metering switch positions, one for measuring current in the printer loop, with the 20- and 60-ma. points marked; one for measuring the signal level at the input bandpass filter, calibrated at 0 dbm.; one that compares the detector outputs for balancing the mark and space channels on noise; and one that adds the detector outputs to give a visual tuning indication.

Neon lamps driven independently from the mark and space channels flicker on and off with the signals to offer an additional visual aid in tuning and for keeping an eye on the operation of the unit. There is also a switch for selecting mark alone, space alone, or both in combination, and another switch for "turning over" the mark and space outputs in case the channels are reversed in the receiver.

The demodulator has a built-in power supply furnishing +24 and −24 volts with respect to ground. As an option, a 130-volt loop-current supply can also be included in the chassis. The loop current supply will furnish up to 60 ma. for the printer.

On special order, plug-in filter boards are available in the following ranges: frequency shift, 170 to 2000 c.p.s.; f.s.k. tones, 400 to 3500 c.p.s.; and operating speeds, 30 to 300 bauds.

— *W1DF*

Frederick Electronics Model 1200 F.S.K. Demodulator

Height: 1¾ inches (1 rack unit).
Width: 19 inches.
Depth: 18 inches.
Weight: App. 10 pounds.
Power Requirement: 105–130 volts, 47–63 cycles a.c.
Price Class: $550.00
Manufacturer: Frederick Electronic Corp., Hayward Road, Frederick, Md.

[2] Thomas, "An Improved Decision Technique for Frequency-Shift Communications Systems," *Proc. I.R.E.*, December, 1960.

The Wavebridge

Combined Wavemeter and S.W.R. Bridge for Coaxial Lines

BY LEWIS G. McCOY,* W1ICP

Here's an instrument that helps keep you out of trouble with the F.C.C. In addition, it will tell you when your transmitter is putting out the "mostest." It's simple to build, and aside from the meter cost isn't too expensive.

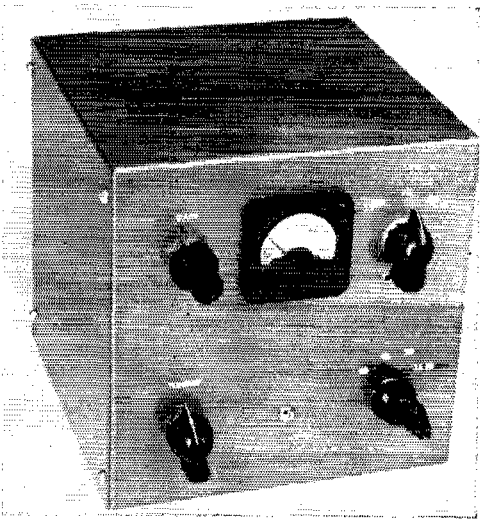
"DEAR Sirs: I've had my Novice license for two months and have filled up several log book pages making calls to other stations but have not had a single answer. Everything *seems* to be working OK, but obviously something is wrong. Can you help me?"

This question, or a similiar one, poses a common problem among newcomers. In nearly every case, the answer is the same. Although the amateur's rig appears to be tuned up on the correct band, as evidenced by the band switch and tuning controls, it usually turns out that the Novice is actually tuned up on some other band or is listening on the wrong band. One thing a Novice should learn as soon as possible is to never put complete faith in the band-switch markings on the transmitter. For example, you may be switched to the 80-meter band, and think you are actually on that band, when in fact your rig is operating on 40 meters. All this means is that your final amplifier tank circuit, under some conditions, can actually cover two bands with but a single setting of the band switch.

The fact that a tank circuit can cover two bands with the same switch setting is only bad news if the user doesn't know it can happen. Every amateur should have some means of checking to make sure that the signal he is putting on the air is actually on the band where he thinks it is.

A simple method of checking is with an absorption wavemeter. An absorption wavemeter is simply a coil and variable capacitor combination that can be tuned over a given frequency range. Whenever the combination is coupled to a circuit containing r.f. energy, and the combination is tuned to the same frequency as the circuit being checked, some of the r.f. will be absorbed by the wavemeter. By connecting a rectifier and meter to the combination, some of the absorbed r.f. can be rectified and fed to the meter, which will provide a visual indication of the r.f. If we calibrate the coil/capacitor circuit, it becomes a simple matter to tell the frequency of the r.f. being checked. One important point: an absorption wavemeter is not a device for making precise frequency measurements; it isn't that accurate. However, it will show you what band you are on — and that's what's important here.

It is customary these days, both in commercial and home-built gear, to design the final amplifier tank circuit to work into 50- to 70-ohm loads. In many instances, the reason a transmitter is accidentally tuned up on the wrong band is simply because the operator attempts to force the transmitter to work into a load that is far removed from 50 or 70 ohms.



Here's the completed wavebridge ready for use. The meter shown here is a surplus job with a 500-μa. movement. However, a 0-1 ma. meter has more than enough sensitivity. At the upper right is S_2 and at the lower right, S_1.

* Beginner and Novice Editor.

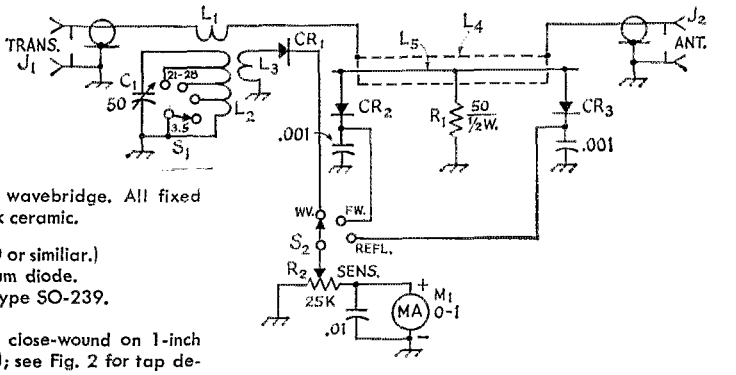


Fig. 1—Circuit diagram of the wavebridge. All fixed capacitors are disk ceramic.

C_1 - 50-pf. variable (Millen 22050 or similiar.)
CR_1, CR_2, CR_3—1N34A germanium diode.
J_1, J_2—Coax chassis receptacle, type SO-239.
L_1—See text.
L_2—45 turns of No. 28 enamel, close-wound on 1-inch dia. form (Millen 45000); see Fig. 2 for tap details.
L_3—Two turns of insulated wire wound at ungrounded end of L_2.
L_4, L_5—See text.
M_1—0-1 ma. milliammeter (microammeter may be used if desired).
R_1—50 ohms for 50-ohm bridge, 33 ohms for 70-ohm bridge; ½-watt carbon or composition.
R_2—25,000-ohm linear control.
S_1, S_2—Single-pole, five-position wafer switch, (Mallory 3215J or similiar).

An ideal instrument would be a wavemeter to show you what band you are on plus a standing-wave-ratio bridge to tell you when your load approximates 50 to 70 ohms. Because we need a milliammeter for the wavemeter, it only adds pennies to the cost of the unit to add an s.w.r. bridge. So here we have an instrument that tells us the band we are on and shows us whether the load is right. Additionally, and probably just as important to the Novice, this instrument will show the operator when r.f. energy is flowing to the antenna. This can be very reassuring if you have doubts that you are getting out. The instrument shown in Fig. 1 and the photographs is just such a device, and can easily be built in an evening.

Wavebridge Circuit Details

In operation, the wavebridge would be inserted in the coaxial line feeding the antenna or transmatch. The wavemeter portion of the unit is at the input or transmitter side, while the s.w.r. bridge is on the output or antenna side. R.f. energy from the transmitter flows through L_1, which is a pick-up loop to couple a small amount of energy to L_2. L_2 and C_1 are the wavemeter tuned circuit. L_2 is a coil tapped to cover the bands from 3.5 to 28 Mc. Energy from the tuned circuit is coupled out via L_3, a two-turn link.

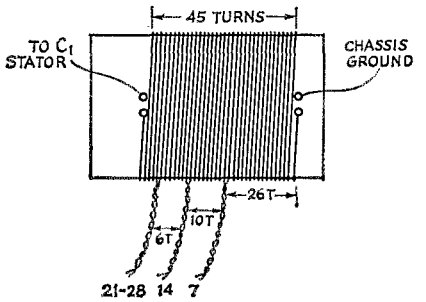


Fig. 2—Details for winding L_2.

This small amount of energy is rectified by CR_1 and then fed to M_1, a 0-1 milliammeter.

The line containing L_1 is connected to one end of the s.w.r. bridge and the other end of the bridge to J_2, the output terminal. This bridge is a version of W1CER's Varimatcher[1], the only significant difference being the use of coax outer braid for L_4 instead of copper tubing.

R.f. picked up by L_5 is rectified by CR_2 and CR_3. This rectified energy is used to read the reflected and forward voltages via M_1. The sensitivity level of M_1 can be controlled by R_2, a 25,000-ohm control.

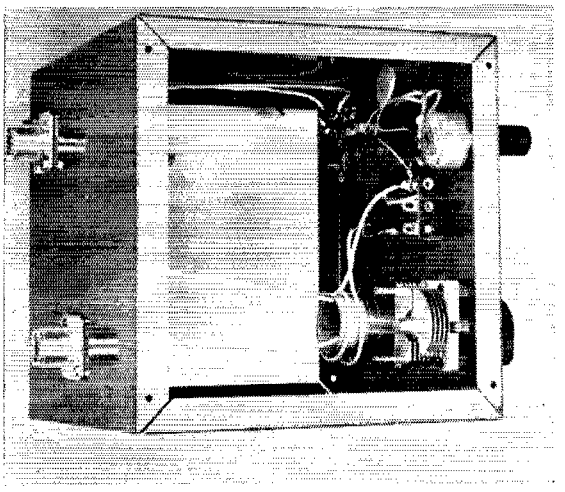
Construction Details

The complete wavebridge is mounted in a 6 × 6 × 6-inch Minibox. L_2 consists of 45 turns of enamel-covered wire, close-wound on a one-inch diameter form. Details of winding this coil are shown in Fig. 2. The coil form, a Millen 45000, is mounted to the front panel with a nut and bolt. This can be seen in one of the inside-view photographs. Unreel about 15 feet of the wire from the spool, and clamp the spool in a vise. Make sure the wire is smooth and without kinks. Then, starting at the free end of the wire, wind the coil on the form, keeping the wire taut. For each tap point, fold about six inches of the wire and twist the two strands together so that you have a twisted lead about 3 inches long projecting from the form, and then continue with the winding. Be sure to scrape away the enamel covering before attempting to solder the tap leads to the switch terminals.

The input lead, with L_1, is a length of insulated wire that projects from J_1, on the back of the box, to the front, with a single half loop inside the coil form, and then goes back to the feed-through bushing on the s.w.r. bridge. L_3 is two turns of insulated wire wound around the coil form at the ungrounded end of L_2.

Study the photograph showing the bridge

[1] DeMaw, "The Varimatcher," *QST* May, 1966.



Looking through the wavebridge from the left side. This view shows the wiring around the wavemeter circuit. L_2, and C_1, and the two turn pick up loop L_3 are shown. At the upper right hand corner is R_2, the sensitivity control for M_1.

details before starting the bridge. The form that is around the bridge section is made from a piece of copper flashing, 2⅜ inches wide, 4¾ inches long. This is formed into a U so that the bottom of the U is 1⅛ inches wide and the sides are ⅝ inch high. However, before forming the U drill the holes for the coax fitting and the feed-through bushing. The distance between the two is 3¼ inches. Set this piece aside until the bridge pickup section is completed.

In W1CER's bridge, copper tubing was used for the L_4 section. In some instances it may be difficult to get the correct size tubing so the bridge described here was made from a length of RG 58/U. Remove the outer vinyl covering from a piece of coax 4¼ inches long. Next, slide the outer braid off the inner insulation. Now refer to Fig. 3 for additional details. Be careful not to cut the wire when cutting the insulation around the inner conductor. The object is to cut down to the inner conductor, and then be able to slide the two outer pieces away from the center. The outer shield is opened at the center, using a soldering aid or similiar probe to make an opening large enough to clear one end of R_1 without shorting. When the braid is slipped over the inner portion, the ends of the braid can be wrapped with a few turns of solid wire and soldered, as shown in the photo detail. This provides a support for the entire portion when the bridge section is soldered to J_2 and the feed-through terminal. Be sure that none of the hair-like wires of the outer braid short to the resistor end of the inner conductor.

The end of the resistor R_1 should be carefully soldered to the inner conductor, making sure not to short out to the outer braid. The other end of the resistor is soldered directly to the copper trough, keeping the resistor leads as short as possible. When soldering the diode leads be sure to use a heat sink between the point being soldered and the body of the diode. Excessive heat can easily ruin a diode.

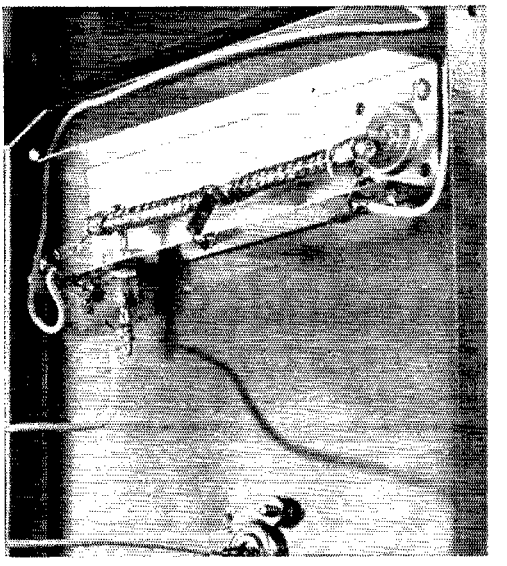
Calibration

If the coil dimensions for L_2 are carefully observed, there should be no need to calibrate the wavemeter. You'll find that in each of the bandswitch positions you'll only get one definite reading. In other words, in the 80-meter position you would only get a meter reading when 80-meter energy is present in the circuit. However, one simple method of checking the circuit is with your rig if you are sure that it is on frequency. Just tune up the rig and note the setting of C_1 for your signal.

If you can borrow a grid-dip meter you can do a fairly accurate job of calibrating for all the bands. Merely couple the grid-dip meter to L_2, tune both C_1 and the grid-dip meter to the same frequency range, and then note the setting of C_1. Go through the various bands in this manner and the wavemeter section is quickly calibrated.

Using the Wavebridge

Insert the wavebridge in the coax line, immediately following the transmitter. A short length of coax can be used. If you have a coax-fed antenna (no transmatch) feed some signal to the antenna and check the wavemeter performance. Set S_1 to the proper band and tune C_1 to where M_1 shows a reading. The sensitivity of M_1 can be set by R_2. Next, switch S_2 to read forward power and set the meter for full scale with R_2. Now switch S_2 to "reflected" and note the reflected



This photograph shows the construction details for the bridge section. Be sure when soldering the resistor R_1 to the inner conductor wire that the lead does not short out to the outer braid.

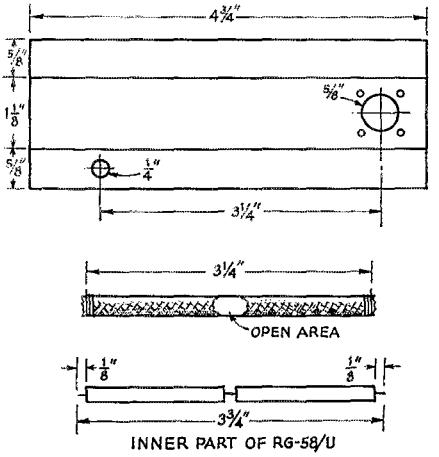


Fig. 3—Construction of the s.w.r. bridge section.

reading. If the meter reads zero (quite unlikely) it would mean that you have a matched antenna system. This s.w.r. bridge is not a precision device but you can get a fairly good idea what the s.w.r. is on the line.

The formula to use for determining s.w.r. with this system is quite simple:

$$S.W.R. = \frac{V_o + V_r}{V_o - V_r}$$

where V_o is the forward voltage and V_r the reflected voltage. For example, our meter M_1 is divided into 10 equal divisions. When set for full scale we would have the figure 10. Suppose when switched to REFLECTED the meter reads 5. In that case,

$$\frac{10 + 5}{10 - 5} = \frac{15}{5} = 3,$$

our s.w.r. would be 3 to 1. As we said, this bridge is not a precision device and our true s.w.r. may be slightly different but for all practical purposes, the 3 to 1 figure would be accurate enough.[2]

As to how large a mismatch one should tolerate, that depends on a great many factors. Generally speaking, the mismatch should be held to 3 to 1 or less. If a transmatch is used, the wavebridge should be connected between the rig and the transmatch. In this case the transmatch should be adjusted for an s.w.r. of 1 to 1 or as close to that figure as possible.

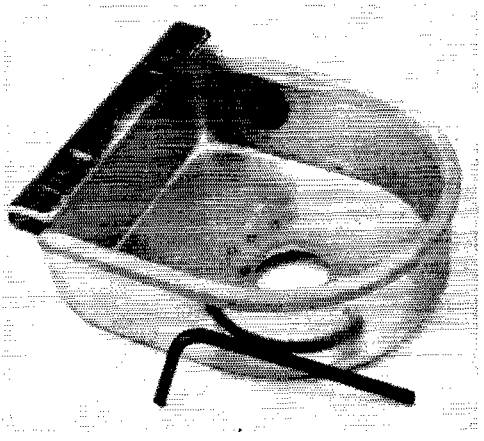
When tuning up your rig, you can use either the wavemeter position of S_2 or the FORWARD bridge position. Set M_1 for about mid-scale and tune your rig watching the reading on M_1. Just keep in mind that the larger the reading, the more power going to the antenna.

As long as you keep your amplifier tube or tubes within their maximum ratings you can forget about plate meter dips and so forth. Just watch the output indicator and tune for maximum. The wavebridge will make your operating more of a pleasure because it is just one more device to show when you are doing things correctly. QST

[2] Provided R_7 is at about midscale when the meter reads full scale in the forward direction. Near either end of R_2's range the meter does not read linearly with voltage and the error from using the formula may be considerable. — *Editor.*

• New Apparatus

No Hole Mobile Antenna Mount



THE E-Z mobile mount shown upside down in the photograph is a support that can be used to install an antenna on the rear trunk lid of a car with a minimum amount of disfiguration of the automobile. No holes are required; once the antenna is attached to the mount, the feed line (RG-58/U or RG-59/U) is fed through the rubber grommet, the paint scraped from the underside of the trunk lid mounting area for a good ground contact, and the mount fastened to the car by tightening the two Allen set screws (an Allen wrench is furnished). Feeding the coax through the space between the trunk lid and the body of the automobile completes the antenna installation.

The E-Z antenna mount is made from chromed tempered steel and its bottom edge is lined with a rubber gasket to protect the car's finish. Three models of the mobile antenna mount are available. Model C 103 is a standard ball mount, model C 375 has a ⅜-inch hole and model C 750 a ¾-inch hole. The price class of all three models is $9.00 and they are available from E-Z Mobile Antenna Mount Inc., P.O. Box 277, Algonac, Michigan.

— *W1YDS*

You still hear equipment for 3.5 through 30 Mc. described on the air as "all-band." The expression is even used that way in print, yet the ham bands from 3.5 to 30 Mc. represent less than one-third of the bands open to amateur use. In terms of frequency, they are no more than a tiny fraction of the territory that is available for our use. This is the story of how two fellows tried to do something about sampling the whole spectrum open to us.

All-Band— Almost!

Two-Way Communication on 15 Bands, 1.8 to 10,000 Mc.

BY IRA BICKHAM, K8HRR*

I had been on the air about a year, working 50 and 220 Mc. with a Technician Ticket, when I met Walt, W8BAX. He invited me over to his place one evening, and I found him working on a 1215-Mc. rig using a 703A doorknob tube. He also had an 832A tripler for 432 Mc. that caught my eye. The u.h.f. bug began to bite, and slowly I accumulated parts for ventures into the 420- and 1215-Mc. bands. This project was interrupted when I left Columbus to come east, in 1959.

Returning in 1961, I sought out Walt, who was found busily engaged in converting an APX-6. By now I was on 144 Mc., and we worked easily on that band, of course. Next I put on an 832A tripler, to work Walt on 432. It was several months before I got an APX-6 converted, and we worked on 1215 Mc. We had a lot of fun during the summer of '62, dragging the APX-6, a home-made a.c. generator and a 16-element 1215-Mc. antenna around the flat Ohio countryside. This effort netted us a DX record of 18 miles, the terrain in Ohio being what it is!

That fall I moved to a somewhat better location, and I kept track of Walt via the landline for a while, before the hamshack and tower were ready at the new spot. Walt had spotted some surplus cavities for 2400 Mc., and by the end of 1962 we had worked on that band. Onward and upward, the next step was 3400 Mc. Polaplexers and associated circuitry were put together for that band, and we had our first QSO there in February, 1963.

Things were going so well that I decided upon an assault on the heretofor solid brick wall represented by the 13-w.p.m. code speed, and I received my General in June. It was no problem then to work W8BAX on the six "D.C. Bands" from 10 to 160 meters.

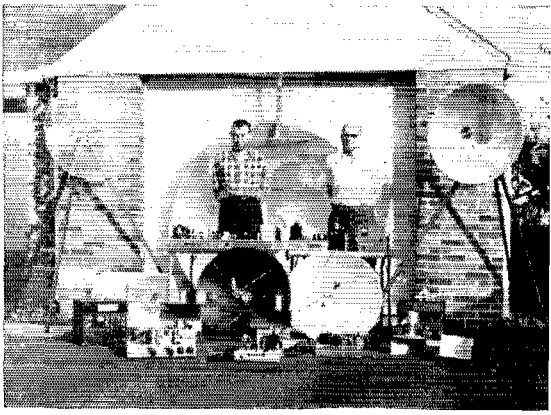
During the summer of 1963, we expanded to 5800 and 10,000 Mc., to make our run complete — almost. We haven't cracked 21 Gc. yet, but we're working on it. For an encore one bright September Saturday, we took our gear out into the field and made 7-mile contacts across a lake on 144, 2400, 3400 and 10,000 Mc. The Communicators and whips used on 144 produced the weakest signals on any of these bands except 10,000 Mc.!

Walt and I have built all of our microwave gear, using surplus or conventional parts. Most of it is shown in the accompanying photograph (that's me on the left), including five dishes, one of them home-made. We also have a 6-footer, but we're both cowards when it comes to mounting this up somewhere on the house.

The 2400-Mc. gear uses lighthouse-tube cavity oscillators, with crystal mixers working into APX-6 i.f. strips. Pulse equipment is in the works, and we hope to work some better DX when this is completed. Our 3400-Mc. polaplexer setups are similar to those described in June, 1958, *QST*, using 60-Mc. i.f., and audio, in the receivers. Equipment for 5800 and 10,000 Mc. merely plugs into the power supply and i.f.-audio system of the 3400-Mc. gear. A QK623 is used as an oscillator on 5800 Mc., and a VA6315 on 10,000 Mc. We now have crystal-controlled gear on 1296 Mc., where we have three-way contact with W8CSW.

Neither W8BAX nor K8HRR has much money tied up in equipment. We adapted what we could pick up cheaply, used what information there was available, and ad libbed where necessary. Our project didn't advance the state of the art much, but it did "keep the boys out of the streets and pool rooms!" It also demonstrated that microwave communication is a practical, if sometimes frustrating, business for enterprising hams.

We have been classified by many friends as "some kind of nut," but we like to think of ourselves more as mountain climbers. We climbed the long road from 1.8 to 10,000 Mc. "because it's there!" QST



* 1423 Thurell Rd., Columbus 24, Ohio.

• Technical Correspondence

ALTERNATOR POWER SUPPLY

Technical Editor, *QST:*

I was pleased to see the article by Exum and Johnson (*QST*, May 1966) describing the direct use of the a.c. alternator output for a mobile power supply. I have had a similar unit installed for two years. Below are five points of experience which might be helpful:

1) Most cars currently equipped with alternators still have relay regulators which interrupt the field current to control the charging rate. Once the battery is fully charged after starting the engine, the regulator can cut out and interrupt the power to the rig. I found it necessary to replace the relay regulator with a solid-state unit. The Motorola regulator can be purchased alone for about $20, and it will work with a Delco alternator.

2) Brush noise from the alternator can be serious. First, it can ride out on the new a.c. wiring. Second, the r.f. suppression capacitors installed in the unit are ineffective in this application, since they are on the battery side of the rectifiers in the alternator. I would recommend a 0.1 μf. or larger coaxial capacitor in each of the a.c. leads.

3) It is easy to install simple terminals on the rear housing of the alternator. I drilled three holes in the side and brought the a.c. out through No. 8 bolts insulated with shoulder washers.

4) The circuit described by Exum and Johnson employed single-phase rectification. I have had good luck with a standard delta-delta three-phase bridge. For the same voltage output this requires more transformers, but it greatly simplifies filtering. The raw d.c. from the three-phase circuit has only 5 per-cent ripple at six times the alternator frequency. A simple 50-μf. capacitor filter takes care of this, even with a 500-ma. load.

5) Because of the higher frequency there is no difficulty using 6.3-volt 60-cycle filament transformers across the 14-volt alternator output. With 115-volt primaries they deliver 320 volts in a delta-delta bridge, 630 volts in a delta-wye bridge.

An a.c. mobile power supply can be very rugged and cheap. Mine uses bargain transformers at $2 each. With nine of them the unit is capable of 900 watts (but my standard 32-amp. alternator is not!). I learned the hard way to use good filter capacitors. Under the rigors of mobile service they may explode beautifully and take 18 diodes with them. — *Dr. Wynne Calvert, WØIUQ/W7BOU.*

TVI FROM BOOSTERS

Technical Editor, *QST:*

The enclosed article (Fig. 1) from the Waseca, Minn. *Journal* relates a story of public service performed by WØISJ, WAØMKH, WØSZW, and WØUGR of Waseca. More important, perhaps, it serves to highlight a little-known but widespread problem which plagues amateur operators, and operators of other communications equipment.

TV "booster" amplifier systems can and sometimes do oscillate — due to poor amplifier design, poor input-output termination or isolation, etc. Coupled to the typical broad-band TV antenna, this oscillation can cause TVI over a radius of one-half mile or more, an area which is sure to include several amateur operators. These unfortunate fellows then become the object of many complaints from irate TV viewers.

This is only half of the story. Many of the TV antenna amplifiers in use are of such poor design that they overload quite easily and, since they often are mounted on the TV antenna structure, one cannot even put a high-pass filter in the line. There is no simple remedy.

This second part of the problem is not wholly unexpected. The antenna amplifiers are designed for fringe-area reception; they are broad-band devices used with broad-band antennas. How could they be expected to reject strong signals on 6 meters, or 2 meters, or 220 Mc.?

I hope that this problem can be brought to light in the pages of *QST*. It should be of interest to many amateurs. — *Eugene Welch, WØUGR, 708 3rd Ave., N.E., Waseca, Minn. 56093.*

... last two
... day evening about
... the source of the inter-
...erence was located and turned off.
The interference was not caused by ham radio operators but by a defective booster accessory installed to improve reception on a television receiving set.

Several television owners had called their service man, believing something was wrong with their own set or installation. Many viewers believed the interference was being caused by amateur radio transmitters, citizens band transmitters, electrical tools or appliances.

Last Friday a group of amateur radio operators, who are also engineers at the E. F. Johnson Co., began the search which resulted in the elimination of the interference. The equipment used consisted of two hastily converted walkie-talkies.

The interfering signal was found to be coming from a defective TV distribution amplifier (booster) system located in Northeast Waseca. This television set accessory was actually oscillating and sending out a signal on Channel 5.

The ham radio operators participating in the search reported excellent cooperation from all TV owners contacted. Without such coop-
ation, discovery and ...
the offending
...

Fig. 1. (WØUGR)

IMPROVISATION — THE MARK OF THE AMATEUR

Technical Editor, *QST:*

While collecting parts to build the "Solid-State S.S.B. Transceiver" (Vester, June 1963 *QST*), I had difficulty getting some of the specified parts, especially the LS-9 coil forms. As Vester says, small coils are necessary for compact construction. A suitable substitute was found by using ordinary slug-tuned coils encircled with the shorted turn of copper strip as used by Harris in his receiver (March 1963 *QST*). This is an effective shield, and permits good access to the coils for modification. I did not find it necessary to construct the r.f. amplifier in a completely shielded enclosure, as these shields and the plated Vectorbord provided good isolation.

The i.f. amplifier coils were salvaged from a Japanese transistor a.m./f.m. radio. The model used was an FM925 Raleigh available at a local discount house for less than ten dollars. This receiver

was disassembled for the parts and transistors, many of which were later used for the transceiver. There are at least two excellent h.f. transistors which made two good r.f. and mixer stages, and the i.f. stages were used intact, by padding them down to hit the intermediate frequency. The receiver was purchased after the audio module had been built, but there is no reason why (as Vester suggested) the audio stages could not also have been used, thus furnishing the bulk of the parts needed. The one drawback is that the job of removing the parts from the circuit board is somewhat tedious.

It is practically impossible to disassemble the little i.f. transformers to find the connections, so it is a good idea to have the receiver's circuit diagram (which came with the set) at hand while taking the parts out so that transformer terminal connections can be sketched. It may be found that there will be minor variations from the schematic. The discriminator transformer was ideal for driving the product-detector bridge.

It was found that an International Crystal ACF-2 filter worked well in place of the filter specified. The parts were removed from the plate furnished and the second i.f. transformer with the ACF-2 was not used.

In adjusting the collector currents, 1000-ohm emitter bias resistors were used and base bias was adjusted to approximately 1 volt drop across this resistor while using a 9-volt supply. Transistor sockets were used and it was found that transistor types could be interchanged without further bias adjustment. The Galeski v.f.o. from page 108 of the *S.S.B. Handbook* was used and worked well.

The results have been excellent. The stability, selectivity and sensitivity of the receiver section is very good, indeed. As it turned out, it could have been built in a smaller case than the 5 × 7-inch chassis specified.

The range is somewhat limited by the very low power, but the transmitter works as it should with good quality. This transceiver is highly recommended as an educational hobby project. Thanks to W3TLN for a good design. — *A. A. Kelley, K4EET, 2307 S. Clark Ave., Tampa, Florida 33609.*

ON USING THE 6EH7

Technical Editor, *QST*:

I have just read K3CFA's "Improving Your Receiver with a Frame-Grid R.F. Pentode" (February 1966 *QST*). I tried the EF184 for that purpose when it appeared in Europe several years ago, but since then have found the EF183/6EH7 a better

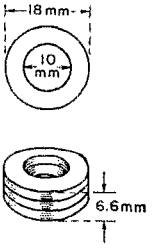


Fig. 2—(F8AJ) Core dimensions. Permeability of the iron measured about 10 as judged by increase in coil inductance compared with air core.

choice due to its remote cutoff and its lesser "nervousness."

The use of an unbypassed cathode resistor is advantageous as regards the variations in input capacitance and resistance where wide bands are concerned, but is far from improving the stability. Comparative trials have proved to me that the best stability is obtained with the two cathode leads duly bypassed. The diagram is shown in Fig. 1.

Careful shielding of the following mixer tube has an important effect on the stability of the r.f. amplifier. A good way to control stability is the use of a swamping resistor, R_1, in series with the anode 220-μh. choke (the idea was borrowed from the Collins KWM-2 diagram). A resistor as high as 1000 ohms may be required at the beginning to stop oscillation. In proportion as the stability is increased by shielding and bypassing, R_1 may be reduced in value.

Of course, a high-transconductance tube deserves high-Q coils. If you have succeeded in putting an EF183/6EH7 in your old receiver without instability, don't have too much pride in your ability until you have a look at the coils. I am using toroidal coils wound on powdered-iron cores; several cores from the local surplus shop were tried, and best results were obtained with small cores of unknown origin having the dimensions shown in Fig. 2. With 49 turns of No. 23 enameled d.c.c. (one layer) the measured inductance is 19.1 μh. The theoretical inductance of the same coil without iron should be about 1.9 μh., which indicates a permeability of about 10.

Antenna coupling, though apparently unorthodox, proved very convenient with 50–75-ohm lines. The value of the coupling capacitor has to be adjusted and switched with each band. The value in Fig. 1 is for 3.5 Mc. — *Aymon Claudet, F8AJ, 7 Allee des bois, 94 Orly, France.*

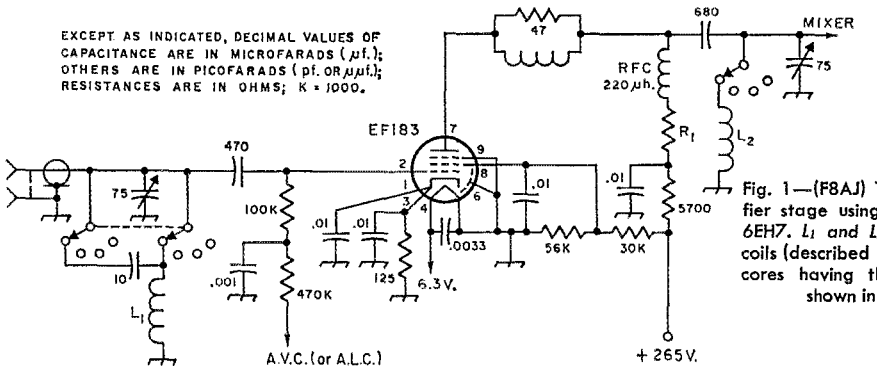


Fig. 1—(F8AJ) The r.f. amplifier stage using the EF183/6EH7. L_1 and L_2 are toroidal coils (described in letter) using cores having the dimensions shown in Fig. 2.

12 Volts at 500 Ma.—Regulated

A Handy Power Supply for the Experimenter

BY CHARLES W. COPP.* W2ZSD

This compact transistor-experimenter's power supply provides a variable-voltage source at minimum cost. Many of the components used in the package are available as low-cost items through several bargain-house outlets.

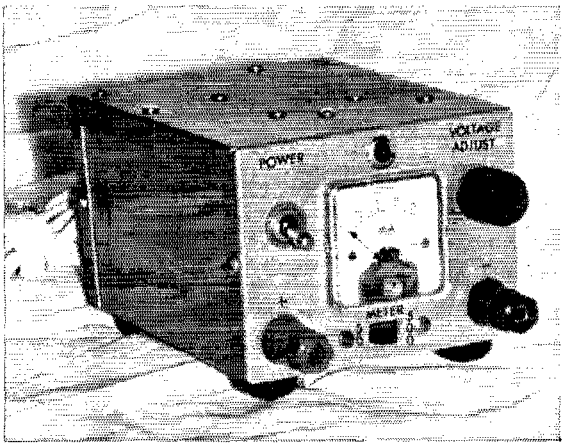
THE circuit described in this article represents what might be a welcome addition to an experimenter's workbench — especially if transistorized circuits are to be built and tested. A 12-volt automobile battery is a cumbersome thing to carry into the house and requires frequent recharging if it is to be relied upon for test purposes. This a.c.-powered unit, designed to substitute for a car battery, was built for the purpose of testing a home-built transistorized mobile receiver. Since then, it has been useful during other experiments which required a low-voltage d.c. source.

The output voltage can be varied from 6 to 18 volts, providing 1 per cent regulation from no load to full load at 500 ma. The d.c. output voltage is free from noticeable ripple in that no evidence of sine-wave energy was detected while measuring the output of the supply with a v.t.v.m. (1.5-volt a.c. scale) during full-load conditions.

The Circuit

A 24-volt, 1-amp. filament transformer is used in combination with a solid-state bridge-rectifier circuit to provide approximately 28 volts d.c. The bridge rectifier contains four 50-p.i.v., 2-amp. silicon diodes, labeled CR_1-CR_4, inclusive in Fig. 1. The rectifiers are mounted on an aluminum bracket which serves as a heat sink. Two 800-μf., 50-volt electrolytic capacitors (Mallory computer-grade aluminum capacitors) are used to filter the rectified voltage from the diodes. Next, the voltage is passed on to the control transistors, Q_1 and Q_2, and to the Zener diode, CR_5. A power transistor is used at Q_1 for the series-regulator portion of the circuit. This unit is a 2N278, has a 150-watt rating, and will handle 15 amperes. Although a rating of such magnitude is not needed, the 2N278 is used because it is readily available and is reasonably priced. The Zener diode (CR_5) is a 1N706 and provides a reference at 5.8 volts for the emitter of transistor Q_2. The base element of Q_2 is connected to the movable-arm terminal of the voltage-adjust control, R_1.

*337 Jamaica Blvd., Carle Place, New York 11514.



The wired and assembled power-supply unit. The on-off switch, voltage-adjust control, meter, and current range switch are conveniently located on the front of the case.

How It Works

When a variation in line voltage occurs, or when the load presented to the power supply changes, the current in the base of Q_2 changes but the emitter voltage remains constant because CR_5 holds it at a fixed value. The change in base current at Q_2 is amplified by the collector and is passed on to the base of Q_1. The change in base current at Q_1 is amplified and in turn brings about the restoration of the original voltage level. Naturally, all of this happens so rapidly that the output voltage from the supply remains constant.

The current drawn by the external load is metered by M_1 which has a 0–50-ma. basic movement. A shunt, consisting of 20 inches of No. 28 enameled copper wire wound on a high-ohmage resistor (0.1 megohm or greater), is switched into the circuit by S_2 so that higher values of current (up to 500 ma.) can be measured. When using the higher range of current, simply multiply the 0–50-ma. scale reading by 10. Few meters having the same basic movement will operate accurately with the same value of shunt. Therefore, the shunt dimensions given in the text represent only a starting point for winding your own. It is best to compare your meter readings with those taken from an accurate d.c. current meter. Decreasing the number of turns on the shunt will cause the meter to read lower. Adding turns will have the opposite effect.

Construction

The power supply is built in a 3 × 4 × 5-inch Minibox (Fig. 2). The layout is not critical,

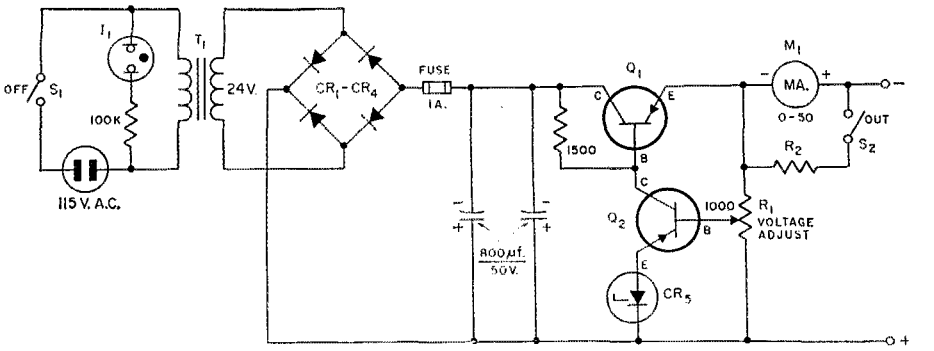


Fig. 1—Schematic diagram of the power supply. Fixed resistors are ½-watt composition; Capacitors are electrolytic. Resistances are in ohms; K = 1000.

C_1, C_2—800-μf. 50 volts d.c. (Mallory CG8-2U5OA1).
CR_1–CR_4, inc.—50 p.i.v. 2-amp. silicon diode.
CR_5—5.8-volt Zener diode, 250 mw. (1N706).
I_1—Small neon lamp (NE 2 or NE 51).
M_1—0–50-ma. meter.
Q_1—2N278
Q_2—2N1415.
R_1—1000-ohm linear taper control.
R_2—500-ma. meter shunt (see text).
S_1—S.p.s.t. toggle switch.
S_2—S.p.s.t. slide switch.
T_1—Filament transformer, 24 volts, 1 amp.

so variations in the parts placement can be made without fear of poor performance.

The heat sink on the rear of the package, although not absolutely necessary, serves to cool the transistor while offering physical protection to it. Insulating hardware, supplied with the transistor, is used to prevent electrical contact between the case of the transistor and the heat sink. The bracket over transformer T_1 supports the rectifier diodes (CR_1–CR_4), the fuse holder, the Zener diode and resistor R_2. Diodes CR_1–CR_4 are insulated from the bracket by using mica washers. They should be mounted in a manner that will prevent them from shorting against the case of T_1. CR_5 and R_2 are mounted on insulated terminals and are located between the vertical section of the bracket and the front panel of the Minibox. The emitter and collector leads of Q_2 are soldered directly into the circuit. The base lead is treated in a similar fashion by soldering it to the center terminal of R_1. Caution: The use of a transistor socket can result in poor connections at Q_2, causing the output voltage to exceed its preset level — resulting in possible damage to the external circuit being tested.

Some Final Remarks

The builder of this power supply may desire to use a d.c. voltmeter in preference to the current meter shown in the schematic diagram. Or, going a step further, he may wish to have provisions for metering current *and* voltage. If two meters are to be used, a larger cabinet will be required. The d.c. voltmeter, if used (0–25 volts recommended), can be bridged across the output terminals of the power supply. QST

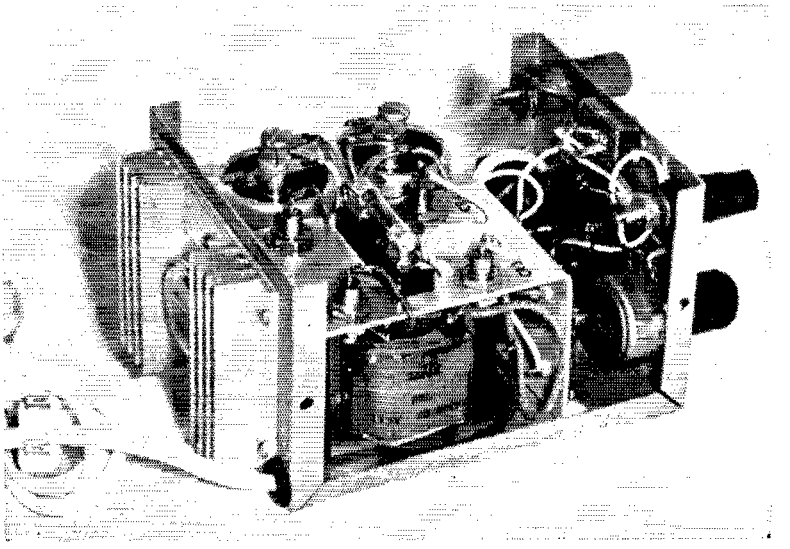


Fig. 2—Inside view of the completed assembly. The heat sink for the 2N278 transistor is visible at the left. An aluminum bracket contains the rectifier diodes while serving as a heat sink for them. The filament transformer is mounted under the bracket.

Radio Frequency Management

The Structure for Regulation of a Valuable Natural Resource

BY LT. COL. LEO A. BUSS,* USAF

THE radio-frequency spectrum is a limited natural resource. This limitation is directly related to the state of the radio art.

The frequency spectrum is unique as a national resource. First, it is reuseable — that is, it neither wears out nor is it consumed. It is a truly permanent resource. Second, it is international in character. It knows no international boundaries: the use of a specific frequency in the United States can and may well preclude the use of the same frequency in another country. Third, like all other limited, useable, natural resources, its demand is high. The demand in many instances far exceeds the supply. It is for these reasons that organizations have been developed to exercise control of the use of radio frequencies.

The first of the management organizations that I would like to discuss today is the International Telecommunications Union. The ITU, as it is known, consists of 129 member nations. The basic policies, organization, and procedures of this body are determined by a Plenipotentiary Conference. These Plenipotentiary conferences are normally held at five-year intervals, the most recent being in the latter part of 1965.

The specifics — that is, the detailed international rules and regulations for the use of radio — are determined by ITU Administrative Radio Conferences. The most recent radio conference was held in 1963 and was called for the purpose of allocating frequencies for space operations. This second type of conference has the responsibility for allocating the radio-frequency spectrum. By allocating, I mean splitting the radio-frequency pie into segments. These segments or bands of frequencies are set aside for specific functions or services. For example: The segment or band of frequencies between 7000 and 7100 kilocycles is allocated for use by amateurs throughout the world. Other portions of the spectrum are allocated for such services as fixed, maritime, aeronautical, radio location and radio navigation — to mention a few.

Allocations are for specific functions or services and not to a specific country or agency. Some allocations are world-wide in nature — that is, they provide for a particular service throughout the world. Some allocations are on a regional basis — for example, the band of frequencies between 7100 and 7300 kc. is allocated for amateur use in North and South America, but throughout the rest of the world it is allocated for use by the broadcasting service. Even within a given region of the world, an allocation may be made to a multiplicity of services — for example, the band 1800 to 2000 kc. is allocated to the Amateur, Fixed, Mobile and Radionavigation services. The sharing of radio frequencies is an established matter of policy through all levels of frequency management. Exclusivity of frequency usage is largely a thing of the past.

Each nation has the sovereign right to assign any frequency it desires; however, each of the members of the ITU has recognized that this right must be exercised so as to facilitate relations and cooperation among peoples through the means of efficient communications. Membership in the ITU involves specific international treaty obligations including the observance of the spectrum allocations of the ITU.

Now let's look at the management structure within the United States. As a member of the ITU, the United States has developed its frequency allocations and assignment procedures in accordance with those established by the union. The basic law which governs the management of frequencies within the United States is the Communication Act of 1934. This act

This presentation at the ARRL National Convention in Boston is a compact summary of the basic structure and mechanics of radio frequency regulation and use.

* Chief, Frequency Branch, Directorate of Command Control and Communications, USAF

gives the President the authority for the assignment of radio frequencies to all federal government and foreign embassy stations and gives the Federal Communications Commission the authority for the assignment of frequencies to all other stations. The authority for the management of frequencies used by government stations has been delegated by the President to the Director of Telecommunications Management (DTM), Office of Emergency Planning, Executive Office of the President. The present director is Mr. J. D. O'Connell. He has a small management staff and an intergovernment body known as the Interdepartment Radio Advisory Committee to assist him. This IRAC consists of representatives from each of the government agencies that use radio frequencies. These members when in committee act *in the interest of the United States as a whole* and not in the interest of any particular department or agency. The committee meets on a regular basis to consider problems referred to it by the DTM and to provide policy proposals to the Director. The IRAC has a sub-committee which considers all applications for radio frequencies submitted by agencies of the federal government. This subcommittee reviews these requests from technical and policy standpoints, and recommends appropriate assignment action to the DTM.

On the civilian side of the house, frequency management is exercised by the Federal Communications Commission. Frequencies are assigned and managed on the basis of the rules and regulations issued by the Commission in conformance with the Communications Act of 1934. The question arises: how is it possible for two independent agencies, the FCC and DTM, to exercise assignment authority and still maintain compatible operations and effective radio frequency management? Constant liaison is maintained between the FCC and the DTM; the FCC sits as member on the FAS and provides a liaison representative on the IRAC. Specific frequency requests having an impact on either agency are fully coordinated within the FCC and the DTM. Specific bands of frequencies are allocated nationally for non-government use, for government use, and for shared use between the government and non-government stations. The lack of disruptive radio interference between the licensees of the FCC and the operators of government radio stations speaks extremely well for the present national management structure.

All United States authorizations for the use of frequencies within the international and national allocations for amateur operations are issued by the FCC. Assignments to amateurs are unique in that permission is granted to operate on any frequency within the specified amateur bands. Authorizations for other types of service such as broadcasting, fixed, and aeronautical are limited to specific frequencies at specific geographical locations, or areas.

Within the United States Air Force, radio frequency management is exercised at the Washington headquarters. All frequency assignments to support USAF operations must conform to international and national regulations. Authority for these USAF operations within the United States is obtained from the Director of Telecommunication Management. Authority for operation within foreign countries is obtained through the procedure established by the status of forces agreement within each country or authority is obtained through State Department diplomat channels.

Due to the amount of congestion in the radio frequency spectrum, many operations must share the same frequency. Sharing is accomplished on the basis of priority of use, time of operation, and geographical separation of transmitter and receiver locations. Sharing requires the utmost in cooperation, a full recognition by all users of a specific frequency of the character of the operation conducted by all other users.

Military Affiliate Radio System stations are government stations under the meaning of the Communications Act of 1934 and therefore fall under the management of DTM and the military departments. MARS frequencies are selected from the bands allocated for the fixed service. Authority to operate these frequencies is obtained by the military department concerned from the DTM. MARS frequencies are assigned specifically to meet established and fully justified military requirements. The scarcity of available radio frequencies precludes the assignment of clear channels to meet the MARS requirements. MARS along with many other communications systems must share the use of specific frequencies on the basis of the sharing arrangements I previously mentioned.

In summary, the spectrum is a permanent, international natural resource. Its use is governed by the rules and regulations of ITU and by rules and regulations established within each country. Within the United States, frequency management is exercised by the DTM for government stations, and by the FCC for all other stations. Close liaison between the DTM and the FCC results in an effective organization. Within the USAF, management is exercised in Washington, with the authority for all USAF frequencies obtained either from the DTM or the foreign administration involved. Last, but not least, sharing of specific frequencies is a fact of life and fully recognized from the highest to lowest levels of management. DST

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 *and your zip code.* Your promptness will help you, the postal service and us. Thanks.

1966 DX Competition High Claimed Scores

THE incoming mails continue to bring in many DX Competition entries from exotic spots the world over. At this mid-May point indications all point to fabulous contest results with a surprise return of ten meters as well as substantial totals on the lower bands. You'll note that in order to limit the following list to one page, the cut-off point for c.w. becomes 225-K and for phone 125-K. Final results are tentatively scheduled for October *QST*. Please note that contest claims for DXCC credit may **not** be made until the final results appear.

— *W1YYM*

W/VE — C.W.

Single Operator

W4KFC.....993,964-382- 868
W3GRF.....821,100-350- 782
W1EVT.....795,633-339- 847
W1BPW.....795,570-345- 770
W3LOE.....738,710-346- 717
W8FGX.....717,750-330- 725
W9IOP.....698,472-327- 717
W3BES.....692,250-325- 710
W3MFW.....671,220-330- 678
WB2APG.....640,038-311- 622
K1DIR.....631,800-312- 675
K3JCT.....623,916-327- 636
W1JYH.....621,618-313- 662
K2DCA.....608,580-315- 644
W3MWC.....567,029-307- 617
W2VJN.....538,986-313- 574
WB2CKS.....536,696-292- 619
W2PCJ.....527,460-298- 590
W2GGE.....527,136-289- 608
WB2MFX.....525,480-290- 650
K3NHL.....517,536-288- 610
W9EWC (W9AQW, opr.)
517,536-288- 599
W6ITA.....504,476-288- 584
K2DGT.....504,450-285- 590
W4BGO.....500,262-277- 602
W4HUE.....490,469-281- 583
W3EKN.....482,257-277- 598
W2LXK.....465,936-272- 575
K1ZVU.....460,446-266- 577
W8VSK.....447,150-275- 542
W3MSR.....439,236-252- 581
K2LWR.....438,900-275- 532
W4BFA (WA4RPK, opr.)
438,126-274- 533
W3GHM.....430,650-275- 522
W3NOH.....415,794-262- 529
WA2OJD.....411,075-261- 525
W3HHK.....411,060-260- 527
W3MCG.....401,886-249- 538
W2MEL.....393,921-253- 522
K4EZ.....391,560-251- 520
W5BRR.....391,090-259- 504
K4YYL.....385,140-245- 524
W3KFQ.....387,960-244- 530
W5CKY.....379,848-266- 476
K6ERV (W6BHY, opr.)
370,500-247- 500
K2CHQ.....368,220-253- 483
VE1RB.....370,180-223- 649
W1ECH.....361,560-262- 460
VE2NV.....353,292-236- 499
W1FJJ.....343,980-260- 441
W3MFJ.....331,072-224- 493
W2HO.....329,280-224- 490
W6WX.....326,574-239- 456
W4DXI.....321,836-244- 442
W4BRB.....316,707-229- 468
W9GIL.....315,984-227- 464
K5RFJ.....313,782-241- 434
W3BIP.....312,936-236- 442
W3HHA.....309,024-232- 444
W1WLZ.....304,425-225- 451
W9QYW.....301,644-228- 441
W3GRS.....292,995-255- 383
W2IRV.....291,720-220- 442
WB2CZZ.....281,899-229- 413
W3KDF.....279,270-214- 435
W2SSC.....279,615-209- 445
W3MVB.....277,995-215- 431
WA4IKU.....273,762-227- 402
W2RFT.....269,658-213- 422
K1RQE.....265,032-216- 409
W6LDD.....263,862-214- 411
W1EOB.....262,710-210- 417
W4BCV.....261,294-214- 407
W5OGS.....253,485-215- 393
W1BGD.....250,668-211- 396
W1GOG.....249,900-196- 425
W1BIH.....248,400-200- 417
K5JZY.....248,184-216- 383
W4HOS.....247,293-213- 387
K1CDN.....243,104-214- 380
W0FDL.....238,992-208- 383
W5KC.....235,476-211- 372
W3ZQ.....233,856-203- 384
W8NJU.....232,752-208- 373
W3EQA.....231,600-200- 387
W2HSZ.....229,800-200- 383
W8ZJM.....228,744-216- 353
W2GKZ.....228,552-214- 356

Multioperator

W3MSK....1,736,448-476-1216
W4BVV....1,511,552-448-1125
W4KXV....1,373,166-431-1062
W3WJD....1,269,070-415-1017
W6RW.....946,404-381- 828
W3BGN.....911,878-362- 842
W3WPG.....701,910-330- 709
W8UM.....595,980-301- 660
WA3EPT.....532,824-298- 596
W8NGO.....509,760-240- 708
K3MBF.....503,565-295- 569
W3GHS.....413,766-254- 543
WA2BLV.....382,284-259- 492
W3ECR.....340,860-247- 460
W4LYQ.....302,977-229- 443
W1AW.....296,262-218- 453
W6ANN.....268,272-216- 414
K8UDJ.....229,482-209- 366

W/VE — PHONE

Single Operator

W4BVV.....872,788-292- 997
WA4PXP.....661,380-292- 755
K2GXI.....621,158-274- 756
W6ITA.....576,675-233- 825
K3NHL.....567,378-266- 712
W3LOE.....560,906-283- 669
W3BES.....525,264-248- 708
W3AZD.....513,216-243- 704
W1JYH.....509,010-235- 722
W4BCV.....500,181-253- 659
WB2MFX....471,040-230- 715
W4BFA (WA4RPK, opr.)
436,821-217- 673
K3JCT.....404,544-224- 602
W3TLN.....393,714-207- 634
K4AQQ.....373,032-198- 628
K1HVV.....361,884-212- 569
K2HLB (W2VCZ, opr.)
324,360-204- 530
W3BGN.....313,296-214- 488
W9EWC.....311,504-228- 456
VE1PL.....311,328-207- 502
K6ERV.....304,590-195- 521
K3TPL.....283,968-204- 464
K1RQE.....279,840-176- 530
W4NJF.....267,273-171- 521
W6WX.....265,860-180- 489
W5KTR.....265,359-197- 450
W3BWZ.....264,153-191- 461
W9JCZ.....262,908-201- 436
K4MSK.....261,855-165- 529
WA4CGS.....253,602-193- 438
WA4ARV....252,324-172- 489
K4ZJF.....245,520-186- 440
K7UDV/7.....243,036-172- 471
K5JZY.....230,958-182- 423
VE7PV.....226,287-153- 493
WA2IZS.....222,894-174- 427
VE3UX.....218,772-177- 412
W0CU.....212,265-159- 445
VE2ANK.....211,680-160- 441
K2LWR.....208,980-162- 430
W3GRF.....208,260-156- 445
K3BNS.....199,479-161- 413
W2QWS.....198,488-172- 386
W3VEQ.....194,880-145- 448
WB2MDH....188,640-160- 393
W0LBS.....188,046-186- 337
W5AJY.....187,680-170- 368
W2WZ.....184,680-162- 380
W2EXH.....184,356-108- 569
W3MCG.....179,280-166- 360
W2GKZ.....178,284-166- 358
VE1AFY.....175,497-137- 427
W9GIL.....170,222-164- 346
W8TWA/8....168,324-166- 338
W1RF.....163,898-161- 348
W1BIH.....163,520-160- 341
W8FYR.....161,859-163- 331
W4FRO.....159,768-168- 317
W5KC.....158,256-157- 348
W2DAJ.....157,680-146- 360
K4WJT.....157,212-132- 397
W3EQA.....156,220-146- 355
K2DGT.....148,248-142- 348
W6LDA.....148,212-138- 358
WB2FON.....142,128-144- 329
WA2WVL.....141,276-122- 386
W8DGP.....140,760-170- 276
W5OGS.....140,344-163- 287
W7UXP/1.....138,270-110- 419
WA2UJM.....132,276-146- 302
K8YRN.....131,040-156- 280
K8AXG.....129,630-149- 290
K2CHQ.....128,470-144- 296

Multioperator

W3MSK....2,316,726-402-1921
W3WJD....1,112,248-238-1131
K6OHJ.....459,192-212- 722
WA4NGO.....452,598-241- 626
W2SKE/2.....384,336-204- 628
W3MWC.....378,336-224- 563
WA3EPT.....226,872-184- 411
W6UMI.....211,600-172- 417
WA5AVL.....196,768-176- 373
K8TIG.....193,815-177- 365
W0YDM.....169,413-149- 379
WA2OJD.....156,975-161- 325
W1AW.....144,102-146- 329
WAØKXZ....127,875-155- 275

DX — C.W.

Single Operator

CO2BO.....1,004,532- 97-3454
HI8XAL.....979,830- 90-3629
HK3RQ.....714,692- 74-3220
KZ5FX.....682,640- 80-2851
PY2SO.....673,800- 75-2838
YV1DP.....629,415- 71-2955
HKØAI.....609,586- 71-2862
VK2EO (VK2ADY/W9WNV, opr.).....607,014- 81-2690
HP1IE.....569,322- 78-2133
7G1A.....484,355- 73-2220
KP4BJM.....419,616- 72-1960
VP5AR.....394,476- 71-1852
GI3OQR.....387,072- 64-2016
OA4PF.....376,788- 68-1847
PY2BGL.....343,575- 75-1530
KZ5JF.....331,062- 69-1608
KP4BBN.....306,068- 68-1564
VK3APJ.....295,746- 66-1497
PY7AKQ.....274,704- 59-1552
CM2BL.....263,700- 60-1465
PY1MCC.....243,756- 61-1332
HB9JG.....227,563- 59-1288

Multioperator

PJ5ME.....1,223,829- 87-4689
ZD8AR.....1,216,212- 86-4714
XEØAL.....952,020- 86-3690
LU1DAY.....585,276- 76-2583
G3SSO.....414,060- 67-2060
WB2PXZ/VP9
361,876- 63-5744
SM6BJI.....253,980- 51-1729

DX — PHONE

Single Operator

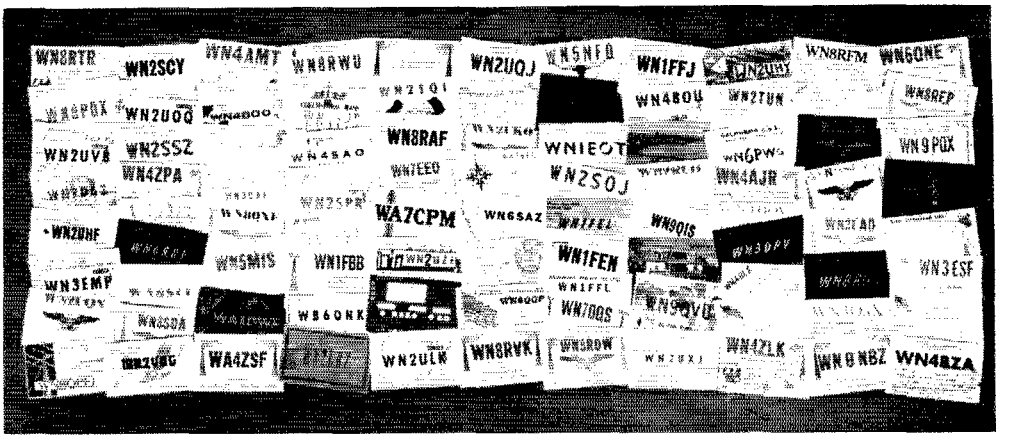
KP4CKU.....792,291- 79-3343
FS7RT.....645,000-100-2150
HK4KL.....601,848- 78-2574
FG7XL.....555,078- 71-2609
KS6BO (W9WNV, opr.)
502,578- 82-2043
HK3RQ.....478,004- 73-2186
HC1TH.....420,003- 69-2029
PY2BJO.....400,554- 77-1734
HC1RT.....397,174- 71-1857
I1BAF.....362,691- 57-2121
VP5AR.....362,664- 69-1752
KV4CF.....357,222- 58-2053
HI8XAL.....340,740- 65-1746
HP1JC.....332,280- 78-1420
PJ2CR.....326,000- 68-1600
DJ6QT.....284,160- 60-1580
TG8CJ.....244,776- 56-1457
PJ3CD.....239,355- 45-1773
OA1W.....208,824- 66-1056
6Y5OF.....206,115- 65-1057
OZ9SL.....206,100- 50-1374
DL1LK.....192,132- 54-1186
XE2JZ.....182,195- 65- 936
DJ5BV.....176,373- 57-1037
OE2EGL.....165,120- 43-1280
G3UML.....137,664- 48- 956
6Y5BS.....134,520- 57- 791
DL4LG.....126,622- 33-1279

Multioperator

ZF1BP.....494,364- 78-2115
KP4BFF.....399,855- 69-1932
GB2DX.....305,816- 56-1823
I0FGM.....241,733- 53-1548
G3SVH.....210,936- 47-1496
GW3NWV....192,780- 54-1190
EA4DO.....173,826- 54-1075
TI2AAC.....168,012- 52-1077
VP2KY.....152,703- 57- 893

QST

• 1966 Novice Roundup Results •



Recognize any of the above calls? This represents the QSL onslaught at W1AW in the weeks following the Roundup

Feb. 5–20 test a success!

THE 1966 Novice Roundup results enters the *QST* annals recording the results of 317 Novices and 103 non-Novices, a significant 13% increase in reported activity over a similar period in 1965. This initial try at a contest operation is an ideal time for the tyro to become exposed to good c.w. procedures, snappy exchanges, new states for WAS, etc. The results should become readily apparent this coming November in the SS classic.

The trend towards higher scores is readily apparent. Last year's high scorer WNØKHD barely topped 20-K. This year, 8 Novice participants made better than that mark: WN1FNK WN5OJI WN5OFZ WN3DRU WN8RWU WN8QPT WN3DNL and WN4AXR/4 — *f.b.!*

Handsome certificate awards are scheduled for July 15 mailing.

— *W1YYM*

SCORES

Scores are grouped by ARRL Divisions and Sections. The operator of the station listed first in each section is award winner for that section. *Example of listings:* WN3DUH 1428-68-21-18, or final score 1428, number of stations 68, number of sections 21, total operating time 18 hours.

ATLANTIC DIVISION

Delaware

WN3DUH	1428- 68-21-18

Eastern Pennsylvania

WN3DNL	20,060-325-59-39
WN3EGM	6280-157-40-27
WN3DQR	4248-118-36-16
WN3ETV	3480-116-30-23
WN3EAD	3456-108-32-24
WN3DPV	2783-111-23-38
WN3DPU	2314- 74-26-13
WN3DPL	1728- 72-24-16
WN3ETT	1704- 71-24-37
WN3EVU	1276- 48-22-12
WN3DVH	1008- 42-24-31
WN3DAK	731- 28-17- 9
WN3EHL	322- 23-14-14
WN3EMP	312- 26-12-11
WN3EMO	60- 10- 6-15
WN3DHV	40- 8- 5- 2
WN3EXU	22- 11- 2-13

Md.-D.C.

WN3DRU	20,748-364-57-39
WN3EUK	11,184-223-48-40
WN3EKS	5282-139-37-28
WN3DGP	64- 8- 8- 5

Southern New Jersey

WN2UVB	6125-165-35-38
WN2SCK	2059- 58-29-12
WN2RVX	742- 53-14-15
WN2UED	702- 39-18- 7

Western New York

WN2ULK	17,112-276-62-30
WN2SCY	14,300-245-55-33
WN2UHK	9450-210-42-30
WN2UQN	5775-160-33-32
WN2USB	2059- 61-29-15
WN2UQJ	1334- 58-23-11
WN2UTZ	1160- 58-20-22
WN2TQY	858- 39-22-12
WN2SOJ	656- 41-16- 7
WN2TCT	116- 32-13- 5

Western Pennsylvania

WN3ESF	9480-237-40-39
WN3DTI	2146- 59-29- –
WN3EIP	936- 39-24- 4
WN3EIB	693- 33-21- 9
WN3DEA	555- 37-15-11
WN3ERT	225- 35- 5- –

CENTRAL DIVISION

Illinois

WN9OHN	13,122-243-54-35
WN9QBM	11,664-216-54-39
WN9PUQ	8798-166-53-17
WN9QVO	4387-107-41-34
WN9PIM	4173-107-39-19
WN9QBO	3468-102-34-15
WN9QIV	3384- 94-36-19
WN9QFT	3071- 83-37-26
WN9QPO	3034- 82-37-21
WN9PYY	2054- 64-26-12
WN9QBX	2025- 75-27-15
WN9PXO	1470- 60-21-21
WN9QOU	1080- 72-15-17
WN9QXT	640- 30-16-17
WN9RHI	221- 17-13- 6
WN9REM	204- 17-12- 9
WN9QBK	20- 10- 2- 9
WN9PYV	16- 4- 4- 7

Indiana

WN9PQX	14,472-248-54-37
WN9PLG	3000-100-30-25
WN9ONZ	1464- 61-24- 8
WN9OOH	1034- 47-22-12
WN9QGT	48- 24- 2-18

Wisconsin

WN9PUN	8280-174-45-35
W9YT	7473-141-53-31
(WN9QMP, oprr.)	
WN9OMO	2624- 67-32-28
WN9PQR	1890- 70-27- 9
WN9QDT	624- 39-16-30
WN9QWW	558- 31-18-16
WN9RAK	152- 19- 8- 9
WN9RBI	50- 10- 5-11
WN9RAJ	2- 1- 1- 1

DAKOTA DIVISION

Minnesota

WNØMJF	8957-169-53-28
WNØMTD	4625-125-37-38
WNØNDN	5384- 94-36-25
WNØMWE	825- 33-25- –
WNØMUD	234- 18-13- 3

North Dakota

WNØMKO	7791-132-53-37

South Dakota

WNØNAG	8321-157-53-39
WNØMWN	2520- 72-35-24

DELTA DIVISION

Louisiana

WN5OJI	21,582-327-66-40
WN5NLS	1400- 56-25- 7

Mississippi

WN5NKX	1711- 59-29-15

Tennessee

WN4AFE	3154- 83-38-19
WN4AHB	2030- 60-29-12
WN4BOV	780- 30-26-10
WN4ALO	55- 11- 5- 8
WN4AHC	18- 1- 1- 1
WN4AET	1- 1- 1- 1

GREAT LAKES DIVISION

Kentucky

WN4AFH	6912-134-48-40

Michigan

WN8QEF	15,228-267-54-31
WN8RTP	12,036-236-51-33
WN8PXA	7360-160-46-40
WN8PKX	5890-140-38-35
WN8RZA	5100-140-34-29
WN8PWZ	4620-105-44-20
WN8PUS	3429-127-27-17
WN8SGR	2412- 67-36-20
WN8RWS	2376- 78-27-33
WN8RSO	1342- 61-22-14
WN8PVR	1273- 67-19-15
WN8SCP	1- 1- 1- 1

Ohio

WN8RWU	20,700-345-60-31
WN8QPF	20,160-320-63-33
WN8PYF	18,300-300-61-40
WN8QNJ	14,906-247-58-32
WN8SCZ	12,400-238-50-40
WN8PRA	11,742-206-57-33
WN8RVK	10,320-230-43-30
WN8SCE	5740-149-35-40
WN8RCN	4400-110-40-14
WN8RAF	4375-125-35-26
WN8PKE	4046-109-34-20
WN8REN	3960-100-36-24
WN8RFM	3888-108-36-41

NOVICE DIVISION LEADERS

Atlantic...WN3DRU	New England...WN1FNK
Central....WN9PQX	Northwestern....WN7CPI
Dakota....WNØMJF	Pacific.....WN6RGR
Delta.....WN5OJI	Roanoke.....WN4BXT
Gr. Lakes.WN8RWU	Rocky Mt.....WN5NEB
Hudson....WN2UXJ	Southeastern.WN4AXR/4
Midwest..WNØNKT	Southwestern...WN7DAZ
West Gulf...WN5OFZ	

WN8RQQ	2782-107-26-14	
WN8PVN	2010- 67-30-27	
WN8SGP	1820-140-13-11	
WN8QPH	1650- 75-22-17	
WN8RXM	493- 29-17- 9	
WN8RQU	350- 25-14- 7	
WN8QNR	336- 24-14- 3	
WN8SDF	324- 27-12-12	
WN8QXF	175- 15- 7- 8	

HUDSON DIVISION

Eastern New York

WN2UHZ	3870-119-30-40	
WN2SOA	500- 30-10-14	
WN2UEQ	24- 8- 3- 6	

N. Y. C.-L. I.

WN2TCU	9160-214-40-39	
WN2UZE	6192-144-43-34	
WN2SNL	5822-132-41-20	
WN2UPB	5423-172-29-31	
WN2UGP	4380-131-30-23	
WN2UHF	3208- 97-34-19	
WN2UHY	3016- 84-29-37	
WN2TBP	1716- 63-22-17	
WN2URE	1539- 81-19-18	
WN2UZU	1241- 73-17-16	
WN2VFF	950- 40-19- 8	
WN2VIO	555- 27-15- 8	
WN2VCM	252- 21-12-11	
WN2UEM	84- 21- 4-10	
WN2SST	1- 1- 1- 5	

Northern New Jersey

WN2UXJ	14,832-309-48-36	
WN2SSZ	7452-192-36-35	
WN2TLA	6876-171-36- –	
WN2SPR	6650-175-38-30	
WN2UFC	5174-199-26-30	
WN2SOU	3224-124-26-33	
WN2TBA	2424- 91-24-17	
WN2UOQ	2231- 82-31-34	
WN2UFS	1254- 46-19-15	
WN2UOP	1088- 54-17-15	
WN2UVP	684- 36-19-12	
WN2UMF	204- 17-12-26	
WN2UEK	35- 7- 5-14	

MIDWEST DIVISION

Iowa

WNØNMA	7200-144-50-40	
WNØNOQ	2550- 60-34-19	
WNØLQD	2148-169-12-39	
WNØMWX	722- 28-19-14	

Kansas

WNØNKT	14,250-235-57- –	
WNØNTC	924- 27-22-17	
WNØNGL	225- 10- 9- 4	

Missouri

WNØMEG	8600-172-50-28	
WNØNIC	2988- 73-36-36	
WNØMHP	2387- 67-31-13	
WNØMPN	2310- 65-35-14	
WNØNOH	1102- 38-29-37	
WNØMBI	495- 33-15- 9	
WNØNDQ	120- 10- 4- –	

Nebraska

WNØMNO	2409- 73-33- –	

NEW ENGLAND DIVISION

Connecticut

WN1EAF	12,636-243-52-13	
WN1FBT	5495-157-35-28	
WN1FGC	3186-108-27-22	
WN1DWF	2928-112-24-13	
WN1FNJ	2450- 78-25-32	
WN1FMN	1700- 58-25-11	
WN1EFT	1539- 81-19-16	
WN1EHK	846- 37-18-12	
WN1FIR	612- 36-17-11	
WN1FFJ	576- 38-12- 4	
WN9QVU/1	184- 13- 8- 3	
WN1EDR	155- 21- 5- –	
WN1FNI	105- 15- 7- –	
WN1FHW	6- 3- 2- 1	

Eastern Massachusetts

WN1EUU	16,588-286-58-32	
WN1FFY	10,485-233-45-32	
WN1EOT	5808-117-44-18	
WN1DZV	1971- 63-27-10	
WN1ENP	969- 47-17-10	

Maine

WN1EKU	2987- 88-29-40	
WN1EIG	840- 84-10-18	

New Hampshire

WN1EUF	4520-113-40-24	
WN1FGN	4032- 96-42-40	
WN1DYP	3850- 95-35-40	
WN1FCK	3390- 93-20-26	
WN1FNQ	864- 38-18-12	
WN1FEN	855- 45-19- –	
WN1EWB	132- 12-11-10	

Rhode Island

WN1FNK	28,480-430-64-34	
WN1FFL	3799-131-29-28	

Western Massachusetts

WN1CDN	7040-150-44-40	
WN1EDM	5016-122-38-36	
WN1FBX	2650- 96-25-38	
WN1EYF	1540- 77-20-18	
WN1FBB	645- 43-15-13	
WN1EUD	96- 12- 8- 4	

NORTHWESTERN DIVISION

Alaska

WN7BVQ/KL7	120- 12-10-27	

Idaho

WN7DAM	2852- 82-31-37	
WN7EDR	108- 18- 6-19	

Montana

WN7DLC	1400- 85-14-20	
WN7DQS	1035- 63-15-14	
WN7EAP	16- 4- 4- 2	

Oregon

WN7CPI	5828-124-47-29	
WN7DOX	3762- 89-38-30	
WN7DGF	1056- 44-24-20	
WN7EMF	609- 29-21-10	
WN7COB	60- 10- 6- 3	

Washington

WN7EBI	539- 49-11-15	
WN7CVB	30- 6- 5- 4	
WN7EKB	26- 13- 2- –	

PACIFIC DIVISION

East Bay

WN6QNE	6600-130-44-17	
WN6REZ	1000- 40-25-21	
WN6QWZ	9- 3- 3- 5	

Hawaii

WH6FQW	171- 19- 9- 4	

Sacramento Valley

WN6PWG	5000-125-40-24	
WN6ONT	2212- 79-28-14	
WN6QZL	400- 25-16- 4	

San Francisco

WN6QJW	990-100- 9-25	

San Joaquin Valley

WN6RDS	3432- 88-39-23	
WN6QNK	2312- 68-34-16	
WN6QVX	630- 30-14- –	

Santa Clara Valley

WN6RGR	10,864-184-56-27	
WN6QWF	2331- 53-37-15	
WN6QYL	1680- 60-28-12	
WN6REG	56- 8- 7- 7	

ROANOKE DIVISION

North Carolina

WN4BGL	14,508-259-52-30	
WN4ZLK	8232-196-42-28	
WN4ZFU	4176-106-36-13	
WN4ZPA	2322- 76-27-15	
WN4ZLJ	2310- 62-30- 5	
WN4BAA	2304-144-16-35	
WN4ZOT	1372- 49-28-12	

South Carolina

WN4YZC	12,376-221-56-35	

Virginia

WN4BXT	16,200-300-54-33	
WN4ZSF	14,456-278-52-37	
WN4AMT	7040-150-44-29	
WN4BOO	6600-190-33-24	
WN4BLJ	2262- 77-26-40	
WN4AHE	420- 30-14-16	
WN3EXR/4	260- 20-13-10	
WN4BOW	1- 1- 1-10	

West Virginia

WN8RDW	8668-177-44-38	
WN8RHT	6943-121-53-11	
WN8RON	6300-130-45- 9	
WN8SDA	5915-169-35-33	
WN8PWR	3604-106-34-15	
WN8RYF	30- 6- 5- 2	

ROCKY MOUNTAIN DIVISION

Colorado

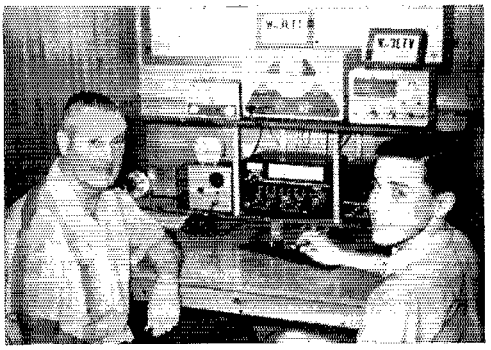
WNØNBZ	9853-167-59-36	
WNØNJP	6468-132-44-25	

New Mexico

WN5NEB	10,085-183-55-12	

Utah

WN7DOP	8008-154-52-28	
WN7CZN	5371-131-41-17	
WN7EML	1600- 64-24- –	



WN3ETT (left) and son WN3ETV shared time in the Round-up at this neat station. Equipment includes an SWR indicator, DX-40, Sixer, oscillator-monitor (from ARRL's Understanding Amateur Radio), 2-B and Q-multiplier. Oh yes, son Bob topped Dad's score in Eastern Pennsylvania!

Wyoming

WN7EWC	7480-136-56-20	

SOUTHEASTERN DIVISION

Alabama

WN4BOJ	11,960-220-52- –	
WN4AYL	2880- 80-32-11	
WN4BMO	1672- 61-22-17	
WN4BAS	836- 28-22- 4	
WN4BBD	45- 9- 5- 4	
WN4BBI	18- 9- 2- 3	

Eastern Florida

WN4AXR/4	20,008-328-61-24	
WN4CGM	8736-168-52-40	
WN4BII	2592- 72-36-16	
WN4AVN	2088- 72-29-30	
WN4BDF	1470- 49-30-17	
WN4AQS	1162- 83-14-12	
WN4ZQZ	1020- 51-20-25	
WN4BMR	864- 23-18-18	
WN4YNP	860- 43-20- –	

Georgia

WN4AJR	5334-119-42-36	
WN4AYN	20- 5- 4- 4	

SOUTHWESTERN DIVISION

Arizona

WN7DAZ	11,664-201-54- –	
WN7ETQ	5265-117-45-27	
WN7EKY	3876-102-38-26	

Los Angeles

WN6QLM	8305-151-55-39	
WN6RHC	3738- 89-42-10	
WN6SAZ	2928-158-16-21	
WN6OKW	702- 24-18- 4	
WN6OIV	333- 27- 9- 3	
WN6QYP	9- 3- 3- 2	

Orange

WN6QQP	8008-144-52-37	
WN6QND	1150- 46-25-15	

San Diego

WN6RDF	4760-104-40-28	
WN6RBR	126- 14- 9- 4	

WEST GULF DIVISION

Northern Texas

WN5NFQ	3822- 90-39-20	
WN5MET	1316- 47-28- 5	
WN5OOB	320- 22-10-15	
WN5NCY	54- 3- 3- 3	

Oklahoma

WN5NZA	1612- 62-26-24	

Southern Texas

WN5OFZ	21,452-346-62-40	
WN5NLF	2346- 54-34-13	
WN5NET	2108- 68-31-20	
WN5NWX	40- 10- 4- 9	

Soapbox

"Much fun." — *WN3DRU*. "Increased my WAS from 32 to 45 and worked W1AW!" — *WN2ULK*. "Strong local QRM made operating tough at times." — *WN2UHK*

University of Cincinnati sophomore WN8QPF just missed out leading Ohio with 320 exchanges in 63 sections. Marianne upped her WAS total by 20 and attributes her enjoyable interest to the enthusiasm of K8LNL.

"Wonderful contest but two weeks is too long." — *WN9PUQ*. "Must compliment the Generals on their courtesy and slow code speed. Noticed a lot of Novices who sent their call so fast it was uncopyable. Is it supposed to be a secret?" — *WN9REM*. "Band conditions fairly good at W9YT, operating under all Novice regulations. Missed KH6, ENY, VT and Nebr." *WN9QMP*, opr. *W9YT*. "Didn't hear any Novices in my own section of Wisconsin." — *WN9PQR*. "The greatest thrill was working Rhode Island and Delaware towards my WAS." — *WNØNAG*. "Thanks for the Roundup, it was the most." — *WN8SCE*. "Worked more Generals than Novices and my first Canadian, VE8BB." — *WN8PVN*. "The N-R gave us an opportunity to see what contest operation is like, many thanks." — *WN8QPH*. "My greatest thrill in ham radio." — *WN2UPB*. "Only ran 15 watts and every contact was a thrill." — *WN2UHY*. "After the SS I was so frustrated I was ready to sell the rig and tear up my ticket. Thanks for running the Roundup not only because it was fun but also because it convinced me not to sell my rig." — *WN2SSZ*. "Where was everyone on 15?" — *WN2UMF*. "Thanks for the contest ARRL, I now have 48 states for my WAS." — *WNØNKT*. "Thanks a lot for the great experience. Boy, wait till my General and the SS!" — *WNØMPN*. "Greatest thrill was working Rhode Island and the greatest letdown was recopying six pages of log." — *WN6RGR*. "Talk about fun, I worked 20 new states and 2 Canadians just on the weekends." — *WN6QYL*. "I know I could have done better but for a bit of bad luck. Right in the middle of a QSO I looked out of the window and there was my 40 meter dipole lying on the ground." — *WN4BGL*. "Where were the VEs and W7 Novices?" — *WN4YZC*. "All in all lots of fun and hope the SS is going to be as great when I get my General." — *WN4BOO*. "Sorry the log jumps around but I'm a housewife as well as the mother of 3 children." — *WN7CZN*. "Thanks to all those Generals for those hard-to-get sections." — *WN6QLM*. "Thanks very much for having the Roundup so that beginners like myself might get the thrill of contest working plus the on-the-air experience we so very much need. If Novice radio can be this much fun, I can only imagine what a real thrill it will be to hold a General Class license." — *WN6SAZ*.

"I sincerely hope that the Novices I worked show this much ability and courtesy when they are Generals." — *WA1DWE*. "Don't know how I ever survived all that 40 meter QRM as a Novice." — *K2MFY*. "Seems to be a good crop of Novices this year." — *W2NIY*. "And I thought QRM was bad on the General portion!" — *WB2PPO*. "Many good operators showing promise." — *WA3BTA*. "Novice participants tell me that it is being pursued by a horde of General-Class stations that makes the Roundup exciting." — *W4KFC*. "Wish I had known about this when I was a Novice." — *WA4YDR*. "Started out just to find a Wyoming Novice, got the bug and between baby sitting and feeding rabbits made over 10,000 points." — *K5KDG*. "Always nice to work the N-R and meet the new crop of contesters." — *WA6VTL*. "A little more effort to inform Novices before the contest would be in order. Many of them missed new sections by not trying 15 meters." — *WA8PLJ*. "I found the signals better, the code faster, the competition keener, though procedures poorer, than last year." — *WA9IXF*. "Some of these boys are real sharp." — *KØHJC*. "Lots of Illinois Novices on."

New England Division leader WN1FNK was a popular Rhode Island multiplier for over 400 stations in 64 sections. Myles is a sophmore at the University of Rhode Island.

— *WAØMLE*. "Nice relaxed contest for an old guy. I enjoyed being the first VE for many of the Novices." — *VE3DN*.

NON-NOVICE SCORES

W1BGD 500, W1CNB 702, K1DPB 1512, WA1DWE 3567, W1ECH 8650, WA1EQU 1334, WA1EWF 210, WA2DSR 1176, K2MFY 2494, WB2MYY 9, W2NEP 2210, W2NIY 1909, WB2NLH 5320, WB2OOJ 8, K2PDK 3045, WA2PIA 792, WB2PPO 338, WA2PZD 900, WB2RSS 578, WB2SYW 2790, WB2TNB 1752, WB2UCB 2156, WB2UIR 1197, WA3AQY/2 342, WA3BSV 36, WA3BTA 3706, W3CBF 2701, WA3CRA 972, WA3DHG 6992, WA3DYW 680, W3MSR 5945, K3ZOL 1062, W3ZSR 99, W4DR 4485, W4KFC 4469, WA4PAE 5246, WA4PRF 126, WA4QLP 4446, WA4QOC 132, WA4TFI 13, WA4TLB 6760, WA4TUF 330, WA4TWB 8610, WA4UAZ 2072, WA4UGA 1560, WA4VEC 3990, WA4YDR 3108, WA4YPB 828, WA5HGP 1500, K5KDG 10,032, WA5LSM 5175, WA5MBC 1550, WA5MHR 6700, WB6IEX 7852, WB6MCA 3196, WB6NBU 1026, WB6NCJ 300, WB6NQS 848, WB6NXK 896, W6OEO 2958, WB6PCV 2552, K6TWE 4674, WA6VTL 7052, WA7ASM 1508, W7FCD 1482, WA8GUF 2923, WA8KHP 8771, WA8KME 492, WA8KUW 1533, WA8MAM 130, WA8MCQ 630, WA8NHU 4440, WA8NYS 902, WA8PLJ 1404, W8RGF 1856, WA8RGT 360, K8SWW 9048, K9GDF 1152, WA9IXF 4750, WA9JDK 279, WA9MJG 35, WA9NYJ 2320, WA9OMO 54, WA9NVY/9 1848, WA9POZ 280, WAØEWJ 6000, KØHJC 100, WAØJNF 1173, WAØKIR 100, WAØKQU 15, WAØLJV 1300, WAØLVG 408, WAØNLN 2604, WAØKXJ 525, WAØMLE 574, WØQMS 8916, VE2AQJ 336, VE3AJE 1092, VE3AQN 851, VE3DGB 4250, VE3DN 4750, VE3DSB 2820, VE3GCE 1520, VE7BLO 3996.

Strays

ANNUAL REPORT, FINANCIAL STATEMENT

The complete Annual Report of the Officers and Directors to the Board of Directors, a booklet of about a hundred multilithed pages, is now available to members at cost price of 75¢ per copy. Many affiliated clubs have requested and received complimentary copies of the report; these should be available on a loan basis to active members of the club.

The financial statement, which forms a part of the above book, can be obtained separately by members at no charge. Again, a self-addressed envelope of business size would be helpful.

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Recently, at a DX convention in Fresno, California, W6DQH broke up the banquet by beginning grace with these words "and now, as we pause to communicate with God. . . . errrr, I realize that for some of you this may be a new country."

AMATEUR RADIO PUBLIC SERVICE CORPS

CUNDUCTED BY GEORGE HART,* W1NJM

ARPSC at the Convention

It has been gratifying to note that programs having public service as their themes have been receiving more prominence at conventions in the past few years — particularly national conventions. Last year at San Jose there was so much public service on the program that some conventioners grumbled that the subject was overdone. This year in Boston there were three or four meetings devoted to this topic, plus a continuing meeting of the Eastern Area NTS staff which few knew about (more on this later).

From the public service standpoint, if you missed Boston you missed a good convention. This was the grandaddy of all amateur conventions, national and otherwise, with attendance of around 5,000. The public service meetings weren't exactly mob scenes, as some of the meetings almost were, but they were well attended and well run and lively.

On Saturday afternoon Milt Chaffee, W1EFW, former ARRL director, SCM and now serving as 1RN manager, conducted a Public Service Forum which lasted the better part of two hours. In the neighborhood of 100 people were in attendance. The discussion took the form of explanation of ARPSC and its purposes and principles. RACES was supposed to have been represented by an OCD official from OCD Region 1 who unfortunately was not able to be present. We offered and undertook to answer any and all questions regarding RACES in his place.

There was excellent participation from the audience. While attendance was naturally predominantly from New England and New York, the number of officials and other amateurs from outside the area gave the convention a definite national (even international) flavor. Canada was represented by Canadian NEC VE2AUU, who was well received. The west coast was represented by Jack Dunn, W6WPF, the south by South Carolina SCM W4PED and Virginia SCM W4SHJ. Many others from far away were also present.

On Sunday morning there was a small meeting of big people: SCMs and SECs for the purpose of discussing AREC problems. Present were SCMs from E. Mass., Conn., R. I., Vt., N. N. J., Va., S. C. and Nevada. SECs present included those from E. Mass., R. I., and W. Mass. Moderator was E. Mass. SCM W1ALP, with W1BDI and W1NJM sitting up front also to answer questions. The principal topic of discussion was whether or not to make technician licensees eligible to hold EC appointments.

Also on Sunday morning we had an opportunity to be a member of the audience (for a welcome change) to listen to EAN Manager K1WJD hold forth on the subject of net controlling. This was a well-thought-out and excellently-presented talk which we could recommend to anyone interested in the subject.

As a wind-up to the Public Service portion of the convention, your NEC presented the latest ARRL slide collection entitled "The Amateur Radio Public Service Corps." Since this program was billed as a traffic meeting, we showed the NTS version (SC3-3), which lasted approximately 35 minutes. This version gives general principles of AREC but full details on the operation of NTS. Among those present were the entire NTS staff of the Eastern Area, prominent traffic men and gals galore from all over the country.

Even more significant than the number of meetings and the attendance at them, however, was the level of interest and enthusiasm shown toward the subject. There was never a dearth of questions whenever such were called for. Frequently, a question was not a question at all, but a desire on the part of someone proud of his own group or organization to expound its virtues.

We think that amateur hamfests and conventions will increasingly feature public service subjects in their meetings, and we think they *should*. Should one be planned for your area that does not contain anything on this vital phase of

During one of the breaks in the Eastern Area Staff's meeting held at the national convention in Boston, we were able to get the boys to stay in one place long enough for this photo. Left to right: W1EFW, 1RN manager; W2ZVW, veteran EAN NCS; W8CHT, 8RN manager; W3EML, Eastern Area TCC Dir.; W4SHJ, 4RN manager and Va, SCM; WA2GQZ, 2RN manager; W7DZX, Pacific Area TCC Dir.; K3MVO, 3RN manager; VE3BZB, ECN manager; K1WJD, EAN manager and W1NJM (who's he?). (Photo by W1BGD).

* National Emergency Coordinator.

amateur radio in its program, we urge you to take steps to see that it does. — *W1NJM.*

RACES in ARPSC

We suggest you take a look at Minute No. 108 of the minutes of the ARRL Board of Directors meetings, published elsewhere in this issue. RACES is now considered an integral part of ARPSC, and our future literature will reflect the change when existing supplies are replaced. The exact details of implementation of this policy require study and some contact with government officials. We'll keep you advised.

Diary of the AREC

The opening rounds of the blizzard of '66 in Virginia started with scattered snow flurries across the state during the week of Jan. 24. The accumulation was moderate and not unusual for most parts of the state. On Jan. 29, the main event began with a steady, blowing snow. By 1700 EST it was obvious that the storm was going to be something other than "usual." Travel was getting to be difficult as rising winds caused the fine powdery snow to drift across roads and streets. K4SCL, PAM Virginia, convened the Virginia Sideband Net to provide a section level net for liaison with the local nets if required. Stations were also sent to monitor the 75-meter NCEF. WA4EUL, RM Virginia, sent the Virginia Net into session to provide additional liaison and support. Several local v.h.f. nets were called and stations took turns monitoring net frequencies.

On the evening of Jan. 30, more high winds and drifting snow closed many highways, roads and streets. Snow plows were able to clear the primary roads only. For the residents of Loudoun Co., Jan. 31 was just the beginning of the ordeal of snow. At Leesburg, WA4NKM, EC Loudoun Co., had made contact with city, county and state officials and offered the services of the AREC. The regional civil defense director declared a c.d. emergency in the county. The local c.d. coordinator asked WA4NKM to determine the status of county roads, but since none of the mobiles could move, the task was not completed.

On Feb. 1, WA4NKM set up his station at the Red Cross chapter to aid in coordinating food drops to isolated families. WA4VVJ relayed food requests from the fire board, W4GFY operated from the airport, while WA4FEY/-WA4FEZ operated mobile at the helicopter food pick-up point at a local shopping center. The next day, WA4NKM again activated the 2-meter net and set up at c.d. headquarters. WA4VVJ set up at the fire control board, WA4FEY at the highway department office, K5GOE/4 at Red Cross headquarters, W4GFY at the sheriff's office and W4NFQ at the helicopter pick-up point. Information on road conditions, food and medical requests and messages concerning the routine operations of the county were relayed by the net. By Feb. 3, the net was secured when the c.d. coordinator decided that the situation was under control.

Operation throughout the rest of the state was mainly a watch-and-wait affair, where amateurs provided whatever local communications might be requested by officials. — *W5VZO/4, SEC Virginia.*

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On Mar. 20, the Grand Forks AREC (N. Dak.) was activated by WAØBIT to provide emergency communications to the dikes bordering the Red River of the North for the Red Cross. The emergency 2-meter net was put into operation in about 1½ hours with mobile units placed in Red Cross vans, which were brought into the area from Milwaukee, Wis. The net control station, WAØJXT, was located at RC headquarters in Grand Forks. The operation lasted for 427 hours with 27 amateurs participating. — *WAØAYL, SEC N. Dak.*

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On Apr. 5, WB2HWH answered a CQ from K3UOS/mm who had urgent traffic for the owners of the ship he was on. WB2HWH took the traffic, delivered it and relayed the reply back to K3UOS/mm in jig time. — *WB2HWH.*

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At 1410 PST on Apr. 7, K7ZOK/m arrived at the scene of a two-car head-on collision in a sparsely populated area in the northwestern tip of Arizona. K7ZOK checked into the West Coast Amateur Radio Service Net where he was answered by WA6MOV and WA6WHP. Requests for medical aid, police cars and an ambulance were relayed to K7SOT, *W7s* ZC PCY and W6VX. — *W7PBV, SCM Nevada.*

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A tornado struck the area west of Coweta, Okla., on April 11, leveling five homes, barns and sheds. Thirty-two people were left homeless. The local AREC net was called into action by the Red Cross and mobile units were asked to go to the disaster area to survey the damage. W5DBZ, K5ZCJ, *WA5s* BPS IVS and WN5OEM went into the disaster area while W5GZS and K5GMP acted as base stations and handled traffic into Tulsa. The operation lasted 6½ hours. On Apr. 12, *K5s* ZCP GMP and WN5OEM returned with the Red Cross to the disaster area while W5GZS assumed the duties of base station. — *K5ZCJ.*

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On Apr. 29, VE1AED, stationed with the U.N. Peace Corps in Gaza, contacted VE2UN and asked him to relay a message to the wife of an airman who had been involved in a crash. VE4MW, operator of VE2UN, took the message and delivered it while VE2BQO and VE2APN kept the frequency clear. — *VE2ABV, SEC Quebec.*

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At 1000 MST on Apr. 2, WØGCH called the Forestry Service to ask if there was any special alert because of the extremely dry condition of the forest and the high winds that were starting. He also asked about the column of smoke that was coming from the mountains. The fire officials said that they hadn't been on alert, but were now. At this point, WØGCH activated the AREC nets, with WAØEJI acting as NCS on 75 meters and WØGCH NCSing the 2-meter net. By 1020 MST, all 15 available amateurs were checked in and standing by, but no emergency situ-

August 1 Deadline for RACES Plans

The Federal Communications Commission (on May 26) approved all outstanding Radio Amateur Civil Emergency Services (RACES) Plans as INTERIM Plans for the Amateur Radio Service under the provisions of Executive Order 11092, which assigned emergency preparedness functions to the Federal Communications Commission.

This action, which was concurred in by all interested Government Departments and Agencies, is the result of studies and recommendations by the Amateur Radio Service Subcommittee of the Commission's National Industry Advisory Committee (NIAC), of which the ARRL Secretary is chairman.

A detailed review of all present RACES Plans will be conducted by the Amateur Radio Service Subcommittee of the NIAC. All State and local Civil Defense Directors are requested to submit two copies of their present RACES Plans to their Regional Director, Office of Civil Defense for transmittal to the NIAC not later than August 1, 1966.

All other interested entities are requested to submit their requirements for emergency communications, utilizing facilities and personnel of the Amateur Radio Service, to the Executive Secretary, NIAC, Federal Communications Commission, Washington, D. C. 20554, not later than August 1, 1966.

The above information will be utilized by the Amateur Radio Service Subcommittee of NIAC in the development of a new BASIC PLAN for the Amateur Radio Service under the provisions of Executive Order 11092.

ation developed, and the nets secured by 1245 MST. — *WØGCH, EC Pikes Peak Area, Colo.*

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On Apr. 24 and 25, a tornado struck the San Antonio, Texas, area. K5HZR, communications director for the Red Cross San Antonio Chapter and Bexar Co. EC, requested AREC members to survey the damage. K5HZR picked up K5FPJ, EC Bee Co., and went to the disaster area in K5FPJ's mobile. Traffic was handled with W5PIL who delivered it to the police station, and K5SRO, operated by W5MIF, in San Antonio. Observation of the stricken area was made, and reported to various officials. — *K5QQG SEC S. Tex.*

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When a severe snow storm struck Southern Manitoba, AREC members stood by on their respective nets waiting to be of service. Both 6- and 75-meter nets were activate and some 54 amateurs participated. Luckily, no communications emergency developed, and the nets secured. — *VE4OC, SEC Manitoba.*

WAØBIT, Grand Forks Co., N. Dak., EC, operated one of the 2 meter links installed by the Forx Amateur Radio Club. The link tied the Red Cross headquarters to their mobile feeding van stationed at the scene of the flood (see Diary for more details).

Forty-six SECs reported for March, representing 20,520 AREC members. This is 6 more reports and 1,290 more AREC members. Since the beginning of the year, the regular reporters have been keeping right up with their jobs. Many others, unfortunately, have sent in only one or two reports. Even if there has been no change in the AREC status in your Section from month to month, we would still like to get your report. Oh yes, please don't indicate "no change," just repeat the figures you gave us in your last report. Those Sections heard from this month were: Conn., E. Mass., N.Y.C.-L.I., N.N.J., W.N.Y., E. Pa., W. Pa.,, Del., Ala., E. Fla., Ga., Ky., N.C., Tenn., Va., Ark., La., Miss., N. Mex., Okla., S. Tex., Los A., Orange, S.F., S.V., Hawaii, Mont., Nev., Ore., Wash., Wyo., Mich., Ohio, W. Va., Ind., Wis., Colo., Mo., Nebr., S. Dak., Que., Ont., Man., Sask., Alta., B.C.

RACES News

On Apr. 19, the Kansas City, Kans., weather bureau issued a severe weather and tornado watch report at about 1000 CST. This report was sent to the Johnson Co., c.d. office and the general news media. KØBJI was alerted and assumed control of the communication net operation of the Johnson County Emergency Communication Unit operating under the c.d. office. WØWYK, c.d. director, asked KØBJI to advise all stations that this was only an alert and that they should monitor the net frequency for any additional information.

At 1300 CST, KØGOZ/mobile, who was returning from central Missouri, contacted KØBJI, who informed him of the situation. By 1400 CST several storm cells were reported and all mobile units were requested to keep a sharp lookout for tornado activity. At 1518, a mobile unit reported the formation of a funnel with ground contact. At the same time, a mobile unit from the sheriff's office reported the same sighting. At that moment, WØWYK ordered the "take cover" signal sounded and immediate warnings were sent to all schools and hospitals. KØGOZ was asked to go mobile and head for the damaged area.

When KØGOZ arrived at the scene of the disaster, he requested additional mobile units be sent. WØGTQ responded and upon arrival set up a temporary communication post near a church. Emergency generators were brought into the area and placed where needed. Full communication links were set up to Johnson County c.d., the Red Cross and supporting services working in the disaster zone. Twenty five amateurs participated. — *KØGOZ, R.O. Johnson Co., Kans.*

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On Mar. 3, the North Dakota Emergency RACES Net was called into operation and operated continually throughout the duration of the worst blizzard in that state's history. Over 150 stations were in constant contact throughout the upper Midwest area. In one case, amateur radio was used to aid the rescue of a group of some 50 stranded cars on an interstate highway. An amateur in the group used his rig to make contact and get a snow plow to the group. — *WAØAYL, SEC N. Dak.*

National Traffic System

One of the high points at the national convention in Boston in April was a get-together of the Region and Area net managers and the Eastern and Pacific Area TCC directors of NTS for some extended face-to-face discussions of problems. The discussions commenced on Friday night, lasted until well after midnight, re-commenced the following day and lasted until early afternoon, continued Saturday evening lasting again until after midnight — about ten to twelve hours in all.

The meetings were set up and all arrangements made by EAN Manager Bud Hippisley, K1WJD, who also was the principal organizer of some of the other public service features of the convention.

What did we talk about for twelve hours? Details, just details. Everybody is agreed on general principles, but how the fur can fly over the details of operation! Each Region net has its own problems that have to be considered, as have the Eastern Area net and the TCC. Then there are problems, even more important, having to do with the liaison functions of the various nets in the system, and subjects concerned with the operation of the system in general. Differences of opinion on policy, no; but differences regarding operation — plenty.

EAN Manager K1WJD smoked out a number of areas to be probed and distributed them as a tentative agenda for the meeting. They were a great help in conducting the discussions which followed, although the whole thing was kept on a pretty informal basis. Perhaps you will be interested in a brief rundown of subjects and the trend of discussions:

(1) *Emergency.* In emergencies, activated NTS nets should keep a close watch on the NCEFs so that any emergency traffic appearing thereon can quickly be diverted to organized channels. Details of emergency activation should follow the general principles in the Public Service Manual, but there was more said on exactly how this should be accomplished. It was the feeling of the group that more NTS operators, and especially control stations, should be equipped with emergency power.

(2) *Simulated Emergency Test.* Many hours of discussion on this topic — so much, in fact, that it had to be curtailed in order to cover others. The discussion is continuing by mail. Principal disagreement was on the NTS cycling procedure to be used and whether or not permitting NTS net managers to use their own judgment would disrupt the system.

(3) This was strictly a managership problem of procedures for issuing certificates. The Public Service Manual sets minimum requirements, leaves much to the judgment of the individual net manager. Question was, just how much can be left to him? Should the minimum requirements stated also be the *maximum* requirements? Long discussion

did not result in any change in basic policy, but the subject received a thorough airing.

(4) On the matter of formalization of an Eastern Area Staff of NTS, there seemed to be general agreement that it should be formalized in a manner similar to that of the Pacific Area Staff. W1NJM was requested to get up some proposals and circulate them among NTS managers at Region and Area level.

(5) It was generally agreed that NTS should *not* go on "daylight saving" time (i.e., operate an hour earlier) until or unless the entire nation changes, because it imposes too much of a hardship on those Sections which do *not* change. It was realized that many Section nets and some Region nets would operate an hour earlier during the six-month "daylight saving" period, but it is recommended that all stick to the suggested meeting times in the PSM.

(6) There was general sentiment that some method for routing foreign traffic should be devised, but no specific proposals were made.

(7) The present policy of including all modes in NTS was generally upheld, with no prejudice against use of any nor partiality for others, but the requirement for adequate liaison between and among modes used is basic.

Sound as though not too much was accomplished? Don't be deceived. It was an accomplishment in itself just to get everybody together for extended discussions, the first time this has been done at any Area level. True, there are many problems still to be tackled and discussed, but we envision other meetings, and in any case there will never be an end to problems. At least we hope not. We also hope that we will always have a group of top-level NTS net managers like those who beat their brains out around the table in the Exeter Room at the Sheraton-Boston Hotel on April 22–23, 1966.

Who participated? These: 1RN Manager W1EFW; 2RN Manager WA2GQZ; 3RN Manager K3MVO; 4RN Manager W4SHJ; 8RN Manager W8CHT; ECN Manager VE3BZB; TCC Director W7DZX; TCC Director W3EML; Dean EAN NCS W2ZVW; participating observers from ARRL headquarters, W1BGD and W1NJM; and in charge of all arrangements and ex-officio chairman of the group, EAN Manager K1WJD. Date of next meeting, undetermined. — *W1NJM.*

April Reports:

Net	*Sessions*	*Traffic*	*Rate*	*Average*	*Representation (%)*
1RN	60	447	.323	7.4	83.6
2RN	56	499	.813	8.9	92.7
3RN	60	845	.525	14.1	98.3
4RN	59	785	.432	13.3	94.8
RN5	60	1012	.429	16.8	89.3
RN6	60	1112	.729	18.5	95.6
RN7	29	413	.500	14.2	62.9
8RN	62	620	.374	10.0	96.2
9RN	30	705	1.248	23.5	100
TEN	60	959	.742	16.0	81.7
ECN	30	217	.342	7.2	86.7
TWN	27	478	.623	17.7	66.7
EAN	30	1832	1.247	61.1	93.9
CAN	30	1611	1.259	53.7	100
PAN	30	1563	1.107	52.1	97.8
Sections[2]	2196	14,546		6.7	
TCC Eastern	120	934			
TCC Central	90	785			
TCC Pacific	120	1066			
Summary	2819	30,443	CAN	9.98	9RN/CAN
Records	2431	32,465	1.322	17.8	100

[1] Representation based on one or less sessions per day.

[2] Section/Local nets reporting (75): VN VSN VSBN(e) VSBN(1) (Va.); NJN NJ6&2 (N.J.); TN ETPN TSSBN TPN (Tenn.); AENB AENP AENO AENM AENH AENR AENT (Ala.); OSN (Ore.); BN OSSBN (Ohio); MOTTN PHD MOSSBN (Mo.); KYN KTN (Ky.); EPA WPA PTTN (Pa.); NCN NCNL NCSSBN THEN NCNE (N.C.); MDD MDDS (Md.-D.C.); BUN (Utah); EMNN WMN (Mass.); SCSN (S.C.); NCN SCN (Cal.); QIN (Ind.); QFN WFPN FMTN GN (Fla.); ILN (Ill.); GTN (Ga.); MTN MNPN MEPN (Man.); OZK (Ark.); CHNN (Colo.); Wolverine, Mich. 6 mtr., QMN(2) (Mich.); WSN (Wash.); LAN (La.); WCBN (Wis.); NTTN (Tex.); Iowa 75, Iowa 160; OQN (Ont.-Que.); MCPN(e) MCPN(n) MSN MJN (Minn.); CPN (Conn.); VTNH (Vt.-N.H.); BCSN BCEN (B.C.)

[3] TCC functions not counted as net sessions.

Veteran traffic man Jack Kane, W7DZX, has been the Director of the Pacific Area TCC since 1962. Jack can be found on most any band doing what comes naturally to him, handling traffic and gobs of it, too. (Photo by *Wenatch Daily World*).

We broke the sessions record again this month. Eight nets were able to stay over the 90% representation figure, but it appears that spring fever has taken its toll, especially with the younger members. A special congrats to the 9RN crew for breaking the 1.0 rate figure. There aren't too many Region nets that have been able to do this in the past, and it's quite an accomplishment.

We would like to remind all Region and Area net managers that when figuring your representation you use the total number of sessions *scheduled* for the month, not always the same as the total number *reported*. You get no credit for representation for unreported sessions.

W1EFW is planning a 1RN bulletin soon in an effort to greet the gang and suggest procedure for keeping things moving. WA2GQZ is still having trouble getting NCS reports; if things don't improve, Joe is going to "shake out the broom" again. K3MVO reports another good month. W4SHJ issued 4RN certificates to K4IEX, WA4UMX, W5VZO/4 and KZ5FX, the first KZ5 ever to receive a 4RN certificate. Representation on RN5 dropped because the two main Miss. men were off the air; K5IBZ issued

NATIONAL CALLING AND EMERGENCY FREQUENCIES (kc)

FULL TIME

3550	7100	50,550
3875	29,640	145,350

PART TIME

7250	14,225	21,400
14,050	21,050	28,100

Full time frequencies are for use 24 hours per day but only for emergency and traffic calling purposes. No transmissions for *any* purpose (except calling for emergency help) the first minutes of each hour.

Part time frequencies are for traffic calling and general amateur use except in an FCC-requested or FCC-declared emergency, at which times they become *full time* frequencies.

This is a voluntary amateur program, designed to show what we can do without FCC regulation. Its success will require us all to work together. Any amateur wishing to assist is invited to use ARRL notification cards to be sent to stations not observing the rules.

RN5 certificates to K5OKR and WA5JOL. K7JHA is happy that Alberta is now providing liaison to RN7; now, let's go Montana! W8CHT called two special sessions for 8RN during the Florida tornadoes this month. W9QLW is proud of the "rate" turned in by the 9RN crew this month, the highest they have ever had; 9RN certificates were issued to WA4WWT and WA4TTE. The move to DST is hurting TEN; Iowa, Mo. and Minn. are the only ones on DST, so TEN is operating on CST which makes the second session very late for a few. WØLGG issued TEN certificates to WØTDR, WØINH and VE4EI. K1WJD issued EAN certificates to *W1s* BGD EFW, WA1APY, W2SEI, WA2UPC, *WB2s* SLI AEJ, K3FHR, W8CHT, *K8s* KMQ YSO, *WA8s* HVR JXM, *VE8s* GI AWE. CAN had a great month with good traffic, an excellent "rate" (a new record for this month) and a continuation of 100% representation. Before they let him go, the navy wants WB6JUH to take one more cruise, this time for seven months. John plans to reactivate K4AKP when he retires.

Transcontinental Corps: W3EML reports another good month, but a few fellows aren't sending their reports to Bill. W7DZX arrived home safely after his trip to the national convention. Traffic is up and Jack boasts another month of 100% reporting.

April report:

Area	*Functions*	*% Successful*	*Traffic*	*Out-of-Net Traffic*
Eastern	120	94.2	2519	934
Central	90	88.9	1570	785
Pacific	120	93.3	2132	1066
Summary	330	92.1	6221	2785

TCC roster: Eastern Area (W3EML, Dir.) — *W1s* BGD EFW NJM, K1ZND, *W2s* GVH SEI, K2SIL/8, *WA2s* BLV UPC UWA WB2AEJ, *W3s* EML FAF NEM, K3s FHR MVO, W4DVT, WA4UMX, *W8s* CHT RYP, *K8s* KMQ NJW QKY YSO, *WA8s* CFJ GYT, WØOHJ. Central Area (W4ZJY, Dir.) — *W4s* OGG ZJY, WA5OL, *W9s* CXY DYG JOZ QLW VAY ZYK, *WA9s* BWY NFS, *WØs* HXB/4 WYJ, *KØs* AEM GSY, WAØDOU. Pacific Area (W7DZX, Dir.) — *W6s* EOT IDY VNQ TYM BGF HC, *K6s* DYX LRN, *WA6s* ROF WNG, WB6JUH, *W7s* DZX GNC, WA2WBA/Ø.

Net reports:

Net	*Sessions*	*Check-ins*	*Traffic*
Mike Farad	26	484	577
7290	41	1232	784
HBN	30	415	721
North American SSB	26	781	1210
Barnyard	26	595	21
20 meter SSB	22	369	2204
Interstate SSB	30	1048	607

The Florida Tornado

The boys in Florida were tired of the same old run of the mill type hurricane disasters, so W4MLE and W4IYT dreamed up something different. They snagged a real live tornado, and turned it lose in the Tampa and St. Petersburg area of the state.

At 1100 EST, Apr. 4, W4MLE was called to the governor's office (along with other reporters and news men) for a briefing on the tornado that had struck in Polk and Hillsborough Counties. George called W4IYT, who was up to his neck in paint, and suggested a Condition Two be established on Net C, C.D. headquarters in Jacksonville was contacted and W4MLE was advised that W4OVE was on the air and operating in Net C; everything was under control. There was no great amount of traffic being passed for the first hour, but little by little, the P2 traffic started to build up. The Miami Weather Bureau advised all tornado alerts were cancelled at 1700z, and a Condition 4 was established by W4IYT.

QFN held its regular session at 2330z and after seeing that there was going to be a great deal of traffic flowing into the state, decided to continue its session until 0635z the next day. Stations in the Second, Fifth, Eighth, Ninth, and VE3 call areas were checking directly into the net and passing their traffic.

W4MLE went to the 80 meter NCEF (3550 kc.) and called a short "CQ QTC FLA" and received two replies. The traffic was handled quickly (off the NCEF, of course) and taken to QFN.

During this time, W8CHT, 8RN Manager, activated 8RN and held two additional sessions for the purpose of clearing any traffic going into or coming from the disaster area. Checks were made of the NCEF by various net members and traffic cleared.

In Broward Co., *WA4s* OAO RXG, and *K4s* CRU IGU, under the direction of EC K4EVY, handled health and welfare inquires into affected areas from local Red Cross and c.d. agencies and relayed same from out of state. Several hundred pieces of traffic were handled.

Lee Co., AREC members were also active in the various nets, W4TUB and WA4HDH operating in both phone and c.w. nets while EC W4SMK participated in the Tropical Phone Net.

W4FP, EC Lakeland Co., lost commercial power shortly after the tornado struck. His emergency generator was quickly hooked up and after a quick check of the 6 meter net frequency he went to the Florida Sideband Emergency Net. At the request of the Red Cross, W4BOW (see page 45, April 1966 *QST*) was activated and a portable 6-meter station set up alongside the Red Cross relief area to serve as an intercom between the disaster area and RC headquarters. This circuit remained in operation for 20 hours, manned by WA4SCA and WA4NEM.

As is typical in emergencies of this type, where the actual disaster takes only a matter of minutes to occur, the amateurs spent most of their time providing communications for the Red Cross, civil defense, the Weather Bureau and local police and fire officials. The bulk of the traffic handled was in the form of health and welfare messages.

In summing up the operation, W4MLE hit the theme of the whole operation when he said, "This has to be one of the most casually run big operations Florida ever ran."

QST

Strays

Stolen Equipment

Sometime between May 7 and May 11, my Galaxy V transceiver (serial No. 6602V2241) was stolen from the Keesler ARC building, Keesler AFB, Miss. Any information should be sent to L. H. Molitor, K9VBS/5, CMR #4, Box 14796, Keesler AFB, Miss. 39534.

Who is trying for a license-plate WAS? On a trip from Maine to Philadelphia, E. C. Helmetag, K3LBM, had his Pennsylvania license plate (K3LBM) stolen from his 1964 Mercury while staying at a motel in East Hartford, Connecticut!

A Collins 75A-1 (serial No. 250) was stolen in transit between Peoria, Illinois and Anderson, South Carolina. Please notify W4DRF, Route 2, Box 62-B Belton, South Carolina 29627.

Venezuelan Independence Contest July 2-3, 1966

Rules for this RCV-sponsored affair were received too late for an earlier *QST* announcement of this phone-only contest. Please refer to page 107 in June 1965 *QST* for information on exchanges, scoring, etc. The postmark deadline is September 15, 1966.

Many inexpensive but valuable publications on radio and electronics can be obtained from the Government Printing Office in Washington, D. C. Sometimes libraries have extensive catalogs on many subjects, but if these are unavailable write to the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. and ask for their price list on radio publications.

It's always distressing when someone informs us he can't find anyone to accept his registration in the Emergency Corps. This article contains some details on what to do in such cases.

HOW TO JOIN THE AREC

Including Some Plain Talk on Public Service Work

BY GEORGE HART,* W1NJM

NOT so long ago we received a letter from one of our avid fans to the effect that: "All this hifalutin' philosophy you give us about ARPSC and AREC is just dandy, but tell me this: suppose a ham wants to get into AREC, just how does he go about it?"

If this is an implied rebuke, it may be well deserved. Often we become so tangled up in the complexities of administering a volunteer organization such as AREC that we tend to neglect the basics. All too often, the fact that it isn't always easy to join the AREC comes forcefully to our attention. It's easy enough to say "see your local emergency coordinator" and leave the poor guy dangling, but this doesn't always do the trick. Who *is* the EC, and suppose there is none, then what? Or supposing the EC doesn't do anything, what then? Suppose you're a novice, suppose you're a technician, suppose you don't belong to the League, suppose. . . .

The Initial Steps

Let's assume you're an amateur who decides he's had enough rag chewing, DXing and general fiddling around and decides he wants to do something more constructive and useful for a change. "Join the AREC!" says the literature you get with your ARRL membership, and enclosed you find AREC forms and a letter from John Huntoon telling you about this and all the other advantages of being a ham and belonging to ARRL. You're impressed. You decide by golly you'll do it, you'll get out there and do your part and stop letting "George" do it. So you fill out the AREC registration form in fullest detail.

Hmm, it says to forward to your EC, SEC or, SCM. You not only don't know who they are, you don't even know what the initials stand for. So you look on page 6 of *QST*, like it says. Funny, you never noticed that page before. Okay, you mail the registration form to your SCM, then sit back and wait for things to happen, in the manner of "come and get me, you lucky people, I'm all yours!"

Variations

Up to this point, your experience is fairly typical. From here on out, however, the variables are tremendous. Of course if you knew who your EC was to begin with, it would simplify matters; you could put the bee on him directly. Otherwise, if you're lucky, your SCM will forward your registration to your SEC who will forward it to your EC who will issue your membership card and send you complete dope about the local set up and invite you to the next drill. That's a lot of forwarding, and if any link in the chain is missing, your application could get lost.

Anyway, suppose *nothing* happens? If you are persistent (and we hope you are!) you'll probably write to headquarters about it, and we'll tell you to try again, this time giving you the address of your local EC (if any) and your SEC and sending a copy of our reply to both, plus a copy to the SCM.

Your Local EC

That oughta get 'em! If it doesn't (alas, it sometimes doesn't!), you probably need a new EC, maybe a new SEC and SCM too! But let's start with the EC, now that you know who he is. If he is in range, call him on the telephone, ask him if he ever received your registration form, tell him you're interested in the local AREC

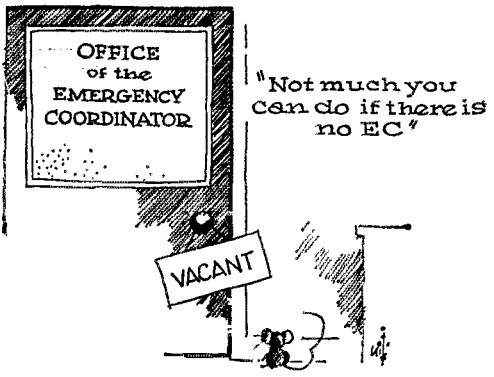
* National Emergency Coordinator, ARRL

group and would like to join it. Give him your qualifications. He will probably say he never received your registration and ask you to send in a new one and tell you about the status of the local AREC group.

Keep in mind that your local EC is a volunteer. He has the appointment because he agreed to do the job, but he has to earn a living or go to school the same as everybody else. He may have a family. Why, then, you might ask — if he doesn't have time — did he agree to tackle the job in the first place? Well, maybe because there just *was* no one else who could or would do it. Anyway, in the beginning be sure to give him the benefit of any doubt. You just may find that he's a pretty good man.

What, No EC?

If there is no EC in your town, county or other local jurisdiction (depends on how your Section is organized by the SCM), your SEC is supposed to issue your AREC membership card, send you a copy of the Public Service Manual and keep your registration on file until an EC can be appointed — after which he forwards it to the new EC, along with any others for the area that he has collected in similar fashion.



Let's develop this subject of "no EC" a bit. As we said, the AREC is an *amateur* organization organized and administered by amateurs, and it is 100% volunteer. If there is no EC in your town, don't blame your SEC, or your SCM, or even headquarters. We can put "an article a month" in *QST*, write bulletins, conduct Field Days and Simulated Emergency Tests, make slide collections, visit clubs, hamfests, conventions, put public service at the top of the list of objectives for the betterment of the amateur service, spend thousands of dollars making free supplies available, untold hours trying to convince the average amateur that public service is requisite, is satisfying, is important to our future, is *fun* — all of this is not enough if 9 out of every 10 active amateurs are solely interested in the hobby aspects and take no part in AREC, NTS or any of the numerous other service activities, ARRL-sponsored or not, and steadfastly refuse to use their licenses for anything else.

Basically, AREC organization is a local function. The local EC is the key man. If you don't have one, your hands are pretty much tied. *Someone* has to take the lead. If that someone cannot be you, that may be understandable, but you have no right to assume that anyone else's personal affairs are any less important than yours; you have no right to criticize the leadership that does exist, or the fact that none exists.

How To Get an EC

If the big stumbling block, then, is lack of a qualified EC, the thing to do is examine the possible procedures in obtaining one. But before we go into this, one more sage observation seems to be in order. An EC without someone to coordinate *for* and work *with* is little improvement over no EC at all. An EC who gets no cooperation from local amateurs is as helpless as the group of amateurs with no EC to lead them. If you follow the procedures about to be described and succeed in getting an EC appointed, this does not free you or the rest of the amateurs in town from the need to pitch in and help organize a good emergency setup. You don't just sit back and wait to be led, and if no leadership is forthcoming shrug your shoulders and piously affirm that you did your part. You get behind your man, support him, *push* him if necessary to get something going, or — if all else fails — find someone to replace him.

But we're getting ahead of ourselves; let's not start talking about replacing him until we find him to begin with.

The first thing you might consider is to take the job yourself. You have to have a general (or conditional) class license or higher and you have to be a League member. The former may require a little work, if you are a novice or technician licensee, but the latter is easy — anyone can do it.

There can be many reasons (and quite a few lame excuses, too) why you can't take it on. Let's assume you are in this category, but remember that if everyone else feels this way you're in trouble from the start.

There are many ways of approaching the problem of getting an EC. One is personally to approach amateurs of your acquaintance and try to talk them into it. Another is to bring it up at the radio club, if there is one. Still another is to send out a notice to all local amateurs calling a meeting at some public place for the purpose of organizing a local unit of AREC. Further details of EC selection and functions have been discussed in a previous article.[1] Whatever method you use, the objective is to get the best man available for the job.

Are You Licked?

Now we have one more supposition. Suppose, in spite of all your good intentions, you find you are the only amateur in town who has even the slightest interest in public service work. Are you

[1] *Organizing Your Local AREC*, Sept. '64 *QST*, page 34.

licked, then? Might you just as well peddle your gear and take up stamp collecting?

Not at all. While you can't very well participate in local emergency work if there is no local emergency group, there are still other ways in which you can be of material assistance. We haven't even mentioned RACES, and even with no other amateurs in town you may be able to get something started along this line, in conjunction with your c.d. director. Trouble with this is that in this case you would probably have to be a leader, and we have already assumed that you are not in a position to take a leadership role. So that's out.

What's left? Nothing, at the local level. But there are still nets and traffic handling. Maybe your Section organization has a Section Emergency Net in operation, in which you can participate. The League's net directory will reveal this information.

Or, if no emergency net, how about giving traffic a whirl? There isn't much distinction between an emergency net and a traffic net these days anyway, because every emergency net should know how to handle traffic (and the only way to do that is to *handle* some) and every traffic net should have an emergency operating plan. If AREC is out for you, in most cases NTS is still available. If no NTS, there are hundreds of independent nets rendering a perfectly good public service, and you will find these listed in the ARRL net directory, too — provided they registered that is.

How About Some Help?

The amateur who finds it impossible to devote at least part of his time to public service operating — that is, the one who really *wants* to — is a rare animal indeed. In the AREC we have some 30,000 who are doing it; in NTS perhaps another 3,000 who are engaged in organized traffic handling. In non-ARRL groups, perhaps another 5,000. If these estimates are anywhere near correct, then our grand total of service-minded amateurs is about 40,000. A large group. But it is less than twenty per cent of the total, and this is not enough.

Does anyone have some suggestions for getting greater amateur participation? QST

July 1941

. . . K. B. Warner discusses the case of the midwestern operator who plagued the FCC for several months before being apprehended by operating on government channels and more or less posing as a ham. KB deplores the fact that the local hams were well aware of his operations but took no steps whatever in running him down. It is the amateur's clear duty to report such infractions immediately. Reminds me a little of some things at present going on in the 75-meter band.

. . . Clint DeSoto quotes from his extensive file of newspaper clippings to show that the amateur "image" is pretty good in the eyes of editorial writers although some headline writers are blaming the hams for non-ham operations, interference, etc.

. . . A nice little portable-emergency transmitter using either 6- or 1.5-volt tubes is described by Clavin F. Hadlock, W1CTW. It is just about a 5-inch cube. Keying is accomplished in the screen circuit of the final amplifier.

. . . Going up in size and power is an "apartment-size" 100-watter described by William A. Woehr, W9WOP. This is a real nice looking rig and uses a TZ40 final. Reminds me of the present table-top types so popular at present.

. . . Announcement is made of the appointment of Dave Houghton to the post of League Treasurer. He came to the League in April 1922 and, next to Warner, has the longest service record with us.

. . . George Grammer, W1DF, describes a compact and sensitive absorption-wave meter equipped with plug-in coils to cover from 1.5 to 72 Mc.

. . . The work of Mexican amateurs in the recent severe earthquake in Colima, Mexico is described by Manuel Medina, XE1N. In particular, the heroic work of Roberto Levy, XE1IO is told. He received an official commendation from Brig. Gen. Lobato of the Mexican army for his work. FB.

. . . The National Bureau of Standards has an article on the prediction of useful distances for radio communication for July, August and September 1941. Very interesting material, in light of the present methods of predicting radio propagation, such as sun-spot activity, configuration of the planets, etc.

. . . For those interested in basic design, an article by R. S. Naslund, W9ISA, on "Optimum *Q* and Impedance of R.F. Inductors" offers a number of graphs for calculating these quantities, thus saving considerable mathematical labor.

. . . In the Ham-Ads, it says you can buy the summer edition of the *Call Book* for $1.25. The type is large enough to read, too.

. . . The League announces a new class of membership, associate member. To qualify, one does not have to have either an operator's or station license. It is non-voting. — *W1ANA*

Hints and Kinks For the Experimenter

CLEANING TRANSFORMER LAMINATIONS

THE insulation from old transformer laminations can easily be removed by soaking the laminations in carburetor cleaner for about 15 minutes and then rinsing them off in clean water. — *Bill Waters, K4YZD*

(Be sure to shellac each lamination as the core is put back together. Otherwise, the eddy-current losses in the core will be quite large. — *Editor*)

KWM RELAYS

SOME KWM owners have had difficulties with their transceivers because of dust and dirt accumulating in the relays. This has been especially true of mobile installations.

Cover the relays with small plastic cups, the type used for food containers. Masking tape will secure the cups to the chassis and keep out the dust. — *Louis A. Gerbert, W8NOH/6*

SHRINKABLE SLEEVE ELIMINATES SHIELDING GAP IN R.F. CABLE

IN order to wire a shielded cable to a multipin connector, it is necessary to remove one or more inches of the shielding. A grounding jumper across the gap between the terminated portion of the braided metal and connector, which is commonly used, does not provide adequate r.f. shielding across the gap. An easily installed sleeve assembly, between the connector and the terminated portion of the metal shielding, as shown in Fig. 1, solves the problem.

The sleeve assembly consists of a short length of braided metal enclosed in a heat-shrinkable plastic sleeve. The assembly is slipped over the terminated end of the cable and the base of the connector. Heat is then applied to shrink the plastic sleeve and force the inner metal braiding tightly around the mating components, thus forming a continuous r.f. shield. The sleeve assembly can be easily removed when necessary. — *NASA Tech Brief 65-10387*

KEEPING FEEDLINES UNTANGLED

KEEPING the feedlines of my two beams from getting tangled in the top rotator clamp continued to plague me until I "borrowed" one of my XYL's large plastic flower pots, removed the flower (of course), cut a hole in the bottom and placed the pot over my rotator as illustrated in Fig. 2. — *H. H. Lewis, K3GSJ*

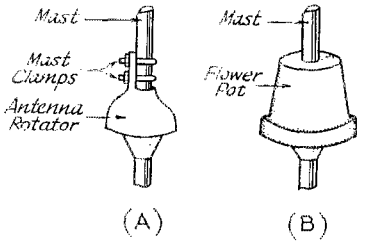


Fig. 2—K3GSJ's antenna rotator (A) before and (B) after modification.

INSTANT B.F.O. FOR CONVERTERS

RECENTLY I required a b.f.o. for my home receiver, which consists of a Gonset 3–30 Mc. converter feeding a BC receiver at 1500 kc. To save the effort of wiring an oscillator, I simply put a transistor radio near the BC receiver antenna terminals, and set the "transistor" to 1500 minus 455 or 1045 kc., so that the local oscillator would be tuned to my first i.f. The transistor radio on-off switch became the b.f.o. switch, the tuning knob acted as a pitch control and the position of the "transistor" determined the amount of oscillator injection. I did have to get out the soldering iron, though, to wire in an a.g.c. defeat switch to ground out the a.g.c. line in the BC receiver. Of course, a transistor radio with a 455 kc. i.f. may be used in this way for any converter with an ouput from 955 to 2055 kc.

— *Alan Budreau*

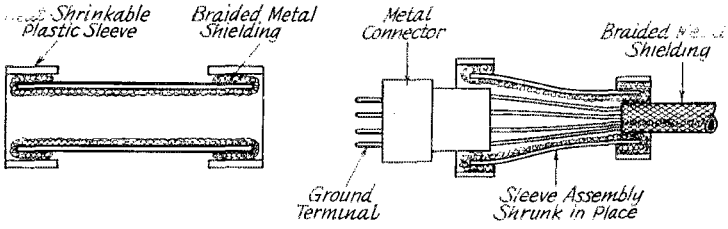


Fig. 1—The drawing shows how good r.f. shielding can be obtained from connector to cable.

THE CWX CONTROL

I believe that the addition of one silicon diode to W4VQK's CWX control system described in the February, 1966 issue of *QST* will speed up the pickup time of K_2 considerably. As the original circuit stands, K_2 will not come up until contacts K_{1A} close. This delays the turning on of the high-voltage supply, and the operation of the antenna relay.

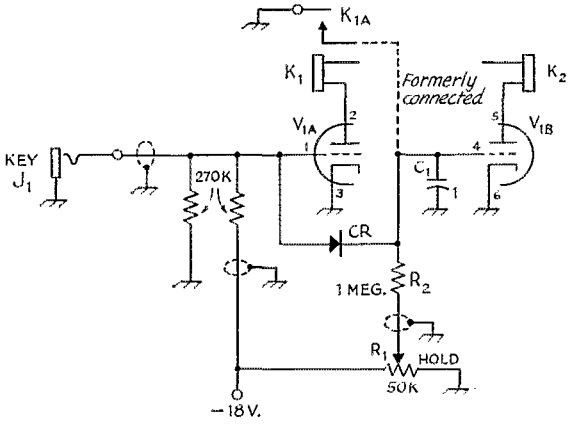


Fig. 3—Operation of the CWX control unit was improved by removing the original connection between K_{1A} and pin 4 of V_{1B} and inserting a silicon diode, CR, between pin 1 of V_{1A} and pin 4 of V_{1B}. CR should have a high back resistance (e.g. 1N659A).

By adding the diode, as shown in Fig. 3, K_2 will be energized simultaneously with K_1. This should reduce the possibility of a missed first dot that W4VQK mentions.

When the diode is used, the contacts K_{1A} are no longer needed to switch V_{1B}, and may be used for some other purpose, if desired. — *Dennis P. Bryan, W2AJW*

(Actually, most of the delay is introduced by the interlock system described in the original article. Thus the improvement brought about by use of the diode may not be too significant. However, the diode does eliminate the need for a two-pole relay. — *Editor.*)

RTTY RIBBON REJUVENATION

When the ink in the ribbon becomes dry and can't transfer to the paper, I found that a few drops of glycerin will give the ribbon "new life." Leave the ribbon on the spool and apply the glycerin to the exposed surfaces of the ribbon. Wrap the spool and ribbon tightly in aluminum foil and put it in a warm spot until the glycerin permeates the ribbon. — *John L. Kemp, WB6KML*

A HEAVY KEY BASE

A lead base will help to keep a brasspounder's key from sliding around the operating table. Find an empty sardine can large enough to contain the key and fill the can with lead (obtainable from fish-line sinkers). Use a kitchen stove to melt the lead. When the lead has hardened remove it from the can. Glue a piece of felt or inner-tube rubber to the bottom of the newly formed base and mount the key on the top side. The key won't walk around so much anymore. — *Roger White, WN2SIJ*

"BANDSPREADING" A PLATE TUNING CAPACITOR

I have a 5-band linear with pi-L network switching. After many hours of trying to tune it on 21 and 28 Mc. with the same big capacitor used on 3.5 and 7 Mc., I switched over to a two-section capacitor and used one section on 14, 21 and 28 Mc. and both on the lower frequencies. However, even one section was still too hair-triggery to tune for comfort on 21 and 28 Mc. So I altered the section as illustrated in Fig. 5. Fig. 4 shows how the capacitance varies as the dial setting is changed for both the modified and unmodified sections. The plates (rotor only) were cut with shears and buffed to round the edges. Sweepback of the cuts is not critical and the capacitance change, as each successively smaller plate is meshing, is fairly smooth, as Fig. 4 shows. Only the modified section is used on 14, 21 and 28 Mc.; the other section is switched in parallel with it on the lower bands. Now the linear tunes as easily on 28 as on 3.5 Mc. — *D. W. R. McKinley, VE3AU*

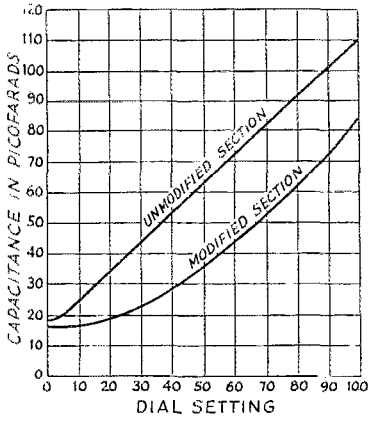


Fig. 4—Graph of the capacitance at various dial settings of the Hammond type 8810, two-section variable capacitor. Values are for a capacitor that has one section unchanged and the other section modified as in Fig. 5.

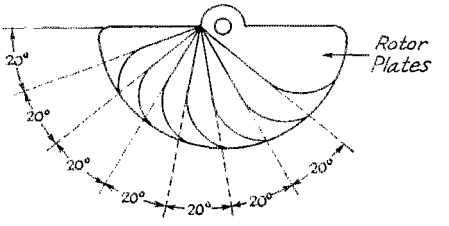


Fig. 5—Details of VE3AU's capacitor modification. Only the rotor plates are altered; the stator plates are left intact.

Happenings of the Month

Board Meeting Minutes
Denniston New President
WØGQ Becomes Director
FCC Examination Schedule

WØNWX NEW ARRL PRESIDENT

At the Board Meeting on May 6-7, Robert W. Denniston, WØNWX, was elected president of ARRL for a two-year term beginning immediately and ending at the close of the 1968 meeting.

The new president has been director from the Midwest Division since January 1, 1956. Now 47, Bob has been licensed since he was 13. He works c.w., s.s.b., and a.m., and uses all the bands from 1.8 through 148 Mc., his work on the latter including some relays through Oscar III. He is ARRL emergency coordinator and RACES radio officer for Jasper County, and serves as a net control station for the Tall Corn Net (c.w.), the Iowa 160 Meter Phone Net and the Jasper County Emergency Net.

Robert W. Denniston, WØNMX

Bob regularly operates in Field Day, Sweepstakes and the V.H.F. Sweepstakes, and, when operating VP1JH in 1960 ran up the highest DX score ever recorded in the ARRL DX contest.

Our prexy claims credit for fathering the DX-pedition, leading "Expedition Gon-Waki" to the Bahamas in 1948, solely to operate VP7NG in the ARRL DX Contest. FO8AJ, Clipperton, followed in 1954 and in 1961 he was with the gang at Malpelo, HKØTU. He's also held VP2VL, W9NWX, (pre-war) and W4NNN.

Back on the organizational scene, Bob is past president of the Des Moines Radio Amateur Association, the Newton Amateur Radio Amateur Association, and the Potomac Valley Radio Club.

He has been a member of the ARRL Executive Committee for the past five years. He has visited 15 countries on behalf of the International Amateur Radio Union, was the U. S. delegate at Mexico City when the Region II Division, IARU, was formed, and has been on its executive committee from the start.

When Bob is not engaged in amateur radio activities, he works at the presidency of Denniston and Partridge Company which owns 27 lumberyards. He is a director of the Newton Home Savings and Loan Association and of Dealers Warehouse Company, a wholesale building materials firm, and is past director of the Iowa Retail Lumberman's Association. He's also a member of Rotary International.

WØNWX had four years in the Army Signal Corps, with duty as chief of the radio control section at WAR, in the Pentagon. He has also served as radio operator aboard the presidential train, near the end of World War II, which he describes as sort of a rolling Field Day station, with balky gas generators, poor antennas and phenomena best ascribed to Murphy's Law.

President Denniston is married and has a daughter in college and a son in junior high.

FOSTER, WØGQ, NEW MIDWEST DIRECTOR

Sumner H. Foster, WØGQ, took office as director from the Midwest Division on May 7, 1966 with the election of Bob Denniston, WØNWX as president. Sum makes his home in Cedar Rapids, Iowa, and is 55 years old. He is vice president of the Corn Refining Division, Penick and Ford, Ltd. He has been vice director from the Midwest Division for the past ten years and is a past president of the Cedar Valley Amateur Radio Club, Inc. Sum is district emergency coordinator for Northwest Iowa, and is RACES radio officer for Linn County and for Area Four, Iowa State RACES. He was first licensed in 1926, and has continuously held a ticket since 1932. His term of office as director continues to January 1, 1968.

REVISED ARTICLES AND BY-LAWS

The Board Meeting minutes to follow show a number of changes in the Articles of Association and By-Laws of the League. Parliamentary procedural requirements make these changes hard material to read. Accordingly, members may write to the Secretary, here at headquarters, for a copy of the Articles and By-Laws as amended. A self-addressed business-size envelope would be appreciated.

W6ZH accepts a silver bowl from New England Division Director W1QV, making the presentation on behalf of the amateurs of New England, at the 1966 National Convention in Boston.

FCC 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 1966. (Applicants for Novice, Technician or Conditional Class licenses should follow the procedures outlined on page 79 of December, 1963 *QST* or in current editions of the *License Manual.*)

1 Boston, Mass. 02109; India & State Streets; Wed.–Fri., 8–10 A.M.
* Also conducts examinations at Bangor, Me. in May; Hartford, Conn. in March and Sept.; Portland, Me. in Apr. and Oct.

2 New York, N. Y. 10014; 641 Washington Street; Tues.–Fri., 9–12 A.M.
* Also conducts examinations at Schenectady, N. Y. in Mar., June, Sept. and Dec.

3 Philadelphia, Penna. 19106; 2nd & Chestnut Streets; Mon.–Wed., 9–10 A.M.

4 Baltimore, Md. 21202; Gay & Water Streets; Mon., Fri., 9 A.M.

5 Norfolk, Va. 23510; Granby & York Streets; Fri., 9–10 A.M.
* Also conducts examinations at Salem, Va. in Apr. & Oct.; Wilmington, N. C. in June & Dec.; Winston-Salem, N. C. in Feb., May, Aug. and Nov.

6 Atlanta, Ga. 30303; 240 Peachtree Street, N. E.; Tues., Fri., 8:30 A.M.
* Also conducts examinations at Nashville, Tenn. in Feb., May, Aug., and Nov.; Memphis, Tenn. in Jan., Apr., July and Oct.; Knoxville, Tenn. in Mar., June, Sept. and Dec.; Birmingham, Ala. in Mar., June, Sept. and Dec.

6S Savannah, Ga. 31402; York & Bull Streets; 2nd & 4th Tues. each month, by appointment only.

7 Miami, Fla. 33130; 51 S. W. First Avenue; Thurs., 9 A.M.
* Also conducts examinations at Jacksonville, Fla. in Apr. and Oct.

7T Tampa, Fla. 33602; 500 Zack Street; Mon.–Fri., by appointment only.

8 New Orleans, La. 70130; 600 South Street; Mon., 8:30 A.M.
* Also conducts examinations at Jackson, Miss. in June and Dec.; Little Rock, Ark. in Feb., May, Aug. and Nov.

8M Mobile, Ala. 36602; 113 St. Joseph Street; Wed. by appointment only.

9 Houston Texas 77002; 515 Rusk Avenue; Tues., 9 A.M.
* Also conducts examinations at San Antonio, Texas in Feb., May, Aug., and Nov.; at Corpus Christi, Texas in Mar., June, Sept. and Dec.

9B Beaumont, Texas 77701; 300 Willow Street; Tues. by appointment only.

10 Dallas, Texas 75202; 1314 Wood Street; Tues., 8 A.M. to 1 P.M.
* Also conducts examinations at El Paso, Texas in May and Nov.; Lubbock, Texas in May and Nov.; Oklahoma City and Tulsa, Okla. in Jan., Apr., July and Oct.

11 Los Angeles, Calif. 90014; 849 S. Broadway; Wed. 9 A.M. to 1 P.M.
* Also conducts examinations at Bakersfield, Calif. in May; Las Vegas, Nev. in Jan. and July; Phoenix, Ariz. in Jan., Apr., July and Oct.; Tucson, Ariz. in Apr. and Oct.

11SD San Diego, Calif. 92101; 1245 Seventh Avenue; Wed., by appointment only.

12 San Francisco, Calif. 94111; 555 Battery Street; Fri., 8:30 A.M.
* Also conducts examinations at Fresno, Calif. in Mar., June, Sept. and Dec.

13 Portland, Ore. 97205; 620 S.W. Main Street; Fri., 8:45 A.M.
* Also conducts examinations at Boise, Idaho, in Apr. and Oct.; Klamath Falls, Ore. in May.

14 Seattle, Wash. 98104; 1st Avenue & Marion Street; Fri., 8:45 A.M.
* Also conducts examinations at Billings, Mont. in May; Great Falls, Mont. in Sept.; Spokane, Wash. in Apr. and Oct.

15 Denver, Colo. 80202; 19th Street between California and Stout Streets; 1st & 2nd Thurs., 8 A.M.
* Also conducts examinations at Albuquerque, N. Mex. in Apr. and Oct.; Rapid City, S. Dak. in May; Salt Lake City, Utah in Mar., June, Sept. and Dec.

16 St. Paul, Minn. 55102; 6th & Market Streets; Fri., 8:45 A.M.
* Also conducts examinations at Jamestown, N. Dak. in Oct.; Marquette, Mich. in May; Sioux Falls, S. Dak. in Mar., June, Sept. and Dec.

17 Kansas City, Mo. 64106; 911 Walnut Street; Thurs. and Fri., 8:30–11 A.M.
* Also conducts examinations at Des Moines, Iowa in Mar., May, Sept. and Dec.; Omaha, Nev. in Jan., Apr., July, Oct.; St. Louis, Mo. in Feb., May, Aug. and Nov.; Wichita, Kans. in Mar. and Sept.

18 Chicago, Ill. 60604; 219 South Dearborn Street; Fri., 9 A.M.
* Also conducts examinations at Davenport, Iowa in Jan., Apr., July and Oct.; Fort Wayne, Ind. in Feb., May, Aug. and Nov.; Indianapolis, Ind. in Feb., May, Aug., and Nov.; Louisville, Ky. in Feb., May, Aug. and Nov.; Milwaukee, Wisc. in Jan., Apr., July and Oct.

19 Detroit, Mich. 48226; Washington Blvd. & La Fayette Street; Wed. and Fri., 9 A.M.
* Also conducts examinations at Charleston, W. Va. in Mar., June, Sept. and Dec.; Cincinnati, Ohio in Feb., May, Aug. and Nov.; Cleveland, Ohio in Mar., June, Sept. and Dec.; Columbus, Ohio in Jan., Apr., July and Oct.; Grand Rapids, Mich., in Jan., Apr., July and Oct.

20 Buffalo, N. Y. 14203; Ellicott & Swan Streets; 1st & 3rd Fri., 9 A.M.
* Also conducts examinations at Pittsburgh, Penna. in Feb., May, Aug. and Nov.; Syracuse, N. Y. in Jan., Apr., July and Oct.; Williamsport, Penna. in Mar., June, Sept. and Dec.

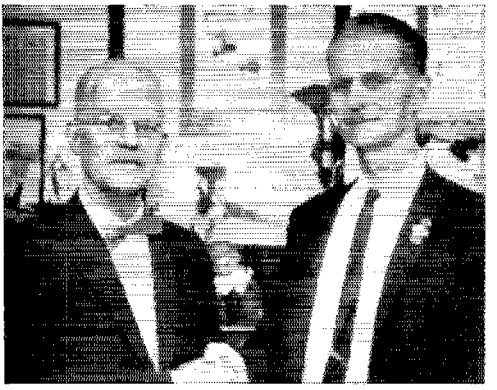
21 Honolulu, Hawaii 96808; 502 Federal Building; Tues. and Wed., 8 A.M. and by appointment.
* Also conducts examinations at Hilo in Oct.; Lihue, Kauai in Nov.; Wailuka, Maui in Oct.

22 San Juan, P. R. 00903; 322 U. S. Post Office & Courthouse; Fri., 9 A.M.

23 Anchorage, Alaska 99501; 4th Avenue at F & G Streets; Mon.–Fri., by appointment only.
* Also conducts examinations at Fairbanks in May and Nov.

24 Washington, D. C. 20555; 521 12th Street, N.W.; Fri., 9:30 A.M. to 1 P.M.
Gettysburg, Penna. 17325; 334 York Street; 1st & 3rd Tues., by appointment only.

* Appointments should be made in the previous month with the District Engineer-in-Charge, who will then furnish the location, date and time of the test. He will probably require advance submission of the completed Form 610 and check or money order for $4.00, payable to FCC.



Harry Tummonds, W8BAH, columnist for the *Cleveland Plain Dealer* congratulates TVI-Chairman Norman Aiken, W8LJS, on the work of the committee, which resulted in a fine story explaining TVI to the Cleveland public written by T. J. Quinn of the paper's fulltime staff.

MINUTES OF EXECUTIVE COMMITTEE MEETING

No. 310

May 5, 1966

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 3 p.m., May 5, 1966. Present: President Herbert Hoover, Jr., in the Chair; First Vice President W. M. Groves; Directors P. Lanier Anderson, Jr., Charles G. Compton, Robert W. Denniston and Noel B. Eaton; General Manager John Huntoon. A number of other directors, in anticipation of the annual meeting, were also present.

On motion of Mr. Eaton, unanimously VOTED to approve the holding of a Florida State Convention in Miami on January 21–22, 1967.

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

The Amateur Radio Club of Cooksville
Cooksville, Ont., Canada
Fenton Area Amateur Radio Assn.,
Fenton, Mich.
Fidelity Amateur Radio Club Cranston, R. I.
Forsyth Radio Club Winston-Salem, N. C.
The Hamster VHF/UHF Club, Inc.
Denver, Colo.
Massapequa H. S. Radio Club
Massapequa, N. Y.
Morton West H. S. Amateur Radio Club
Berwyn, Ill.
North Pocono Amateur Radio Club
Moscow, Penn.
Roxbury Y Radio Club Roxbury, Mass.
St. Ignatius H. S. Amateur Radio Club
Cleveland, Ohio
St. Mary's College Amateur Radio Club (H.S.)
St. Mary, Ky.
Salesian H. S. Radio Amateur Club
Detroit, Mich.
The Scotch Plains-Fanwood H. S. Radio Club
Scotch Plains, N. J.
Valley Amateur Radio Society Simsbury, Conn.
Warminster Amateur Radio Club
Warminster, Penn.
Arkansas City Amateur Radio Club
Arkansas City, Kansas
Boystown Amateur Radio Society (H.S.)
Boystown, Neb.
Brush Creek Plaza Bird-Watching and
VHF Society Kansas City, Mo.
Luther College Amateur Radio Club
Decorah, Iowa
PHD Amateur Radio Association
Kansas City North, Mo.
Scenic City Amateur Radio Club
Iowa Falls, Iowa
South Dakota School of Mines Ham Radio Club
Rapid City, S. Dak.

There being no further business, the Committee adjourned, at 3:12 p.m.

JOHN HUNTOON
Secretary

Minutes of the 1966 Annual Meeting of the Board of Directors

The American Radio Relay League, Inc.
May 6–7, 1966

1) Pursuant to due notice, the Board of Directors of The American Radio Relay League, Inc., met in annual session at the Grantmoor Motor Lodge, Newington, Connecticut, on May 6, 1966. The meeting was called to order at 9:30 A.M., with President Herbert Hoover, Jr., in the Chair, and the following directors present:

P. Lanier Anderson, Jr., Roanoke Division
Roemer O. Best, West Gulf Division
Charles J. Bolvin, Southeastern Division
Dana E. Cartwright, Great Lakes Division
Robert Y. Chapman, New England Division

Adelbert Zwink, W1HOM, center, receives the trophy marking him as New England Amateur of the Year, from Father Dan Linehan, W1HWK, while the Honorable John Volpe, Governor of Massachusetts, applauds. The presentation was made at the National Convention.

Charles G. Compton, Dakota Division
Gilbert L. Crossley, Atlantic Division
Harry J. Dannals, Hudson Division
Robert W. Denniston, Midwest Division
Noel B. Eaton, Canadian Division
Harry M. Engwicht, Pacific Division
Philip E. Haller, Central Division
Howard F. Shepherd, Southwestern Division
Carl L. Smith, Rocky Mountain Division
Philip P. Spencer, Delta Division
Robert B. Thurston, Northwestern Division

Also in attendance, as members of the Board without vote, were Wayland M. Groves, First Vice President; F. E. Handy, Vice President; John Huntoon, General Manager. Also in attendance, at the invitation of the Board as non-participating observers, were Atlantic Division Vice Director Jesse Bieberman, Canadian Division Vice Director Colin C. Dumbrille, Central Division Vice Director Edmond A. Metzger, Hudson Division Vice Director Stan Zak, New England Division Vice Director Bigelow Green, and Southeastern Division Vice Director Albert L. Hamel. There were also present Treasurer David H. Houghton, General Counsel Robert M. Booth, Jr., Associate Counsel for Canada Arthur K. Meen, Assistant General Manager Richard L. Baldwin, Technical Director George Grammer, and Senior Assistant Secretary Perry F. Williams.

2) On motion of Mr. Eaton, the following resolution was unanimously ADOPTED by rising vote: WHEREAS, the Board of Directors of The American Radio Relay League note with regret the absence of Vice President Alex Reid from its meeting because of illness; and, WHEREAS, Mr. Reid has been a member of the Board since January 1, 1930; and, WHEREAS, Mr. Reid has never previously been absent from a meeting of the Board; and, WHEREAS, for more than thirty-six years Mr. Reid has devoted a great deal of time and talent to amateur radio and the affairs of the League and added statesmanship and graciousness to its annual meetings; now, therefore, BE IT RESOLVED, that the Board of Directors of The American Radio Relay League, in annual meeting here assembled, do hereby express to ALEX REID, VE2BE, both their sincere regret at his absence and their warm best wishes for a speedy recovery from his present illness.

3) On motion of Mr. Anderson, unanimously VOTED that the Board will take up Item 12 of the Agenda, the election of officers, just prior to Item 11, the selection of additional members of the Executive Committee. Whereupon, on motion of Mr. Chapman, the Agenda was unanimously APPROVED.

4) On motion of Mr. Cartwright, unanimously VOTED that the minutes of the 1965 annual meeting of the Board of Directors are approved in the form in which they were issued by the Secretary.

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

6) Mr. Anderson, as Chairman, presented the report of the Finance Committee; Mr. Crossley, as Chairman, presented the report of the Planning Committee; Mr. Best, as Chairman, presented the report of the Membership & Publications Committee; Mr. Compton, as Chairman, presented the report of the Public Relations Committee; Mr. Groves, as Chairman, presented the report of the Merit & Awards Committee; Mr. Anderson, as Chairman, presented the report of the Special Committee on Organization & Personnel; Mr. Smith, as Chairman, presented the report of the Official Availability Committee.

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

8) At this point, supplementary oral reports were entered by the Officers of the League and the General Counsel.

9) On motion of Mr. Crossley, after discussion, unanimously VOTED that a suitable note on League services be placed in letters sent from Headquarters to amateurs, copies to be made available for all directors if they desire.

10) On motion of Mr. Crossley, unanimously VOTED that a brochure submitted relative to merits and awards be referred to the Merits & Awards Committee of the Board for study and report of recommendations at the next annual meeting.

11) Moved, by Mr. Spencer, that an application form for membership be published in "QST" monthly for a one-year test period. After discussion, moved by Mr. Crossley, that the matter be laid on the table; but the motion to table was lost, 7 votes in favor to 9 opposed. After further discussion, the original motion was ADOPTED, 15 votes in favor to 1 opposed.

12) On motion of Mr. Spencer, after discussion, unanimously VOTED that an order form for ARRL publications be included in alternate issues of "QST."

13) On motion of Mr. Spencer, after extensive discussion, VOTED, 15 votes in favor to 1 opposed, that a personal visit by a Headquarters representative or the Division Director to all continental U. S. QSL Bureaus be made at least once a year, and to other bureaus as often as feasible, to provide assistance and to assure uniformity of procedures.

14) The Board was in recess from 11:02 A.M. to 11:12 A.M.

15) At this point, Director Spencer presented a Certificate of Commendation from the Health Department of the City of New Orleans to ARRL in recognition of distinguished services by amateurs during Hurricane Betsy; on behalf of the Board, the President expressed the sympathy of the League to the citizens of New Orleans over the tragedies caused by the hurricane disaster, and stated that the League and amateurs everywhere stand ready at all times to continue their emergency public service and preparedness activities in New Orleans and elsewhere.

16) On motion of Mr. Spencer, after discussion, VOTED, 15 votes in favor to 1 opposed, that a committee be appointed by the President to study and make recommendations to the Board on how the Citizens Radio Service and the Amateur Radio Service can work in closer harmony during emergencies and in emergency planning under AREC and RACES programs sponsored by the League.

17) Moved, by Mr. Cartwright, that in "ballot-type" elections of directors, vice directors, and/or SCMs, the declared winner must receive a majority of the total valid ballots cast. After discussion, on motion of Mr. Smith, unanimously VOTED that the matter is laid on the table for later consideration.

18) Moved, by Mr. Denniston, that the League continue and intensify its efforts to increase League membership. But, after discussion, Mr. Denniston

withdrew his motion for later consideration with other membership matters.

19) On motion of Mr. Chapman, unanimously VOTED that the Federation of Eastern Massachusetts Amateur Radio Association clubs and its duly elected officials are congratulated by the 1966 ARRL Board of Directors for holding and concluding a successful National Convention in the City of Boston on April 22, 23, and 24.

20) On motion of Mr. Chapman, unanimously VOTED that The American Radio Relay League establish and promote a "Founders Week" dedicated to Hiram Percy Maxim, the League's first president and one of the early League founders, and that this event be associated with the month and day of our first president's birthday, September 2, and that the League request observance of this event by all affiliated societies, affiliated clubs and members in good standing.

21) On motion of Mr. Chapman, after discussion, unanimously VOTED that a study be conducted by management to determine the merits and feasibility of awarding a life membership to a person or persons who have held valid membership in The American Radio Relay League for thirty-five years or more.

22) On motion of Mr. Chapman, after discussion, unanimously VOTED that in the best interests of The American Radio Relay League and its DX QSL Bureau services, and in continuation of present policy, that when the present operator of a QSL Bureau no longer desires to continue its operations, this responsibility will be assigned to an approved ARRL affiliated club, if practical.

23) Moved, by Mr. Chapman, that The American Radio Relay League membership certificate carry a suitable identification number that will provide classification and identification in the interest of valid membership recognition and confirmation. But, after discussion, on motion of Mr. Crossley, VOTED, 13 votes in favor to 1 opposed, that the matter is laid on the table for later consideration with other membership matters.

24) The Board was in recess for luncheon from 12:11 P.M. until 2:55 P.M.

25) On motion of Mr. Engwicht, unanimously VOTED that a study be made by the Headquarters staff on the feasibility of changing present amateur regulations on power input for frequencies above 420 Mc. to a basis of average power output as better adapted to present-day measurement techniques.

26) Moved, by Mr. Engwicht, that ARRL should immediately update the "License Manual" to better reflect FCC Extra Class requirements. But, after discussion, on motion of Mr. Spencer, the matter was laid on the table.

27) On motion of Mr. Engwicht, after discussion, unanimously VOTED (Mr. Eaton abstaining) that the Headquarters staff study the feasibility of a change in RACES Rule 97.203 (c) (1) to read as follows: "Such operator shall at all times be under the personal supervision and responsibility of the holder of an amateur operator license other than Novice or Technician Class and shall be prohibited from making any adjustment that may result in improper transmitter operation."

28) On motion of Mr. Bolvin, unanimously VOTED that the vice directors in attendance be commended for their interest and devotion to duty in coming to this meeting, and further that the individuals and clubs of the Southeastern Division be commended for their actions in providing financial assistance to make their vice-director's presence possible.

During a break, President Hoover, W6ZH, chats with General Manager Huntoon, W1LVQ

29) Moved, by Mr. Bolvin, that the directors shall have the right to authorize the vice director's travel expenses to Board meetings, with any such authorization to be charged to the division budget. After discussion, on motion of Mr. Spencer, unanimously VOTED that the matter is laid on the table.

30) On motion of Mr. Bolvin, after discussion, VOTED that the appropriate committee study the present control of distribution of directors' letters and make such recommendations as are found necessary and/or desirable to the Board, or to the Executive Committee if earlier action is indicated.

31) On motion of Mr. Shepherd, unanimously VOTED that the General Manager and his staff are commended for actions taken with regard to minimization of TVI and RFI on the manufacturers level, and he is authorized and requested to actively continue the League's effort in such field.

32) On motion of Mr. Shepherd, unanimously VOTED that the General Manager shall conduct a study and report to the Board of Directors as to ways and means of affording Citizens Radio Service licensees a greater opportunity to obtain licenses in the Amateur Radio Service.

33) On motion of Mr. Shepherd, after extended discussion, unanimously VOTED that the General Manager and the Executive Committee shall refer to division directors for their information in advance of taking final action thereon, all major changes in contest and award rules and membership services, and all proposed comments or petitions to the FCC, except where delay would be detrimental to the League.

34) On motion of Mr. Shepherd, after discussion, unanimously VOTED that the General Manager shall conduct a study of the feasibility of requesting rulemaking by the FCC to permit ground, airborne, and space wide-band translator operation above 144 Mc. in the Amateur Service.

35) On motion of Mr. Best, after extended discussion, VOTED, 11 votes in favor to 4 opposed, to eliminate the present 1000-mile round-trip restriction on reimbursed QSL Manager travel to conventions.

36) On motion of Mr. Best, unanimously VOTED that the Board expresses its deepest appreciation

to the several vice directors present for their demonstration of interest in League affairs by their attendance at this meeting, since vice directors incur the expense of attendance out of their own pockets and are to be commended for their interest in The American Radio Relay League and actions of the Board, their attendance and interests as well as their devotion to the League going beyond the call of duty.

37) At this point, the General Counsel and Associate Counsel for Canada presented their joint report on revisions of the Articles of Association and By-Laws.

38) Moved, by Mr. Spencer, to amend Article 1 to eliminate as no longer necessary, the words "and the present directors, subscribers hereto, are the lawful successors and associates of the incorporators." After discussion, on a roll-call vote, all 16 directors voted in the affirmative; so the Article was AMENDED.

39) Moved, by Mr. Compton, that Article 3 be amended to read as follows: "The principal office of the corporation shall be maintained at 225 Main Street, Newington, Connecticut." After discussion, on a roll-call vote, all 16 directors voted in the affirmative; so the Article was AMENDED.

40) Moved, by Mr. Smith, to delete Article 4 as no longer necessary. After discussion, on a roll-call vote, all 16 directors voted in the affirmative; so the Article was DELETED.

41) Moved, by Mr. Spencer, that Article 5 be renumbered Article 4 and revised to read as follows: "The affairs of the Corporation shall be governed by a Board consisting of sixteen Directors who shall be elected for terms of two years by the members eligible to vote. Eight Directors shall be elected for terms beginning on even-numbered years, and eight Directors shall be elected for terms beginning on odd-numbered years. Election of Directors shall be by mail vote in accordance with the rules and regulations prescribed by the Board of Directors in the By-Laws. Directors shall be elected to represent specific geographical areas as may from time to time be prescribed by the By-Laws. The Board shall meet semi-annually at times and places as provided in the By-Laws. Special meetings of the Board shall be called by the President upon written request of at least one-half the membership of the Board as then constituted." After discussion, moved, by Mr. Anderson, to amend the motion to strike "semi-annually at times and places" and substitute therefor "annually at a time and place." After further discussion, a roll-call vote being requested, the motion to amend was decided in the affirmative: total number of votes cast, 15; necessary for adoption, 9; those voting in the affirmative were Messrs. Anderson, Bolvin, Cartwright, Compton, Crossley, Dannals, Denniston, Eaton, Engwicht, Haller, and Shepherd; those voting opposed were Messrs. Best, Chapman, Spencer and Thurston; Mr. Smith abstained; so 11 votes in favor to 4 opposed, the motion was AMENDED. The question being on the original motion as amended, on a roll-call vote all 16 directors voted in the affirmative; so the Article was AMENDED. During the course of the above, the Board was in recess from 4:56 P.M. to 5:09 P.M.

42) Moved, by Mr. Shepherd, to renumber Article 6 as Article 5. On a roll-call vote, all 16 directors voted in the affirmative; so the Article was renumbered.

43) Moved, by Mr. Chapman, that Article 7 be renumbered as Article 6 and revised to read as follows: "During the intervals between meetings of the Board of Directors, the affairs of the Corporation shall be administered by an Executive Committee consisting of the President, the First Vice-President, the General Manager, and four Directors selected by the Board of Directors. The Executive Committee shall meet at the call of the President, but no less often than bi-monthly. The Executive Committee may in its discretion submit for determination or decision by members of the Board of Directors by mail vote any proposal pending before the Executive Committee. When such submission is made, it shall be made in precise terms embodying the text of a proposed resolution. Such resolution shall be deemed adopted upon the receipt of the affirmative mail votes of at least 60% of the members of the Board. Otherwise, it shall be deemed rejected. Such action shall be binding upon the Executive Committee." After discussion, moved, by Mr. Smith, that the motion be amended to provide for an additional office of Executive Vice President. After further discussion, on motion of Mr. Bolvin, unanimously VOTED that the matter is laid on the table.

44) Moved, by Mr. Spencer, that Article 8 be renumbered as Article 7. On a roll-call vote, all 16 directors voted in the affirmative; so the Article was renumbered.

45) The Board was in recess for dinner from 6:27 P.M. to 8:45 P.M.

46) Moved, by Mr. Spencer, that Article 9 be renumbered as Article 8 and revised to read as follows: "The officers of the Corporation shall be a President, a First Vice-President, not more than two additional Vice Presidents, a Secretary, and a Treasurer, who shall be elected by a majority of the Directors at its annual meeting on even-numbered years. After discussion, on a roll-call vote, all 16 directors voted in the affirmative; so the Article was AMENDED.

47) On motion of Mr. Chapman, unanimously VOTED to take from the table the proposed amendment of old Article 7. With unanimous consent, Mr. Smith withdrew his pending motion to amend concerning the office of Executive Vice President. Further moved, by Mr. Smith, to amend the proposed new Article by striking the remainder of the first sentence after the words "General Manager" and substituting therefore the following: "and five directors selected by the Board of Directors from

Canadian Division Vice Director Colin Dumbrille, VE2BK (l.) and Southeastern Division Vice Director Albert Hamel, K4SJH gets the word from Canadian Division Director Noel Eaton, VE3CJ (r.)

specific geographical areas as may from time to time be prescribed in the By-Laws." After discussion, a roll-call being requested, the motion to amend was rejected, 7 votes in favor to 9 opposed. Those voting in the affirmative were Messrs. Best, Chapman, Engwicht, Shepherd, Smith, Spencer and Thurston; those voting opposed were Messrs. Anderson, Bolvin, Cartwright, Compton, Crossley, Dannals, Denniston, Eaton and Haller.

48) Moved, by Mr. Smith, to amend the proposed revision of Article 7 to strike the word "bimonthly," and substitute therefor the word "quarterly." A roll-call being requested, the motion to amend was decided in the affirmative, 14 votes in favor to 2 opposed; all directors voted in the affirmative except Messrs. Anderson and Cartwright, who voted opposed. So the motion was amended. Moved, by Mr. Best, that in the first sentence of Article 7, the words "the routine affairs of the Corporation or matters of emergency nature" shall replace the words "the affairs of the Corporation," and that the third sentence be amended to read: "The Executive Committee shall submit for determination or decision by the members of the Board of Directors by the fastest means of communications possible any proposal concerning League policy, other than routine or matters of emergency nature, before the Executive Committee and to keep the Board fully informed at all times of actions taken by this Committee." A roll-call being requested, the motion to amend was rejected, 1 vote in favor to 14 opposed; all of the directors voted opposed except Mr. Best, who voted in the affirmative, and Mr. Thurston, who abstained. The question then being on the proposed new language for Article 7, as amended, on a roll-call vote, all 16 directors voted in the affirmative; so Article 7 was AMENDED.

49) Moved, by Mr. Compton, that Article 10 be renumbered as Article 9 and revised to read as follows: "These Articles may be amended by a three-fourths vote of all Directors, or, provided due notice of the proposed amendment shall have been placed in the mail to each Director at least thirty days in advance, by a two-thirds vote of all Directors. The Board of Directors may from time to time adopt By-Laws not inconsistent with the Articles and applicable statutes. By-Laws may be amended by a three-fourths vote of the Directors present, or, provided due notice of the proposed amendment shall have been placed in the mail to each Director at least thirty days in advance, by a two-thirds vote of all Directors. Notices shall be sent by First Class Mail, and to all Directors residing more than 250 miles from Newington, Connecticut, by Air Mail." After discussion, on a roll-call vote, all 16 directors voted in the affirmative; so the Article was AMENDED.

50) Moved, by Mr. Thurston, that Article 11 be renumbered as Article 10. On a roll-call vote, all 16 directors voted in the affirmative; so the Article was renumbered.

51) Moved, by Mr. Smith, that Article 12 be renumbered as Article 11, and revised to read as follows: "No person shall be eligible for the office of Director, Vice-Director, President or Vice-President who has not been a full member of the League for at least four continuous years, and who has not held continuously during that period a valid authorization as a radio amateur in accordance with the applicable laws and regulations of the United States or Canada prevailing at the time of his election and throughout his term of office. No person shall be eligible for, or hold, the office of Director, Vice-Director, President or Vice-President who is commercially engaged in the manufacture, sale or rental of radio apparatus capable of being used in radio communication, is commercially or governmentally engaged in frequency allocation planning or implementation, or is commercially engaged in the publication of radio literature intended in whole or in part for consumption by radio amateurs." After extended discussion, on a roll-call vote, all 16 directors voted in the affirmative; so the Article was AMENDED.

52) Moved, by Mr. Chapman, that Article 13 be renumbered as Article 12. On a roll-call vote, all 16 directors voted in the affirmative; so the Article was renumbered.

53) The Board recessed at 11:12 P.M., reconvening at 9:28 A.M. on May 7, 1966, at the Headquarters offices of the League in Newington, Connecticut, with all directors and other persons hereinbefore mentioned in attendance.

54) Moved, by Mr. Crossley, to amend By-Law 1 by adding, after the first appearance of the word "Canada," the words "or temporarily resident elsewhere." After discussion, on a roll-call vote, all 16 directors voted in the affirmative; so the By-Law was AMENDED.

55) Moved, by Mr. Shepherd, to add the following to By-Law 3: "Members in arrears shall be carried on the League records for thirty days, but if they have not renewed their membership by that date, they shall be dropped." After discussion, on a roll-call vote, all 16 directors voted in the affirmative; so the By-Law was AMENDED.

56) Moved, by Mr. Spencer, to amend By-Laws 4 and 5 by adding, after the words "United States and Possessions," the words "the Commonwealth of Puerto Rico;" to strike the words "Dominion of;" and to strike the word "full" from By-Law 5. After discussion, on a roll-call vote, all directors voted in the affirmative; so the By-Laws were AMENDED.

57) Moved, by Mr. Crossley, to add the following to By-Law 6: "One or more honorary officers may be elected and shall continue in office until the next election of officers." After discussion, on a roll-call vote, all 16 directors voted in the affirmative; so the By-Law was AMENDED. During the course of the above, Mr. Metzger departed from the meeting.

58) Moved, by Mr. Bolvin, to amend the last sentence of By-Law 15 to read as follows: "They shall forthwith prepare and sign in the name of the Executive Committee a report of the results of the vote, declaring duly elected as new directors the candidates in each division receiving the majority of votes therein; if no single candidate receives a majority, a new ballot shall be prepared containing the names of the two candidates having the highest number of votes; thereafter the procedure shall be as in the original ballot." But there was no second, so the motion was lost.

59) Moved, by Mr. Spencer, to amend the first sentence of By-Law 20 to read as follows: "The annual meeting of the Board of Directors shall be held in the vicinity of Newington, Connecticut, on the first Friday in May of each year, at a place to be designated by the President and notified by the Secretary." After discussion, on a roll-call vote, all 16 directors voted in the affirmative; so the By-Law was AMENDED.

60) Moved, by Mr. Cartwright, to add a sentence to By-Law 22 reading as follows: "Article 9 and 10 nevertheless shall be applicable to the election

of officers and amendment of any Article or By-Law." On a roll-call vote, all 16 directors voted in the affirmative; so the By-Law was AMENDED.

61) Moved, by Mr. Thurston, to amend By-Law 25 by striking the word "Labrador" and, after the word "Caribbean," to add the words "the Commonwealth of Puerto Rico." On a roll-call vote, all 16 directors voted in the affirmative; so the By-Law was AMENDED.

62) Moved, by Mr. Spencer, to delete the second sentence, and to amend the last sentence of By-Law 27 to read as follows: "Should the First Vice President be also absent or unable to act, the Vice Presidents shall succeed in the order of their election." After discussion, on a roll-call vote, all 16 directors voted in the affirmative; so the By-Law was AMENDED.

63) Moved, by Mr. Anderson, to amend By-Law 29 by striking the last seventeen words and substituting therefor: "in any bonds, or stocks or other securities as would be selected by a trustee

Southeastern Division Director Bolvin, W4LVV (l.) makes a point with Midwest Division Director Denniston, WØNWX, while Delta Division Director Philip Spencer, W5LDH (r.) looks on.

with the care of a prudent investor." After discussion, on a roll-call vote, all 16 directors voted in the affirmative; so the By-Law was AMENDED.

64) The Committee was in recess for luncheon from 1:03 P.M. until 1:35 p.m.

65) Moved, by Mr. Anderson, to amend By-Law 32 to read as follows: "The Finance Committee shall act as advisor to and supervisor of the Treasurer in regard to the investment of the League's funds; it shall, at the beginning of each year, and in collaboration with the General Manager, review and approve the operating budget for the coming year and formulate budgetary projections for the intermediate and long-term requirements of the League." After discussion, on a roll-call vote, all 16 directors voted in the affirmative; so the By-Law was AMENDED.

66) Moved, by Mr. Eaton, to amend By-Law 37 to read as follows: "There shall be an official publication maintained by the League, in the form of a monthly journal, the name of which shall be 'QST.' A copy of this journal shall be supplied each month to every member of the League in good standing. The general management of this journal shall be in the hands of the General Manager. The policy of the journal shall be determined by the Board of Directors." After discussion, on a roll-call vote, all 16 directors voted in the affirmative so the By-Law was AMENDED.

67) Moved, by Mr. Spencer, to delete By-Laws 38 and 40, as no longer necessary. On a roll-call vote, all 16 directors voted in the affirmative; so the By-Laws were DELETED.

68) Moved, by Mr. Denniston, to add the following to By-Law 39: "References in these By-Laws to Articles shall be corrected, when necessary, by the Secretary to conform to renumbered Articles." On a roll-call vote, all 16 directors voted in the affirmative; so the By-Law was AMENDED.

69) Moved, by Mr. Engwicht, to adopt a new By-Law reading as follows: "The President shall not serve for more than two consecutive terms." After extended discussion, on a roll-call vote, the motion was rejected, 6 votes in favor to 10 opposed. Those voting in the affirmative were Messrs. Best, Bolvin, Chapman, Compton, Engwicht and Spencer; those voting opposed were Messrs. Anderson, Cartwright, Crossley, Dannals, Denniston, Eaton, Haller, Shepherd, Smith and Thurston.

70) Moved, by Mr. Compton, to amend By-Law 8 by deleting the words "at least a General Class amateur license, or a Canadian Advanced Amateur Certificate" and inserting the words, "a renewable amateur license issued by an appropriate agency of the U. S. Government, or the holder of a Canadian Amateur Certificate." After discussion, on a roll-call vote, the motion to amend was rejected, 5 votes in favor to 11 opposed. Those voting in favor were Messrs. Best, Compton, Haller, Smith and Spencer; those voting opposed were Messrs. Anderson, Bolvin, Cartwright, Chapman, Crossley, Dannals, Denniston, Eaton, Engwicht, Shepherd and Thurston.

71) The Board was in recess from 3:40 P.M. to 3:55 P.M., during which time Mr. Bieberman departed from the meeting.

72) On motion of Mr. Cartwright, unanimously VOTED that the Board now take up Items 12 and 11 of the Agenda, concerning election of Officers and members of the Executive Committee.

73) The Chair announced the opening of nominations for the office of President. Mr. Anderson nominated Mr. Denniston. Mr. Shepherd nominated Mr. Compton. Mr. Best nominated Mr. Groves. Mr. Groves spoke briefly in appreciation, but requested that his name be withdrawn. On motion of Mr. Smith, unanimously VOTED that the nominations are closed. The Chair appointed Messrs. Green and Dumbrille as Tellers. The Tellers announced the result of the vote as follows:

Mr. Denniston 9
Mr. Compton 7

whereupon Robert W. Denniston was declared elected as President for the ensuing term. (Applause)

74) The Chair announced the opening of nominations for the office of First Vice President. Mr. Spencer nominated Mr. Compton. Mr. Eaton nominated Mr. Groves. Mr. Compton spoke briefly in appreciation but requested that his name be withdrawn. Mr. Spencer nominated Mr. Smith. Mr. Smith spoke briefly in appreciation, but requested that his name be withdrawn. On motion of Mr. Smith, unanimously VOTED that the nominations are closed and the Secretary cast one ballot electing Wayland M. Groves as First Vice President for the ensuing term. (Applause)

75) The Chair announced the opening of nominations for an additional Vice President. Mr. Haller nominated Mr. Crossley. Mr. Best nominated Mr. Compton. On motion of Mr. Anderson, unanimously VOTED that the nominations are closed. The Tellers announced the results of the balloting as follows:

Mr. Crossley	2
Mr. Compton	13
Invalid Ballot	1

whereupon Charles G. Compton was declared elected as Vice President for the ensuing term. (Applause)

76) The Chair announced the opening of nominations for an additional Vice President. Mr. Smith nominated Mr. Crossley. On motion of Mr. Cartwright, unanimously VOTED that the nominations are closed and that the Secretary cast one ballot naming Gilbert L. Crossley as a Vice President of the League for the ensuing term. (Applause)

77) The Chair announced the opening of nominations for Honorary Vice Presidents. On motion of Mr. Spencer, unanimously VOTED that the Board proceed to elect two Honorary Vice Presidents. Mr. Eaton nominated Mr. Reid. Mr. Shepherd nominated Mr. Handy. On motion of Mr. Spencer, unanimously VOTED that the nominations are closed and that the Secretary cast one ballot naming Alex Reid and Francis E. Handy as Honorary Vice Presidents for the ensuing term. (Applause) At this point Director Cartwright, under the necessity of returning to his home, departed from the meeting.

78) The Chair announced the opening of nominations for the office of Secretary. Mr. Dannals nominated Mr. Huntoon. On motion of Mr. Crossley, unanimously VOTED that nominations are closed and that the Secretary cast one ballot naming John Huntoon as Secretary of the League for the ensuing term. (Applause)

79) The Chair announced the opening of nominations for the office of Treasurer. Mr. Anderson nominated Mr. Houghton. On motion of Mr. Chapman, unanimously VOTED that nominations are closed and that the Secretary cast one ballot naming David H. Houghton as Treasurer for the ensuing term. (Applause)

80) The Chair announced the opening of nominations for director members of the Executive Committee. Mr. Dannals nominated Mr. Eaton. Mr. Chapman nominated Mr. Anderson, who spoke briefly in appreciation but withdrew his name because of his decision not to stand as a candidate in the autumn director elections. Mr. Shepherd nominated Mr. Smith. Mr. Smith nominated Mr. Compton. Mr. Compton nominated Mr. Engwicht. Mr. Thurston nominated Mr. Best. Mr. Haller nominated Mr. Crossley. On motion of Mr. Chapman, unanimously VOTED that the nominations are closed. The Tellers announced the results of the balloting as follows:

Mr. Eaton	13
Mr. Compton	13
Mr. Crossley	11
Mr. Smith	10
Mr. Engwicht	7
Mr. Best	6

whereupon Charles G. Compton, Gilbert L. Crossley, Noel B. Eaton and Carl L. Smith were declared elected as members of the Executive Committee for the ensuing term. (Applause)

81) On motion of Mr. Compton, unanimously VOTED that the General Manager is hereby authorized to reimburse the division directors for actual expenses incurred by them during the year 1966 in the proper administration of ARRL affairs in their respective divisions, up to amounts as follows:

Canadian Division Director	$1500
Atlantic Division Director	2400
Central Division Director	2500
Dakota Division Director	800
Delta Division Director	2400
Great Lakes Division Director	2300
Hudson Division Director	2000
Midwest Division Director	900
New England Division Director	2000
Northwestern Division Director	2000
Pacific Division Director	2000
Roanoke Division Director	1500
Rocky Mountain Division Director	1600
Southeastern Division Director	2300
Southwestern Division Director	2500
West Gulf Division Director	2400

82) On motion of Mr. Chapman, unanimously VOTED that, to continue the Board's policy of reimbursing Section Communications Managers and QSL Managers of the League for certain travel in furthering ARRL organizational activities, the General Manager is hereby authorized to pay during the year 1966 a total amount not to exceed $12,500 under terms prescribed by the Communications Manager following the general pattern established by the Board.

ARRL General Manager Huntoon, W1LVQ, addresses the Board during the early part of the proceedings. Facing the camera, left to right, are Assistant Secretary Williams, Treasurer Houghton, and Directors Eaton and Chapman. With their backs to the camera are Vice President Handy, Directors Denniston, and Thurston, Vice President Groves, and Director Engwicht.

83) On motion of Mr. Thurston, unanimously VOTED that, to continue the Board's policy of reimbursing Section Emergency Coordinators for certain travel in furthering ARRL organizational activities, the General Manager is hereby authorized to pay during the year 1966 a total amount not to exceed $9,500, under terms prescribed by the Communications Manager following the general patten established by the Board.

84) On motion of Mr. Crossley, unanimously VOTED that the General Manager is hereby au-

thorized to pay, during the period between January 1, 1967 and the 1967 meeting of the Board, expenses against usual authorizations for administrative and committee operations in no greater amounts than 1966 authorized amounts.

85) On motion of Mr. Smith, after discussion, unanimously VOTED that, to continue the Board's policy of reimbursing National Traffic System officials above the section level for certain approved travel in furthering ARRL organizational activities, the General Manager is hereby authorized to pay during the year 1966 a total amount not to exceed $6,000 under terms prescribed by the Communications Manager following the general pattern established by the Board.

86) On motion of Mr. Best, unanimously VOTED that the General Manager is authorized to reimburse Director Noel B. Eaton the amount of $93.00 for additional 1965 administrative expenses.

87) The Board then proceeded to an examination of the reports of its committees. On motion of Mr. Shepherd unanimously VOTED that the report of the Finance Committee is accepted and the same placed on file.

88) On motion of Mr. Crossley, unanimously VOTED that the report of the Planning Committee is accepted and the same placed on file. On further motion of Mr. Crossley, unanimously VOTED that full members temporarily residing in other areas of Canada or the United States than their home divisions may receive absentee voting ballots for their home division in director elections upon written application to the Secretary received by September 20 of each election year.

89) On motion of Mr. Best, after discussion, unanimously VOTED that the report of the Membership & Publications Committee is accepted and the same placed on file.

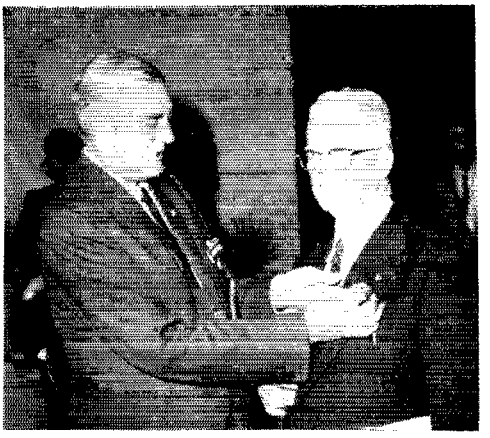
90) On motion of Mr. Compton, after discussion, unanimously VOTED that the report of the Public Relations Committee is accepted and the same placed on file.

91) On motion of Mr. Smith, the following resolution was unanimously ADOPTED: WHEREAS, the General Counsel and Associate Counsel for Canada have provided invaluable advice to the Board on legal matters; and WHEREAS, their assistance in the current review of the Articles of Association and By-Laws is especially appreciated; and, WHEREAS, their efforts on behalf of the Board and of individual members of the League throughout the year far exceed the call of duty; now, therfore, BE IT RESOLVED, that the Board of Directors of The American Radio Relay League in annual meeting assembled does heartily recommend and applaud Robert M. Booth, jr., and Arthur K. Meen, Q.C., for their wisdom, helpfulness and understanding.

92) The Board was in recess for dinner from 5:55 P.M. to 8:30 P.M.

93) On motion of Mr. Groves, unanimously VOTED that the report of the Merit & Awards Committee is accepted and the same placed on file, and the Committee is continued for an additional year.

94) On motion of Mr. Groves, the following resolution was unanimously ADOPTED: WHEREAS, in December, 1915, QST made its first appearance; and, WHEREAS, its founding editor and publisher was the co-founder and first Secretary of The American Radio Relay League, then itself scarcely 20 months old; and, WHEREAS, his early efforts established the solid bases of service to and control by active amateurs upon which both the League and "QST" have been built in the half century which has followed; now, therefore, BE IT RESOLVED, that the Board of Directors of The American Radio Relay League, in annual meeting assembled, does hereby express its deepest appreciation for the foresight and enthusiasm displayed by our beloved co-founder and founding editor, Clarence D. Tuska, together with our warm best wishes for a long and happy life.



They always come back to amateur radio—here W6ZH puts a League pin on Guy R. Entwistle, ex-1JJ, now W1AL, who put on the first recorded amateur convention at Boston on February 23, 1917.

95) On motion of Mr. Anderson, unanimously VOTED that the report of the Special Committee on Personnel & Organization is accepted and the same placed on file.

96) On motion of Mr. Smith, unanimously VOTED that the report of the Official Availability Committee is accepted and the same placed on file. On motion of Mr. Spencer, VOTED, 14 votes in favor with 1 absention, to publish in "QST" the report of this Committee.

97) On motion of Mr. Haller, unanimously VOTED that the Board extends its appreciation to the Field Engineering Bureau and the Amateur & Citizens Radio Division of the Federal Communications Commission, and to the Telecommunications Division of the Department of Transport, for their continuing assistance and cooperation in administering affairs of the amateur body during the past year.

98) On motion of Mr. Compton, unanimously VOTED that the League staff study, then discuss with regulatory agencies, the technical and legal aspects of independent sideband, pulse-code modulation, pulse-width modulation, digital and other advanced transmission techniques in the amateur service.

99) On motion of Mr. Compton, the following resolution was unanimously ADOPTED: WHEREAS, the TRW (Thompson-Ramo-Wooldridge) Radio Club of Redondo Beach, California, in conjunction with Project Oscar, Inc., has constructed and provided the fourth amateur radio satellite for the use of the amateur service throughout the world in furtherance of extending the art and science of amateur radio in space communications; now, therefore, BE IT RESOLVED, that the Board of Directors of The American Radio Relay League, assembled in annual meeting, does hereby extend to the

(*Continued on page 160*)

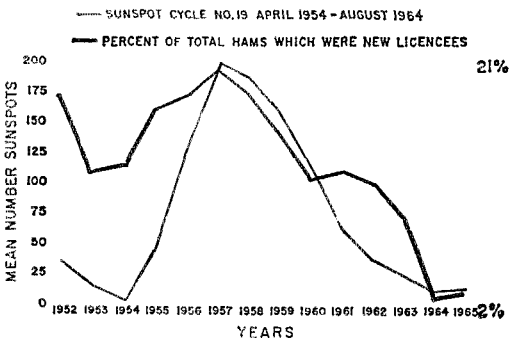
Correspondence From Members-

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

SUNSPOTS AND NEWCOMERS

¶ Re your February editorial on fewer newcomers, while there are certainly many factors, I am willing to bet there is a strong correlation between the number of sunspots and the number of new hams. I have the CRPL data, and if you would send me the license figures for the past 12 years, I would be interested in making an analysis. Admittedly one cycle would not be conclusive, but it would certainly be indicative. — *Kayla Bloom, WØHJL, Denver, Colorado.*

(EDITOR'S NOTE: Hq. supplied the data, and Kayla furnished us the following graph as a result of extensive computations, which is indeed indicative of something more than chance. She suggests the deviation during the first few years is a result of rapid postwar growth plus lowered FCC licensing standards, and that the minor deviation in 1961 may reflect the influx of new hams who were CB enthusiasts originally and went on to become hams. Our thanks to WØHJL for an interesting study.)



JIM

¶ Thank you for printing "Jim" in May *QST*. It was a pleasure to read it for the first time, since I am only 18 and have been a ham for only two years. It clearly shows the quality of *QST* material, and I'm sure many others enjoyed it as much as I did. I sincerely hope you print other articles by Mr. Flippin. — *Clifford Albertson, WB2UCB, New City, New York.*

¶ "Jim" is still a good story. I should have expressed my appreciation thirty years ago to the author and *QST*. Better late than never. — *Philip Hatfield, W9GFS, Evansville, Indiana.*

¶ . . . This beautiful story might well be read by some of our carping appliance-type brethren, who have objected to the thought that their "hobby" should be complicated by anything resembling work or study . . . I think it would be a wonderful idea if all the stories by John C. Flippin were published in book or pamphlet form. There must be many present-day amateurs who enjoyed reading "Jim" and who would like to read his other stories.

The prophesied tear came to my eye and I had no trouble conjuring up a vision of the shy little guy in ham's heaven. — *John W. Turner, W9GDI, Park Forest, Illinois.*

¶ I commend John Flippin, W4VT, for his masterpiece . . . "Jim" was a real *classic*. I wish you would continue to print his articles. They really add to my enjoyment of *QST* . . . — *Walter W. Bardenwerper, WA9OVL, Waterford, Wisconsin.*

¶ Set your mind at ease; you picked the very best of feature stories to reprint when you picked "Jim." This story portrays, as no other has ever done, the two extremes of amateur operation in the late 20s and early 30s, and how both extremes had a common bond of ham friendship which is not as noticeable today. Let's hope some of today's hams get the story. — *Russ Robinson, W4JGS, Bristol, Tennessee.*

QST CARTOONS

¶ I realize it must be because I missed some issues during the last bunch of years, but I have never read a write-up on or even seen the name of the excellent cartoonist that does the work that *makes QST*. I for one have enjoyed this artist's work for many years and I would like to know who he is. — *Bud Bearce, K5JGU, Houston, Texas.*

(EDITOR'S NOTE: Most *QST* cartoons in recent years have been the fine work of "Gil," W1CJD.)

AMATEUR COMPUTER SOCIETY

¶ This is an invitation to readers, who are amateur builders of digital computers, to join the new Amateur Computer Society, whose main purpose is to exchange information through a news-letter. To limit the membership to the really serious, ACS is open only to those who are building or operating a homemade computer that can at least perform automatic multiplication and division . . .

Will qualified readers please send me information about their computers, such as word length, memory size, clock speed, number of instructions, sources of hardware and schematics, present problems, and details of clever solutions to previous problems? . . . — *Stephen B. Gray, 219 West 81 Street, New York, New York 10024.*

GL AND 73 AND BCNU AND . . .

¶ A person meets a friend on the street. Depending on circumstances, a conversation will ensue which will usually end with "so long" or "see you around." In any case, it will be a natural conversation and not forced, as a rule.

Not so with ham radio these days. I have just been listening to a 20 meter c.w. QSO. The usual RST and QTH/name reports were exchanged during the first two minutes. Then followed about 20 minutes of tearful farewells, 73s, hope to CU again, thanks for the FB QSO, etc.

My goodness! If parting is that much sorrow, why go? . . . — *Ben Lane, W7FNE/MM, Seattle, Washington.*

MODULATION INCREASERS

¶ In the past few months, there have been several circuits put forth as modulation increasers. They consist of one or two diodes, whose purpose is to eliminate either all or part of the negative peaks on the modulated wave (a.m.).

It is reasoned that if the negative peak is responsible for overmodulation, then its elimination does away with overmodulation, and any amount of audio power can be applied to the final amplifier. This is a fallacy. The elimination of the negative peak destroys the balanced qualities of the sine wave and results in much distortion and overmodulation. This becomes apparent if an oscilloscope is employed.

I hope that no reader falls prey to these devices, as several stations have been awarded FCC notices as a result of using said devices. Besides, the radiated signal is horrible. — *Stanley Jaffin, W12SUY, Flushing, New York.*

ELECTRICAL INTERFERENCE

¶ I wish to express my appreciation for the articles on "Electrical Interference" by W. R. Nelson, WA6FQG. The information contained therein is very timely and, of course, is particularly pertinent to the amateur living in fairly congested areas, as I am.

In view of the precautions that the ham has to take in order to avoid, or prevent, interference to the various forms of communication, it would seem to me that some restrictions should be placed on the manufacturers of electrical equipment and gadgets that disrupt communication for the amateur, commercial and/or government activities. I hope more work will be done along the line of Mr. Nelson's efforts, and that out of this work progress will be made in reducing electrical interference in general. — *Karl G. Krech, W3BS, Drexel Hill, Pennsylvania.*

DXPEDITIONS DEFENDED

¶ Recently, I have read in *QST* and several other amateur publications of suggested "monetary tomfoolery" when it comes to receiving QSL cards from the various DXpeditions . . . I have been fortunate enough to QSO nearly every one of the DXpeditions run by W9WNV, W4BPD and W6KG in the past two years. To date, I have never failed to receive a prompt QSL from any one of them, and through financial limitations, I have been unable to give them any monetary support. Perhaps those who scream loudest about not receiving cards have been the repeat "pig" types in pile-ups, or those who simply haven't made the QSOs they thought they had. Of the many DXers I know, none have ever failed to receive a QSL from any of the above mentioned DXpeditions, when use of GMT and s.a.s.e. have been made.

I suggest the gentlemen who have made the DXpeditions continue to ignore those who doubt their honesty and integrity, and accept thanks from those of us who sincerely appreciate their efforts to keep DX "hopping." — *J. Stephen Swaim, W5LXG, Houston, Texas.*

USE THE HANDBOOK

¶ I've had my problems, as I'm sure many Novices have had, and when I was in a fix I would rely on a General or Extra Class ham for an answer. But I have found this is not always the best way. I've been told to dip my transmitter when it should have been peaked; to use a 72-ohm lead instead of 52-ohm coax, which should have been used; and not to ground things which really should be grounded. I'm not saying I don't appreciate the upperclassmen's help, because if I couldn't rely on them at times I wouldn't have my license. Now, when I have a problem or question to be answered, to be safe I rely on the *Radio Amateur's Handbook*. I recommend this book because it has the deepest technical information and easy to understand material. It covers all kinds of anteunas, receivers, transmitters, et cetera. I feel you definitely learn more and understand it better when you have researched the problem in a book. — *Stephen P. Day, WN3EQY, Potomac, Maryland.*

PARTS UNKNOWN

¶ In April "Correspondence" W6KKF stated that the "age of the pioneering constructor is decadent." Now I know why. After scouring the city for 2 months, searching for coils for a Handbook project, I am extremely discouraged. To put it in the words of one of the parts house salesmen, "Once you attempt your first project you'll never try it again." I am going to try it again, but only once more. — *Dave Gibson, Parma, Ohio.*

(EDITOR'S NOTE: For any Handbook rig, our technical information service probably can suggest a source for any listed part, or suitable substitute)

MEMBERSHIP ENDORSEMENTS?

¶ . . . I would like to see the League issue a permanent membership certificate which could be endorsed with each renewal by a stamp showing continued League membership. I feel sure many amateurs would value such a certificate, and hesitate to drop their membership if it meant a break in the chain.

Perhaps I am overly enthused about this prospect, but I can see possibilities in a membership certificate being more than just a piece of paper . . . — *Earl Conley, W3KPF, New Cumberland, Pennsylvania.*

Strays

Ricky Lewis, WA4YXN, has his six meter mobile, including storage battery power supply, mounted on his bicycle! He's worked stations as far away as forty miles while in motion.

I.A.R.U. News

INTERNATIONAL AMATEUR RADIO UNION

WØNWX NEW IARU PRESIDENT

Under the Constitution of the International Amateur Radio Union, the president, first vice president and secretary of ARRL hold the same offices in the Union.

Accordingly, Robert W. Denniston, WØNWX, having been elected president of the League is also president of the Union. Union Vice President Wayland M. Groves, W5NW, and Secretary John Huntoon, W1LVQ, were reelected to the parallel League offices and thus continue in IARU office. Other information on WØNWX and on the ARRL Board Meeting may be found in "Happenings of the Month."

NEW IARU MEMBERS — NICARAGUA AND CZECHOSLOVAKIA

Both the *Club de Radio Experimentadores de Nicaragua* (CREN) and the *Central Radio Club of Czechoslovak Socialist Republic* (CRC) received the unanimous approval of the member societies participating in recent balloting. The Union is pleased to welcome its 67th and 68th members.

CREN has a total of 50 members, all of whom are licensed radio amateurs. Headquarters address is Apartado Postal 925, Managua, and the officers include YN1RD, president; YN1MR, secretary; YN1AP, treasurer; and YN1HTM and YN1OS, vice presidents. In Nicaragua, licenses are available to anyone over 16 years of age. Only one class of license is issued, and is valid for an indefinite period. Third-party traffic is permitted without limitations. Mobile and maritime mobile operation are permitted, but special licenses are required. CREN maintains a society station, YN1YN, and sponsors an emergency corps. On August 5-7, CREN will be host for the VII FRACAP Convention for Central American clubs. At that time, CREN will present awards to those who participated in the FRACAP contest on April 24.

CRC has a total of 7659 members, of whom 1570 are licensed. Official CRC address is P. O. Box 69, Praha 1. Officers include OK1VEX, president; OK1PC, vice president; and OK1ANK, secretary. Three classes of amateur license are available to Czechoslovak citizens, at least 18 years of age, who pass the required examinations: license fee is equivalent to $3.50 U. S. The Class C license, good only for six months, entitles the holder to use 10 watts input, c.w. only, on the 1.75 and 3.5 Mc. bands; Class B, 50 watts, all bands and emissions; Class A, 200 watts (1000 watts in special cases), all bands and emissions. Young people, aged 15 to 18, may obtain special licenses, with the OL prefix, for limited use on the 1.75 Mc. band; such permits expire when holders reach age 18. Mobile operation is permitted without special authorization; maritime mobile or amateur TV operation requires special permission. Third-party traffic is not allowed.

LA1ITU, OSLO

The Norwegian Government has authorized an amateur station, call LA1ITU, for the Plenary Conference of the International Radio Consultative Committee (CCIR) being held at Oslo June 22 through July 22. CCIR is an agency of the International Telecommunications Union which studies technical matters submitted to it by other ITU agencies or members.

The station has been installed by the *Norsk Radio Relae Liga*, the IARU member-society for Norway. It may be operated by any licensed amateur regardless of nationality.

The Yugoslavian Government has issued an .85 Dinar postage stamp commemorating the 20th anniversary of the *Savez Radioamatera Jugoslavije* and the 20th of the Region I Division, IARU. Here is the Official First Day Cover, postmarked May 23, 1966, the opening day of the IARU Region I Conference at Opatija, Yugoslavia.

FOREIGN CN8 MOBILE OPERATION

We are advised by G3BID, Advisor on International Affairs for the Amateur Radio Mobile Society, and by CN8AW, International Relations Officer for the Association Royale des Amateurs Emetteurs du Maroc (ARAEM), that arrangements have been made for the Moroccan Post Office to accept applications from foreign amateurs for authority to operate mobile in Morocco.

Applications should be sent to the Ministere des P.T.T., Services des Telecommunications, Rabat, Morocco, and should be accompanied by the following:

a) Photocopy of applicant's amateur license.
b) Three passport photographs of applicant.
c) Full details on applicant (names, address and preferably passport number, plus date and place of issue of passport).
d) Details of vehicle in which radio equipment is fitted (make, type and registration number). Where the applicant intends to hire a vehicle, this should be stated; authority will then be issued by the Ministere des P.T.T., Rabat, where vehicle details will be filled in.
e) Frequency bands on which operation is planned.
f) Period of time in Morocco for which authority is requested.

A letter should be written to the applicant's consular representative in Rabat, stating that application has been made for authority to use radio equipment in a car for the period in question, and requesting the consular representative to give Moroccan authorities any assistance that may be required (by answering any questions which may be asked regarding the applicant). A copy of this letter should accompany the application. Three months should be allowed for completion of these formalities.

W1LVQ admires a "puukko" (Finnish knife) presented to him by Osmo Wiio, OH2TK, president of SRAL, the Finnish society.

The Radio Society of Great Britain was represented by Ray Hills, G3HRH, at the ARRL National Convention, held in Boston, Mass., April 22-24. G3HRH, former RSGB Council member and V.h.f. Manager, was an active participant in the convention v.h.f. program.

FOREIGN QSL BUREAU NOTES

The QSL Manager for the Jamaica Amateur Radio Association (JARA) wishes to point out that JARA handles cards for Jamaica *only* — not for Turks and Caicos, Cayman or any other islands in the West Indies.

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CN8AW, of ARAEM (Morocco), advises that the new CN8 QSL Bureau address is Box 299, Rabat.

FRANCE — U.S. RECIPROCITY

France and the United States have agreed to permit amateurs of the one country to operate while visiting in the other, effective July 1. The agreement only covers the fifty states and the District of Columbia on the one hand, and metropolitan France and Corsica (not its other islands) on the other.

United States Reciprocal Operating Agreements exist with: Australia, Belgium, Bolivia, Canada, Colombia, Costa Rica, Dominican Republic, Ecuador, Luxembourg, Paraguay, Peru, Portugal, Sierra Leone and United Kingdom. Several other foreign countries grant FCC licenses amateur radio operating privileges on a courtesy basis; write headquarters for details concerning a particular place.

(Continued on page 144)

Duplex Phone on 56 Mc.

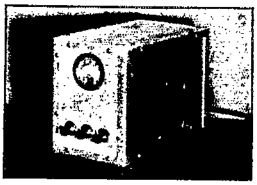
A Portable "Five-Meter" Transmitter Using Pentode Modulators; Further Notes on 56-Mc. Experiment

By Ross A. Hull, Associate Editor

THE more we "monkey" with 56-mc. apparatus, the firmer does our conviction become that it all has a valuable and completely practicable application in the field of ordinary amateur radio communication. During the last few weeks we have been engaged in 56-mc. experimental contact over periods totalling many days. In the work there have been disappointments (enough of them to keep our enthusiasm within reasonable limits), but the ease with which reliable short-haul phone communication is maintained with rudimentary equipment and very low power is a constant source of delight. Of course, as we have stated, there is really nothing new about it. "Five-meter" communication has been known for many years and doubtless some of it has been quite reliable. But, speaking generally, it has been a thing of the laboratory characterized by tricky circuits and much in need of delicate handling. To-day, we believe, 56-mc. working is ready to be hauled out of the laboratory by amateurs who can visualize its worth and to be installed as one more special tool in the amateur communication factory.

> *In one town we know about, seven or eight members of an active radio club converse nightly and at great length on a variety of subjects. Their total power consumption must be of the order of four or five kilowatts and their local "rag-chewing" (on the 3500-kc. band) must reach the far corners of the globe. Imagine what power would be saved and what widespread interference would be avoided if these fellows operated on the 56-mc. band! It can be done — and we think it will.*
>
> — Editor.

Last month a series of receiving tests were run with the receiver in an automobile and the transmitter at Headquarters. Since the last QST was put safely to bed, experimental work has been resumed with the idea of checking up on "two-way" communication and investigating the possibilities of "duplex." To permit this, a second transmitter and receiver were needed. Because an automobile had proved so convenient for "range" tests and the comparison of locations, it was planned that the new transmitter should be a companion to the small receiver described in the July QST and equally suited for operation in remote spots. It had to be small, relatively light, completely reliable, operative from low power and at the same time immune from the jolts and vibration it would certainly receive in being moved from one operating location to the next. The complete unit is to be detailed later in this article. Fundamentally, it consists of a low-powered push-pull oscillator, plate-modulated by a pair of pentodes in parallel. In the first experiments, the transmitter was supplied with plate power by a small dynamotor driven from the car battery. With the 300 volts available, a respectable output could be obtained and a series of tests was immediately planned. During the construction of the transmitter, George Grammer had rigged up an experimental super-regenerative receiver, and with this completing the foursome it was only a matter of minutes before two-way communication was established. This, of course, proved to be of tremendous advantage in the conduct of tests. Rapid changes could be made at both stations and reported on at all times, whereas in the past it had been necessary for the automobile crew to return to the office or to telephone from some town in order to exchange notes.



A COMPANION FOR THE SUPER-REGENERATIVE RECEIVER: THE COMPLETE 56-MC. TRANSMITTER

Ordinarily, this unit is mounted on top of the receiver and bolted to it.

At this stage, several trips were made in the car to points six or seven miles from the home transmitter. Because of the non-existence of amateur *mobile* licenses, transmission could be attempted only with the car stationary. Completely satisfactory signals were received from it, however, and

has been concerned chiefly with the modification of the transmitter for battery operation (so to avoid the interference from sparking dynamotor brushes) and the checking of its performance at amateur stations around the town. As now operated, the four tubes of the transmitter draw 45 ma. at 135 volts and its performance naturally suffers by comparison with that of the higher-powered installations. Nevertheless, it still is capable of putting a fat signal across town even when four or five miles of odd houses block the view. In cases where it is not necessary to depend upon battery plate supply, it is obviously poor economy not to take power from the mains. It is only natural that the higher-powered version (operating at 300 volts) should be easier to handle and capable of producing a better signal. Because of this, we will describe the set as it was originally used, then mentioning those alterations which were made to allow the outfit to work satisfactorily with a battery plate supply.

From the illustrations, it will be seen that the transmitter has a somewhat similar appearance to the super-regenerative receiver described in last month's QST. This is because the chassis of both units are almost identical. The only difference in the transmitter frame is that the base plate is 9 inches instead of 8 inches from front to rear. The idea in making the chassis similar, of course, was to permit both transmitter and receiver to occupy similarly small metal boxes.

In planning the transmitter, we decided to depart as little as possible from normal practice so as to be able to demonstrate just how conventional and how simple a 56-mc. transmitter can be. We could have branched off into some dizzy unusual circuits and we could have made an attempt to incorporate a handful of unusual ideas. Such a course probably would not have resulted in any worthwhile improvement in performance, however.

In view of the splendid results which had been obtained with a modulated self-excited oscillator, we could see no reason for introducing the complications of an oscillator-amplifier system at this stage of the game — particularly in view of the desirability of conserving space. We did think, though, that a departure from the conventional modulator practice could be made with advantage. Experiment soon showed that pentodes in place of triodes as modulators would allow the use of a decent microphone without a speech amplifier tube, and that they would give us a reasonably high percentage of modulation without dropping lower the already very low oscillator plate voltage.

After considerable experiment, Type '71-A tubes were decided upon for the oscillator and Type '47 pentodes for the modulator. For the oscillator, the now famed "TNT" (fixed-tune grid) circuit was used with apparently complete satisfaction. To the amateur who has read James Lamb's article in the July QST, no further details of it will be necessary other than that contained under Fig. 1. For the modulator, the conventional practice is followed. The only point of interest is in the necessary connection of the auxiliary grids to the plate supply side of the speech choke. Operating at 300 volts, these tubes are somewhat overloaded. This has not proved harmful, however, particularly when the control grids are slightly overbiased. It would be an advantage, possibly, to provide an auxiliary grid voltage lower than the plate voltage instead of depending on high control-grid bias to limit the plate current. This method was avoided in the present instance simply because of the complications it would have incurred. An examination of the characteristics of the Type '47 shows that at a plate voltage of 300,

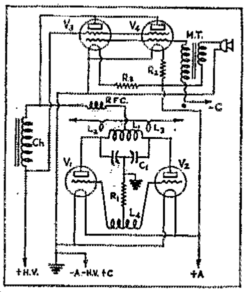


FIG. 1. — THE COMPLETE CIRCUIT OF THE 56-MC. TRANSMITTER

C_1 — Type 406B 25-plate Cardwell receiving condenser with stator split and plates removed to give 5 stator and 4 rotor plates in each section.

R_1 — 50,000-ohm Electrad wire-wound resistor.

R_2, R_3 — 2-ohm fixed filament resistors for Type '47 modulators; 12-ohm resistors for Type '33 modulators.

L_1 — 5 turns 1 inch inside diameter of ⅛-inch diameter copper tubing or wire.

L_2, L_3 — One turn each ¾-inch diameter of similar conductor.

L_4 — 7 turns spaced ⅛ inch of 22 d.s.c. wire on ½-inch bakelite tube. Adjustment of turns and spacing may be necessary.

R.F.C. — 15 turns of 30 gauge d.s.c. wire on former 5/16-inch diameter. Turns spaced approximately twice diameter of wire.

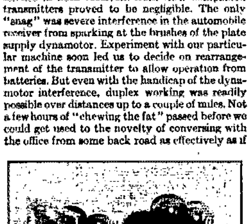
M.T. — Microphone transformer made from old audio transformer with primary removed. New primary of 300 turns of 30-gauge d.s.c. wire. A split primary of 600 turns would serve for double button type microphone.

CH. — Type 244 Silver-Marshall choke. Any similar choke rated at 150 ma., 20 to 30 henrys, would be suitable.

V_1 to V_4 — See text.

no particular effort was required at the office station to retrieve the signal at each stop. The low power and small antenna of the automobile station appeared to be offset by the larger receiving antenna at the office, with the result that similarly satisfactory signals were received at both stations. In transmitting over undulating country it was soon found that from locations in pronounced valleys the signal from the car dropped as abruptly as the signals received in it, whereas the climb to a point on the crest of even a diminutive hill immediately provided better signals at both ends of the link.

Just as soon as the effectiveness of both installations had been shown, an attempt was made to work "duplex." This involved setting one transmitter near the 56-mc. end of the band and the other near the 60-mc. end. Surprisingly, the interference in both receivers from their companion transmitters proved to be negligible. The only "snag" was severe interference in the automobile receiver from sparking at the brushes of the plate supply dynamotor. Experiment with our particular machine soon led us to decide on rearrangement of the transmitter to allow operation from batteries. But even with the handicap of the dynamotor interference, duplex working was readily possible over distances up to a couple of miles. Not a few hours of "chewing the fat" passed before we could get used to the novelty of conversing with the office from some back road as effectively as if we had had a connection through the telephone exchange. George Grammer, who operated the "office" station hour after hour, showed evidence of inexhaustible patience through it all.



MINUS THE OUTER SHELL

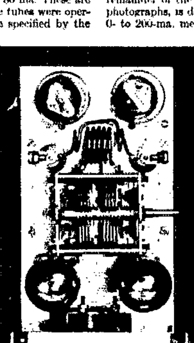
The transmitter unit fitted with Type '47 modulators

During this period, we had planned a trip to Round Hill and Cape Cod where, we knew, some 56-mc. activity was to be found. Paul Hendricks of Round Hill had lately been visiting Hartford, and tales of our 56-mc. stunts had gone back with him. On the day after our arrival at Round Hill, we drove over to Wianno (on Cape Cod) where we found, at Mr. E. C. Crossett's famed W1CCZ, a fine 56-mc. outfit all ready to shoot. In that "Ham's Heaven" (which fairly bristles with 861's, 849's and the like) John Dyer had arranged a push-pull oscillator with Type '52's modulated with a pair of 849's. In addition, he had built up a couple of super-regenerative receivers for the same band. Needless to say, the day was spent driving over that corner of the Cape checking and rechecking his signals. Strangely, the flat-wooded country of the Cape did not come up to our expectations. We had hoped that it would be almost ideal for the work but found instead that in every small valley and in the heavily wooded parts signals dropped sadly. Finding that the signals from W1CCZ dropped behind the noise "background" at about 15 miles, we decided that flat country was not necessarily good for 56-mc. unless both transmitter and receiver antennas projected well above houses and trees.

On the return trip to Round Hill that evening, we held a continuous watch for W1CCZ while John Dyer kept the transmitter on the air. Though we have no definite information, we imagine that John must only now be recovering from the effects of that three-hour talking bout. His signals, maximum strength for the first 12 miles, dropped irregularly from then on. At about 17 miles they sank out completely. From this point to New Bedford the road was particularly jammed with tourist traffic, and even if there had been signals they would surely have been drowned in the ignition QRM. On arriving at Round Hill (about 37 air miles from Wianno and half across water) we heard nothing of W1CCZ with the car parked outside the radio shack. Having a sneaking suspicion that the signals simply must have been flitting by overhead, we rigged the receiver indoors and hitched it to the standard 3500-kc. antenna at W1AXV — and Presto! W1CCZ was there full blast, still talking but very hoarse. After telling him this via 3500-kc. phone, we then proceeded to work him "duplex" with 3500 kc. one way and 56,000 kc. the other. Because of the limited distance and poor conditions, W1CCZ's 56-mc. stuff was considerably better than his transmission on 3.5 mc. Further tests the next morning showed that the height of the receiving antenna was quite critical. With anything lower than about 30 feet there were absolutely no signals. With the antennas higher than about 50 feet, the signals could be heard and read across the room. All of which is just a check on one of the few things we do know about 56-mc. work — that though it is not essential to "see" the transmitter in order to receive from it, the intervention of large objects (particularly the earth itself) is certain to play havoc with the signals. Experiment since the return to Hartford

with a control-grid bias of 20, the two tubes are capable of giving approximately 60 per cent modulation of the output of two Type '71 operated at the same plate voltage and with a plate current of approximately 80 ma. These are the conditions under which the tubes were operated. They are far from those specified by the tube makers, of course, but they have not resulted in any tube fatalities to date.

In view of the similarity of the chassis of this transmitter and the super-regenerative receiver, little need be said about it. As in the receiver, the radio-frequency components and wiring are all above the base, with the audio apparatus below. In the illustrations it will be seen that the two tubes of the oscillator are immediately behind the panel and mounted in ordinary tube sockets. Behind them is the split-stator condenser made up from a Type 406B Cardwell. As modified, it has five stator plates and four rotor plates in each section. It is so mounted in aluminum angles that the shaft runs laterally. A slot in the end of the shaft and a hole in the "can" allow the condenser to be set with a screwdriver. Behind the condenser and mounted directly on its terminals with lugs is the tank inductance. The feeders or antenna are coupled to it inductively with the aid of a split two-turn coil mounted on insulators. The particular insulators used were of Isolantite. G. R. sockets, through brass angles mounted on these insulators, serve as receptacles for plugs on the feeder or antenna leads. Two three-quarter-inch holes in the "can" allow for their passage. Because of their height and the limited space, the modulator tubes fit in sub-panel sockets of the type used on broadcast receivers. The sockets are available in most radio stores. The radio frequency choke, described under Fig. 1, is mounted under the tank condenser — above the base. The only remaining apparatus on top of the base is the fixed-tune grid coil. It is wound on a piece of ½-inch bakelite tubing supported with machine screws.



THE R.F. COMPONENTS AND MODULATOR TUBES: A PLAN VIEW OF THE TRANSMITTER

On the underside of the base, the arrangement becomes somewhat haphazard. Reference to the photograph will show the supply cable connector plate at the left top corner; the microphone transformer between the two modulator sockets; the speech choke at the right front; the grid leak on the left side and the three control switches on the front panel. The switches serve to open or close the filament, microphone and plate circuits. The remainder of the panel, as can be seen in other photographs, is devoted exclusively to the small 0- to 200-ma. meter which reads the total plate current of the four tubes.

Yaxley fittings are used for the supply leads — of which there are just four. Four-wire shielded cable has been fitted in place of the usual Yaxley cable. Obviously the original cable could be used instead.

The metal cases for both transmitter and receiver were made up to permit satisfactory suspension of the units in an automobile or airplane. They are, of course, unnecessary for most amateur work and since the details of their construction are made evident in the illustrations it is unnecessary to describe them. In operation, the two units are screwed together — the transmitter on top of the receiver — and the whole suspended with rubber straps.

In operation, the transmitter is just about the acme of simplicity. It has been dismantled and set up scores of times under all sorts of conditions and has yet to fail to put out signals of reasonably decent quality. Plate voltage (depending on the condition of the dynamotor batteries) has varied from 200 to 300 without seriously unfavorable consequences at the receiving end. The one important point in first setting up the outfit is to adjust the grid coil so that the point of minimum plate current (as the tank condenser is varied) occurs at the desired working frequency. Then, in adjusting for maximum output with the antenna, it is merely necessary to tune the tank condenser carefully until the plate current flips up to a sudden peak. The ordinary antenna or feeder meters would not respond to the very small currents to be expected in this case.

In order that the oscillator will provide a suitable plate load for the modulators, it is necessary that the plate current of the oscillators be somewhere in the region of 80 ma. Adjustment of the grid-leak resistance or of the antenna coupling may be necessary to bring the plate current to the right value.

It is perhaps unnecessary to say that any well-filtered plate supply of about 300 volts is suitable for the transmitter. It is essential, of course, that the supply apparatus be capable of a continuous load of about 130 ma.

Because the antenna problem for 56 mc. was so thoroughly outlined last month, it is unnecessary to do more than describe the small affair used on the car. In the work, the set was slung behind the front seat of the sedan and feeders were run through the window to a quarter wave copper rod mounted on the spare tire on the front fender. This antenna, of course, was operated against the frame of the car as ground and was, therefore, "current" fed. This necessitated half-wave feeders with one connected to the antenna and the other to the frame of the car. The arrangement is shown in Fig. 2. The procedure in determining the correct length of antenna involves the use of the same old formula,

$$\text{Length (feet)} = \frac{468{,}000}{\text{Freq. (kc.)}}$$

And now for the modifications for battery operation. To limit running costs it was decided to use not more than 135 volts of plate supply. Experiment at this voltage showed the superiority of the almost forgotten 201-A's for the work. Their obvious companions as modulators were Type 35 pentodes. Their normal plate current is 14 ma. at this voltage with 13.5 volts negative bias. With the two of them in parallel, a suitable plate load for them is obtained when the oscillators are taking 35 ma. at the same voltage. Under these conditions, a percentage of modulation is obtained similar to that with the larger tubes.

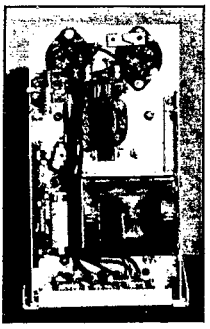
The only essential alterations necessary to obtain these working conditions are to change the values of the filament resistors R_2, R_4 and to reduce the modulator bias. In some cases an adjustment of the oscillator grid leak may be necessary, but we found that 50,000 ohms gave satisfaction with both types of oscillator tubes.

As a microphone for most of the work we used an ordinary single-button type. Since the speech quality obtained from the transmitter will be directly dependent on the quality of the microphone output we can only suggest the use of the best possible microphone of medium output. Because of the high sensitivity of the pentode modulators it is actually possible to use a double-button microphone driving them directly. At least, we were able to do this with one good microphone available in the laboratory. It is possible that other types (with lower output) would be quite unsuitable.

An ordinary hand microphone was used with this transmitter chiefly because of its poor response to extraneous noises "on location." Also, it proved suitable for conversion to a "French type" hand-set. Just as soon as duplex working was shown to be practical, we rigged up the hand-set shown in the cover illustration on this issue. The single receiver, borrowed from a head-set, is mounted with a metal bracket to the handle of the old hand microphone. The thing not only looks but works just like the recent A. T. & T. product!

And again, in closing, it might be as well to say that the idea in writing this has been merely to present a simple practical piece of apparatus which has performed with satisfaction under a variety of operating conditions. It is not necessarily ideal in any respect. Technically it is, perhaps, a crudity. It has merit, however, in that it works.

Whoa! But there is a warning before we go. Whilst a transmitter of this type can be operated at a licensed station without special dispensation, it cannot be operated as a portable transmitter without a license for portable operation. Even this license does not allow transmission from a moving automobile. Mobile operation of a portable amateur transmitter is illegal.



RESERVED FOR THE AUDIO CIRCUITS AND POWER SUPPLY WIRING. THE UNDER-SIDE OF THE CHASSIS

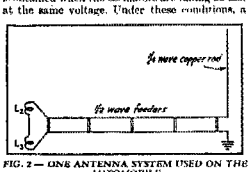


FIG. 2 — ONE ANTENNA SYSTEM USED ON THE AUTOMOBILE

Each feeder wire is 7 feet 6 inches long; the antenna exactly 4 feet.

"Five Meter" Receiver Progress

Describing a Successful Super-Regenerative Receiver for the Ultra-High Frequencies

By Ross A. Hull, Associate Editor

AGREAT many notions have had to be modified since the time when amateurs first took an interest in "five-meters." Chief of these is the original idea that, because "20-meters" was a whole lot better than the longer waves for distance work, the five-meter band should be better still. This apparently erroneous presumption led to disappointment when the uselessness of the band for DX work was indicated; and this disappointment, in turn, so thoroughly anesthetized amateur interest in the work that it is only now being revived after two years of dormancy.

As we see it now, it seems that experiment on the frequencies between 56 and 60 megacycles can be just as absorbing as that on any other band if only one's DX ambitions are not allowed to mask the real issue. The band, it appears, is useful exclusively for short-haul work. As such, it represents a territory of peculiar and undoubted worth.

The local ultra-high frequency revival (it we may call it that) started out some few months ago when James Lamb cooked up some new equipment and began experiment with it in the laboratory. So successful was it and so intriguing its possibilities that before long all of us were steamed up to the point where only an active interest in the work would appease our appetite. As will probably be reported in Lamb's article, his laboratory work was concerned with the development of simple, practical equipment which would be free from the "craziness" which seems to have been considered characteristic of all 56-mc. apparatus. It was only after the successful attainment of this objective that communication was attempted, during the last two days, outside the laboratory.

The receiver illustrated on these pages was used in the communication tests. It is a hybrid with circuit details borrowed from several of the scores of five-meter receivers which have been described in *QST* since 1926. It has quite high sensitivity, freedom from microphonic noises and a simplicity and effectiveness of adjustment which has made it unnecessary to touch the tuning of the set during an eighty-mile observation trip in an automobile. The reasons for the success of the set lie chiefly in the use of super-regeneration and the new indirectly heated 6-volt "automobile" tubes. Without super-regeneration the set would be insensitive and extremely difficult to tune. Without the indirectly heated tubes it would be noisy when operated in a moving car. These things we know from sad experience.

A PLAN VIEW OF THE SUPER-REGENERATIVE 56 mc. receiver, the chief features of which are extremely high sensitivity, simplicity of tuning control, and an ability to operate reliably in a moving automobile.

Since super-regeneration plays such an important part in this set and since it has had so little treatment since the original *QST* articles of 1922, it might be well to outline the principle on which it operates. We all know that the sensitivity of a regenerative receiver increases very rapidly as the point of oscillation is approached, but that the point of oscillation constitutes the limit to which this amplification may be carried in the usual receiver. In the super-regenerative system the application of an auxiliary super-audible frequency voltage on the grid or plate of the regenerative tube allows relatively terrific regeneration without the paralyzing self-oscillation which would ordinarily occur. In this particular version of the system, the regenerative detector is "plate modulated" by the long-wave oscillator and the detector plate voltage is therefore swinging back and forth at the frequency of that oscillator. On the positive peaks the voltage is of an order which would ordinarily make the detector oscillate violently. Such oscillation has no time to develop, however, before the plate voltage swings down on the next half-cycle of the auxiliary oscillator. Strictly speaking, an oscillation may develop during the positive half cycles but its amplitude is of such a low order as to be of little consequence. Operated in this condition, a regenerative detector may provide amplification many million times greater than that of the simple regenerative detector operated just below oscillation.

The super-regenerative receiver as originally described by Armstrong in 1922 appears at that time to have been considered a "flop" for amateur work (or any other work for that matter). The low ratio between the frequency of the received signals (on 2-0 meters) and any possible super-audible frequency limited the amplification of the system and caused it to be wretchedly difficult to handle. Since that time the arrangement has been used successfully for reception on the higher frequency amateur bands where the ratio between the received and auxiliary oscillator frequencies is much higher; but it is on the 56 mc. band where super-regeneration really comes into its own. On that band, the possible amplification is very great indeed. All the dizzy squeaks and general irregularities of operation disappear and we are provided with an extremely sensitive receiver, much simpler and more positive in its control than any conceivable autodyne set of the usual type. With the one tuning knob and a regeneration control, the receiver behaves just as if it were an ordinary rig on the 1715-kc. band. As we have said, it has been tuned to a signal just below the point of oscillation and has remained in that condition during an 80-mile ride over more or less rough back-roads. But enough, enough — on super-regeneration at least.

The other important feature of a 56-mc. receiver (perhaps it should have received first mention) is the tuning circuit. For this, almost any amateur could cull from his repertory a half-dozen possible schemes. Probably they would all work but it is certain that some of them would be quite unsuited. On the frequencies with which we are concerned it is obvious that the total amount of inductance in the circuit, even with a low order of capacity, is to be very limited. The leads within the tube itself added to the connecting links to the coil and tuning condenser are likely to represent quite an appreciable proportion of the total inductance necessary. Then, we have the capacity between these leads and between the elements of the tube. It is also to be of great importance in limiting the possible inductance in the coil itself. A preliminary experiment (or computation if you like) soon shows that if we are to connect the tuning condenser across the coil itself the inductance of the coil will have to be kept very low if we are to reach 60 mc. (the high-frequency end of the band). With a tuning condenser having a low minimum capacity and a low capacity range, the scheme could be used with satisfaction — and has — but there are much more interesting possibilities in that group of tuning circuits in which the tuning condenser is in series with the coil and the capacity between the two elements of the tube to which the tuned circuit is connected. By using this scheme, a much lower minimum capacity is obtained and the coil can be made considerably larger than in the parallel-tuned circuits. This, perhaps, is made clearer in Fig. 1. At "A" is shown the usual parallel-tuned circuit with the grid-filament capacity of the tube in parallel with the condenser C_1. At "C" is the series tuned circuit in which, as "D" shows, the grid-filament capacity is in series. Carried into the realm of push-pull we see that at "E" and "F" the tuning condenser and coils could be in series with the two tube capacities also in series, so permitting an even greater increase in the tuning inductance. The push-pull feature could be applied to the shunt tuned system with similar advantage. However, we can hardly digress to discuss all the possible schemes. There are scores of them, all probably having some particular worthwhile characteristic.

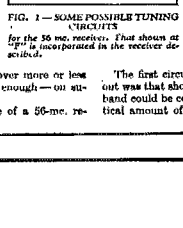


FIG. 1 — SOME POSSIBLE TUNING CIRCUITS for the 56 mc. receiver. That shown at right is incorporated in the receiver described.

The first circuit tried in our bread-board layout was that shown in Fig. 1 at "C." The 56-mc. band could be covered satisfactorily with a practical amount of inductance but with the usual

The V.H.F. Era Begins

Newspaper headline writers rarely worry about conveying facts accurately so long as their wording gets attention. The headline above has a similar tongue-in-cheek element. The fact is the oldest kind of radio; Hertz's first experiments were at a wavelength on the borderline between what we now call v.h.f. and u.h.f. And a well-documented body of v.h.f. experimentation continued from the time of Hertz to the time when the classic QST articles reproduced here were published.

What these two articles did was to ignite the widespread amateur interest in v.h.f. that we see today. They did it by emphasizing the interesting things that could be done with "local" communication, as contrasted to the DX that had been the accepted objective of practically all amateurs. For their time, the equipment designs had intriguing innovations, along with circuit simplicity.

We're sorry that space doesn't allow us to show you more than the first two pages of the second article.

The World Above 50 Mc.

CONDUCTED BY SAM HARRIS,* W1FZJ

Moonbounce Down Under

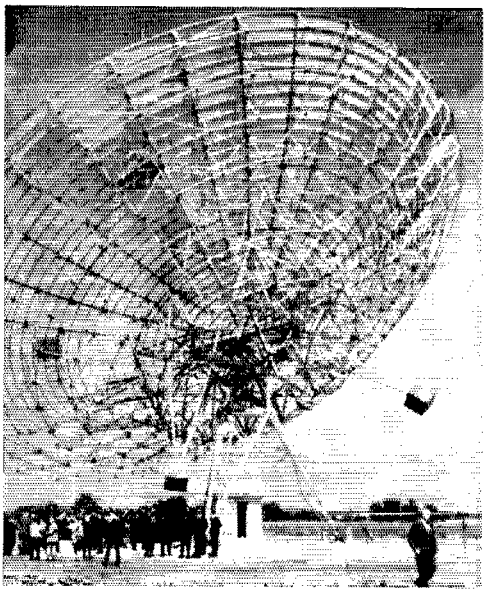
For the past few years moonbounce activity has been reported in terms of U.S.A. to Europe or U.S.A. to U.S.A. Rumors of activity in Australia and New Zealand have come and gone with no actual results reported.

In early 1965 VK3ATN of Birchip, Australia, started planning to enter the moonbounce ranks. After many long talks via h.f. radio (mostly 40-meter s.s.b.) with W6YK, K6MYC, W3SDZ, W1FZJ and others, the decision was to try it first on 144 Mc. The prime reason for choosing 144 Mc. was the availability of equipment plus good salesmanship on the part of Bill, W6YK. The fact that there are many more stations equipped and ready to go on the 420-Mc. band is offset by the lack of ready communication with these stations. The h.f. bands are the only practical way to exchange ideas and discuss the problems encountered in setting up for a moonbounce test half way around the world. Ray, VK3ATN, is well set up with rhombics, beams and verticals for all bands. Not only does he place high (like on top) in the VK-v.h.f. contests, he does the same in the h.f. world-wide contests as well. He handled the VK end of the first VK/W1 160-meter s.s.b. contact with W1BU for instance. Knowing his past performance record it was only natural to expect results from him on his moonbounce efforts.

Ray is located in south-eastern Australia about 180 miles northwest of Melbourne. The land around Birchip is flat and ideally suited for the use of ground-mounted beams.

The results obtained and the techniques employed by the first amateur moonbouncers, W3GKP and W4AO, impressed Ray. The extreme distance involved in working continental U.S.A. only allows a couple of hours of common moon at best. The final decision was to aim at a point in space which is visible to stateside stations and in the path of the moon at least three or four days a month. This allows the use of large, fixed arrays and eliminates the problems encountered in tracking. It does not, of course, eliminate the problem of finding the moon; but once you have the beam properly oriented you can relax. The moon will definitely come back at the appointed time.

The aerial chosen for use in the Birchip effort consists of four rhombics with 342 feet on each leg. The individual beams are stacked roughly one wavelength apart with a mean height of 24.4 feet. Apex angle for 144.090 Mc. is 11 degrees 28 minutes. Calculated gain is approximately 34 db. with a main-lobe radiation angle of 4 degrees. This is approximately the performance one might expect from a 150-foot diameter parabolic reflector. The half-power beamwidth is 3.5 degrees which allows about 8 to 10 minutes of moon time at full gain. (Minus 1 db. points.)



New parabola recently dedicated at Buenos Aires Argentina. LU9AS, LU3AED and LU7AT all attended the dedication and we're wondering which of them will be first to get in on the amateur-v.h.f. bands.

Ray had the aerial up and working for his first schedule on March 1, 1966. Skeds were held with W6YK and K6MYC on March 1, 2, 3, 4, and 5, 1966. For a first try results were terrific! Signals from K6MYC were heard during the March 5 schedule period. They were pretty spotty and no complete calls were copied but complete letters, some in sequence, were received at both ends of the circuit. The path was open? A little refinement on both ends should make a two-way contact a reality. Unfortunately the 60-foot parabolic reflector at S.R.I. which was used by K6MYC was no longer available. A new site and a new antenna had to be found. As of the middle of May the site has been located and the antenna is under construction. Target date for Mike, K6MYC, is May 25.

Next schedules were with W6YK on March 28, 29, 30 and 31. The rhombic had been completed and tuning of both the beam and the equipment resulted in the first recorded echoes by Ray of his own signals on the 28th. The equipment at

* P.O. Box 1738, Arecibo, Puerto Rico 09613.

VK3ATN consists of a 4X150 final driven by a heterodyne mixer out of a 3281. Power input is 150 watts. The receiver on this schedule was a 5 db. converter into a 75A4 with a 500 c.p.s. filter into a 100 c.p.s. audio filter. No signals were heard from stateside but careful record keeping and fairly consistant echoes made it possible for Ray to get a "live" fix on his beam orientation and pattern.

With a new Parks preamp and a new set of coordinates to provide positive overlap on all possible moon times Ray went into his third schedule loaded for bear and primed to hear and record his own echoes. Which he did. Not only did he hear them but he predicted where in advance. Echoes on this schedule were running 15 db. or better over the noise. Complete returns were copied again and again for the full ten-minute period. Let no one be deceived! VK3ATN is ready for a 144-Mc. moonbounce contact! Anyone who can hear his own echoes with not more than 700 watts into the antenna can work him. As a matter of fact if K6MYC has had any luck in getting his new antenna up and running he has probably already worked him. Late news about the schedule can be heard on 7090 kc. at 0800 GMT Mondays and Thursdays. 0230 GMT on 21,415 kc. Saturdays. 144-Mc. schedule times for the summer months are as follows:

June		July		August		September	
Date	*GMT*	*Date*	*GMT*	*Date*	*GMT*	*Date*	*GMT*
17	2116	15	2003	11	1744	7	1531
18	2223	16	2108	12	1849	8	1634
19	2323	17	2205	13	1949	9	1735
21	0016	18	2305	14	2043	10	1830
						11	1848

Ray transmits odd two-minute intervals starting ten minutes before and continuing twenty minutes after the times noted. He listens in the even two-minute periods. (Odd and even counted from the beginning of each hour.) All times and dates are GMT. Frequency of transmitter is 144.090 Mc. Receiver tuning range plus/minus 5-kc. maximum.

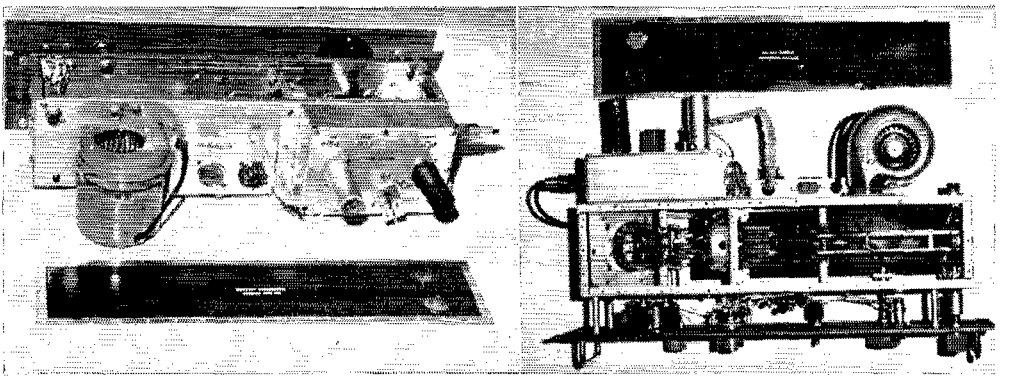
V.H.F. — Alaska

The following received from WA8AYL/KL7FCD: "As to v.h.f. communications here in Anchorage, Alaska; almost every amateur in the city has something on two meters from 2ers to a couple of hundred watts and 20-element beams. Six meters is not put to much use here because of Channel 2 and a very bad ground situation in this area. (The soil is very sandy.) Plans however, do call for six-meter operation this summer from the QTH of Jim, KL7CDG. Jim lost his beams in a recent wind storm but bigger and better things are on the way up. (That's the way to do it!) Operation will be on c.w. and s.s.b. later this summer. No definite operating times have been set as yet but at least there will be one KL7 on six this season. You should see his QSL file from the six-meter openings in 1957!" We'd like to see it Dave, but we can well remember hearing Jim go back to all call areas except ours. That is, the first time we heard him it sure seemed that way, although he did come back to the is too. We all had to wait our turn!

144 Mc. and Up

A letter receiver from K1UGQ (WB2LNA) alerts the v.h.f. fraternity that Biddeford Pool, Maine, will once again be active on 144 Mc. (and hopefully 420 and 220 Mc., too) during the summer. Doug sez that he will be happy to keep skeds once he learns what weeks he will be in Maine. His rig on 144 Mc. will be a Clegg Zeus and Interceptor with which he has worked 18 states on two meters during 15 weeks of operation during the summers of 1962 through 1965. K1UGQ, K1OYB and K1MTJ are really in there pitching on the v.h.f. bands from Maine. Although we're sure there must be many others active on 144 Mc. and up in Maine, these are the boys who are always looking for m.s. contacts, aurora, tropo, skeds and just plain contacts.

K2SCD reports he has completed hooking up of the directional coupler for s.w.r. measurement on 10 Gc. and is now in the process of calibrating the cavity frequency meter for that band. Not quite as high in frequency is K1YON and K1GLW who are working on 1220 Mc. Ted, K1YON, tells us that their short-distance check is probably the first 1220 Mc. contact in the township of Hartland, Connecticut. (O.K. Now let's find someone in the next township, eh, fellas!) New contacts on 220 come slowly but K1YON did recently work W2ITE in Spring Valley, New York and W2IRA in Congers,



"Home construction is not dead yet!" says George, W5UQR, of Lacombe, Louisiana. Shown is his new 100-watt 144-Mc. bandpass coupled r.f. unit. Tube line up is as follows: 6CL6, 5763, 832A, 829B. Transmitter is modulated by an external modulator using two push-pull 807s. (Photo courtesy W5GHP.)

2-METER STANDINGS

W1REZ	32	8	1300	W5JWL	33	7	1150
W1AZK	29	8	1384	W5DFU	29	9	1300
W1JSM	27	8	1330	K5WXZ	29	8	1225
W1AJR	25	7	1130	K5TQP	26	7	1250
W1KCS	24	7	1150	W5UGO	25	7	1384
W1MEH	24	6	1000	W5UKQ	25	8	1150
W1MMN	22	8	1200	W5SWV	20	5	960
W1HDQ	22	6	1020	W5ML	17	6	700
K1ABR	20	6	1140	W5KFU	15	5	1360
W1AFO	19	6	920	W5WAX	11	5	735
K1CRQ	19	6	800	W5BEP	9	3	1000
K1AFR	17	6	675	W5EDZ	8	5	1375
K1MTJ	16	5	1225	W5YYO	7	4	1330
K1OYB	16	5	1225				
				W6WSQ	15	5	1390
W2NLY	37	8	1390	W6NLZ	12	5	2540
W2CXY	37	8	1360	K6HMS	10	5	1240
W2ORI	37	8	1320	W6DNG	9	5	5250
W2BLV	36	8	1020	W6GDO	6	3	864
K2CQI	35	8	1365	W6AJF	6	3	800
K2LMG	32	9	1710	WB6KAP	5	3	1300
W2AZL	29	8	1050	W6MMU	3	2	950
W7PUA/2	26	8	1150				
K2CEH	25	8	1200	W7JRG	24	6	——
W2AMJ	25	5	960	K7NIL	19	5	1275
W2ALR	24	8	1100	K7ICW	12	4	1246
WA2PZE	23	7	1200	W7LHL	10	4	1170
W2LWI	23	7	1050				
WA2FGK	22	7	1340	W8PT	41	9	1260
W2FSX	21	6	750	W8KAY	39	9	1210
W2UTH	20	7	880	W8IFX	39	8	1225
WA2EMA	19	6	1010	W8SDJ	37	8	1220
K2HLA	19	6	1005	W8YIO	36	9	1250
WA2LTM	17	7	730	K8AXU	34	9	1275
WA2YXS	17	6	720	W8LOF	34	8	1060
WA2PMW	17	6	675	W8MVF	33	9	1155
K2OEI	16	6	1010	W8NOH	31	8	1090
WB2CCO	16	6	780	W8EHW	31	8	860
WA2RAT	16	5	700	K1CRQ/8	30	9	850
K2JWT	16	6	550	W8WNM	25	8	900
WA2JAM	16	5	670				
WA2UDT	16	5	550	W9WOK	42	9	1170
				K9UIF	41	9	1150
W3RUE	34	8	1100	K9SGD	37	9	1100
W3GKP	31	8	1108	K9AAJ	36	9	1200
W3TDF	30	8	1125	W9WDD	35	9	1300
W3BYF	30	8	1125	W9AAG	35	9	1050
W3LST	22	6	800	W9GAB	34	9	1075
W3LNA	21	7	720	W9OII	32	8	1090
K3GHU	20	7	930	W9PBP	28	8	820
W3MFT	19	6	600	W9OJI	27	9	910
K3CFA	17	6	600	W9IFA	27	6	1000
W3HHC	16	6	550	W9CUX	24	7	1000
W4HJQ	39	9	1150	WØBFB	43	9	1350
W4HHK	38	9	1280	WØLFE	33	9	1040
W4WNH	35	9	1350	WØENC	28	7	1250
W4ZXI	34	8	954	WØDQY	27	8	1100
W4MKJ	34	8	1149	WØMOX	23	6	1150
K4QIF	32	8	1000	WØIDY	22	8	1050
W4MNT	31	8	1225	WØIC	22	7	1360
K4IXC	29	8	1255	KØITF	21	6	940
W4FJ	28	8	1050	WØJAB	19	7	1130
W4RFR	24	9	820	KØJXI	19	7	750
W4TLV	23	7	1000	KØCER	17	6	1225
W4AWS	22	7	1225				
W4RMU	21	7	1080	VE1CL	8	5	800
W4OLK	20	6	720	VE3DIR	37	9	1300
K4YYJ	20	6	720	VE3AIB	29	8	1340
K4MHS	20	5	800	VE3BPR	24	7	950
W4LNG	19	7	1080	VE3BQN	23	7	1180
K4VWH	18	6	590	VE3AQG	18	8	1300
				VE3HW	17	7	1350
W5RCI	39	9	1280	VE6HO	1	1	915
W5AJG	33	9	1360	KH6UK	2	2	2540
W5FYZ	33	9	1275	OH1NL	1	1	5250

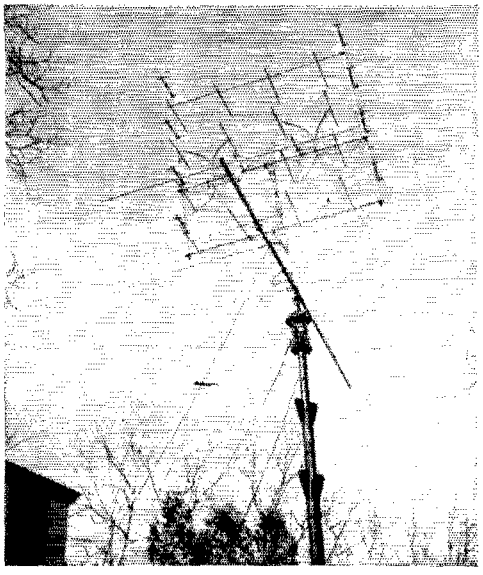
The figures after each call refer to states, call area and mileage of best DX.

New York on that band. Experimental-sample transistors are being used by Bill, WB2MBU, in the 432-Mc. converter being built. Should be completed and listening by the time you read this. Bill has recently completed the transistor preamp (*à la* Tilton) for two meters and sez it is good enough to necessitate much extra shielding from f.m., TV, etc. Recent construction at the QTH of K3QCQ at Lebanon, Pennsylvania, includes a coax filter for 432 and a 32 element colinear at 50 feet for the same band. From Bristol, Tennessee, K4EJQ writes that he has three new beams "in the works" for 432 Mc. plus a new multiplier chain; and that WA4BXZ is now operating on 432 with a varactor rig. WB6GHB is still looking for more people with modulated oscillator 420-Mc. gear, or even walkies. He's found three so far but would like to find more. At Los Angeles W6QJW is revising his antenna system and is working on a plane reflector for 432 Mc. Back in Watervliet, Michigan, K4GL/8 writes us that 48 elements of a 96-element colinear for 432 Mc. is completed and will be back on the air; that a 48-element colinear for 144 Mc. is in process; that a W1QWJ-W1HDQ 432-Mc. 4CX250B amplifier is in process. Skeds are being kept with W9ZIH on 432 Mc. every Sunday morning at 0900 EST and Jack sez: "Can keep skeds with any v.h.f.-u.h.f. man on any low frequency band on c.w. or s.s.b." As usual, Jack is keeping busy!

At a recent meeting of the Michigan Six Meter Club in Detroit W8FWF gave a talk, demonstration and display of equipment he uses on 432 Mc. Equipment displayed included transistorized preamps, transceiver units from taxicabs (converted to 432), cavity amplifier and also a 12-volt d.c. supply to power the transceivers while using their original vibrator power supplies. The demonstration was successful (using an 8-foot Yagi in the same room) when contact was made with WA8FMZ about six miles away. K8WXO and K8TJP assisted with equipment and commentary and from what we've heard the meeting was a big success. George (W8FWF) operates on 432.9 Mc. from six to eleven every evening and usually has his beam pointed south. If anyone is getting on that frequency outside of the Detroit area and would like the group to listen for them, please write W8FWF or K8TJP to set up a schedule.

WB2UCS reports that the 432-Mc. amplifier ATV.-color project is just about completed. Wayne and WA2VEW have been working at this for some time and we're glad to hear that they're holding on until completion. Good luck, fellers. At Bryn Mawr, Pennsylvania, K3ADS wonders why there isn't some frequency standardization on amateur TV Sez he: "Some on 435, 440, 445. Some tune low, others high. Some antennas are too narrow. Any suggestions on the east coast?" Now is the time boys, to let him know! K4VGN at Fort Myers, Florida, sez that he and W4SCW have flying-spot scanners operating and also vidicon cameras. Work is underway to modify 450-Mc. transceivers for use around 445 Mc. for amateur t.v.

144-Mc. activity is growing in Massachusetts



The view is beautiful at QTH of W1OOP. 96 elements on 432 Mc.; 32 elements on 144 Mc.; 7 elements on 50 Mc.

with W1EAL, K1HQII, WA1EEC and G3PXB/W1 (darn it!) all putting in an appearance on the band. Barry, K1BTF, in Framingham, Massachusetts, is putting in a telephone and will handle messages (two-meter type) for anyone in the area. In New Hampshire K1VUB is now operating s.s.b. on 144. WA2RAT writes: "I have completed my two-meter s.s.b. heterodyne converter and 829B linear amplifier. Preliminary results seem good with contacts which would have been difficult with high-level a.m. I can cover 144 to 145.7 Mc. with the Drake TR-3 as a driver. One problem is a lack of s.s.b. activity in this area which I attribute to band conditions more than anything else. A few years ago I managed to work 13 states on s.s.b. I expect to be set up from Pine Plains, New York, this summer with 100 watts on two meters plus 18 elements on top of a 40-foot tower." Let us know how you make out during the summer, Mike. April was an eventful month on 144 Mc. for W4CKB at Lake Placid, Florida. Bev writes that on April 9 144 Mc. was open to northwest Florida, Alabama, Mississippi and Texas with W4UUF (425 miles) putting in a signal over S9. April 24 accounted for a tropo QSO with K4QIF in Salisbury, North Carolina (580 miles); April 25 brought forth a c.w. QSO with W4LSQ in Columbia, Alabama with 5–8–9 signals; April 26 came up with a m.s. QSO with W4FJ, Richmond, Virginia, (750 miles) on a non-shower full minute burst. Wonder if any of these were new states for you, Bev!

Weekly tests on 144.090 Mc. continue between K7NII and K5TQP even though Fred (K5TQP) is now at the home location in Tijeras Canyon rather than the mountain QTH. Strongest signal received from K7NII to date at the home location was 3–3–9. Rig at K5TQP consists of a k.w. on two meters and 50 watts output on six. A new converter using 3 TI-XMO5s for use with the mobile rig on 144 Mc. was Fred's most recent construction and he sez that operation is noticeably better than any previous mobile receiver. In L.A., W6QJW is busy revising the feed to his 80 element, two-meter quad to provide for coax and power balance between elements. WA6ROJ at Ukiah tells us that the 145.35-Mc. net is active almost nightly with a few newcomers.

Several months ago WB2KLD was wondering (in this column) about the possibility of the comet having caused some of the good openings on the v.h.f. bands. He has delved into the subject and come up with the following: "As the comet neared the sun the matter in its tenuous tail was excited by the sun's radiation (similar to aurora or Sporadic E). This caused a layer of ionized material, causing the opening. Note this, most reports indicated the openings followed the sun; that is, in the morning, generally east and somewhat south, in the evenings, the east was fairly dead in comparison to the heavy western activity heard. I suspect that this type of thing will occur again whenever a comet nears the sun." Tom would like comments on his theory so please write him at 1036 Stelton Rd., Piscataway, New Jersey, 08854.

During the latter half of April and first part of May 432-Mc. skeds have been held between W1OOP and VE2LI with very satisfactory results. Hank (W1OOP) tells us that nine successful contacts were made with signals varying from 3–4–9 to 5–7–9. W1OOP runs 200 watts out to a 96-element beam on 432. (See photo.) W1TQZ writes that he recently had quite an extended QSO with W1IGJ. The QSO started out by landline, continued on 50 Mc. then moved to 420 Mc. with W1TQZ using a Gonset and 4CX250 tripler and W1IGJ using a Gonset and diode varactor. Sez Frank: "Wound up with a 4 way including W1OOP, W1YWQ, W1IGJ and W1TQZ. QRM on 432 Mc.!" Guess the rig at W1TQZ couldn't take the guff 'cause the final blew up. Frank allows that now either he needs a new tube or he just doesn't know enough to load it properly 'cause it just doesn't perform properly. An antenna raising party was held in West Bridgewater (W1TQZ) with W1ZIG and W1HIV assisting in the erection of 48 elements on 421 Mc. and the old 5 over 5 repaired.

220- and 420 Mc. STANDINGS

220 Mc				K2UUR	9	3	280
W1BU	14	5	600	W7PUA/2	7	4	500
W1HDQ	12	5	450	WA2EUS	7	3	130
W1AJR	12	4	480	K2YCO	6	5	500
K1JIX	11	4	615	W2YPM	6	3	300
				WA2DTZ	6	3	200
K2CBA	16	7	660	WA2TOV	5	3	140
W2AOC	15	5	530	K2GGA	4	4	383
W2SEU	12	5	450				
K2DZM	12	5	400	W3MMV	11	5	410
W2LWI	12	4	400	W3RUE	10	5	470
K2KIB	12	4	300	K3CLK	9	4	—
K2ITQ	11	5	265	W3FEY	8	4	296
K2ISA	11	4	300	K3IUV	8	3	310
K2ITP	10	5	265	W3SZD	5	4	300
K2AXQ	9	3	240	W3UJG	4	2	350
K2JWT	6	3	244				
K2UUR	6	3	210	W4HHK	9	4	550
WA2BAH	6	3	200	W4GJO	6	2	1000
				W4TLV	6	2	500
W3FEY	11	5	350	WA4BYR	6	2	420
W3RUE	10	5	480	W4RFR	5	2	665
K3IUV	10	3	310	W4TLV	4	2	500
W3LCC	10	3	300	K4QIF	4	1	285
W3JYL	8	4	295				
W3JZI	4	3	250	W5RCI	16	5	725
				W5AJG	7	3	1010
W4TLC	5	1	315	W5SWV	7	3	525
K4QIF	4	2	500	W5HTZ	5	3	440
				W5MIL	5	1	350
W5AJG	3	2	1050	W5UKQ	3	2	500
K7ICW	4	2	250	W6GDO	2	2	385
W7AGO	2	1	160	W6FZA	1	1	280
				K6GTG	1	1	180
K8AXU	11	5	1050				
W8PT	11	5	660	W8PT	11	7	600
				W8KYIO	11	6	560
W9JCS	6	2	340	W8RTYY	9	5	580
				W8IFX	8	5	470
VE3BPR	3	3	300	K8REG	6	4	275
				W8JLQ	6	3	275
430 Mc.				W8RQI	6	3	270
W1BU	13	3	390	K8AXU	5	3	660
W1AJR	12	4	410	W8FWF	5	3	450
W1OOP	11	3	390				
W1UHE	10	4	430	K9AAJ	9	5	425
W1HDQ	10	3	250	K9UIF	9	5	390
W1QWJ	10	3	230	W9GAB	9	4	608
K1JIX	9	3	230	WA9HUV	8	5	450
				W9AAG	8	4	525
W2BLV	13	5	460	WA9NKT	7	3	310
K2DZM	10	4	390	W9OJI	6	3	330
W2OTA	10	4	300				
K2ACQ	8	5	525	W9IDY	9	5	560
WA2HQE	8	4	280	K9ITF	3	2	158
K2HQL	8	4	250				
K2CBA	9	7	220	VE3AIB	5	4	450
W2VCG	9	4	280	VE3BQN	5	4	447
WB2EGZ	9	4	260	VE3BPR	4	4	600

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

50 Mc.

Massapequa Park, New York, reports through WB2RBA that although nothing exceptional has been observed on 50 Mc. recently, good ground wave was noted on several occasions and hopes are high for good skip conditions this season. Joe sez he is still experimenting with balun and 300-ohm twin lead on six meters and so far has found that using balun and twin lead increases TVI and is harder to get rid of. (He notes that his neighbors will agree.) WA2SUY reports that six meters is dead, and local activity at a low level. Stan makes the following observation concerning experimental work at his QTH: "I am trying to eliminate the negative peaks in my audio. This eliminates the

(*Continued on page 150*)

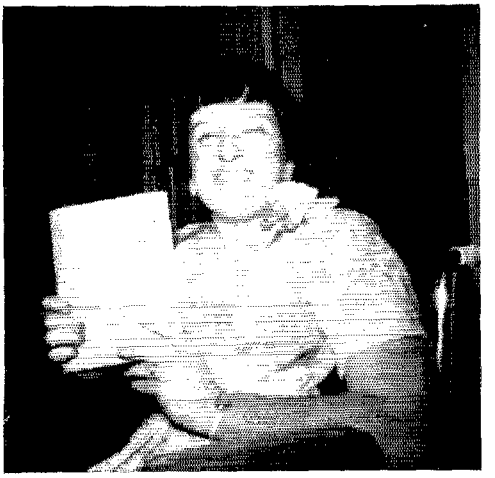
YL news and views

CONDUCTED BY JEAN PEACOR,* K1IJV

Results: Seventeenth YL/OM Contest

Rigs all over the land may still be in the process of cooling as a result of this year's YL/OM test, judging from the many high scores. Whether you won — placed — or just showed, there's no denying the fact that this test provided two exciting weekends of radio activity. If it was your first year, there was the added excitement of everyone and everything being new. Veteran contestants found pleasure just in hearing many of the old faithfuls; many of whom have never missed a contest.

In the YL phone portion, Marte Wessel, KØEPE, turned in the highest score in many a year for 1st place, which she also won in 1964 (see YL Column, July 1964). Ellen White, W1YYM, (YL Column, October 1965) jumped from 3rd place winner of the c.w. portion in 1965

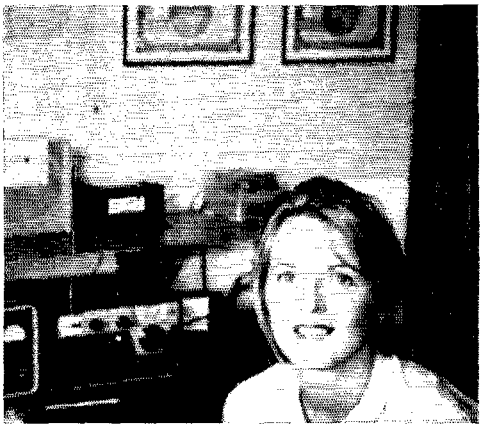


"smiling all the while—that's" Peg Harnois, K1GSF Editor for the new YL Harmonics. Peg is the daughter of K1EFZ of Westbrook, Maine.

to another highest score ever for 1st place honors this year. Jessie Billon, WA6OET, (YL Column, March 1964) has held one of the top scores for the past three years.

Dave Thompson, K5MDX, (see YL Column, July 1963) was high scorer for OMs in the phone portion in 1963 and 1964, and has done it again in 1966. Ken Bauer, W9WGQ, who was 2nd in the phone portion last year (see YL Column, July 1965), returned to capture 1st place honors in the c.w. portion this year.

*YL Editor, *QST*. Please send all news notes to K1IJV's home address; 139 Cooley St., Springfield, Mass.



First licensed in 1962, Brenda, WA4HOM, whose OM is Hess, WA4GCS, is one of the top three for both the YL/OM c.w. and phone portions. Holder of DXCC (200 cfmd in 9 mos.), YLCC, WAC, WAS (7 mc. c.w.), Brenda is also a YLISSBer.

To paraphrase some comments from YLRL's Vice President, Edie McCracken, K1EKO, who was chief log-checker this year — Sincere thanks for the many nice notes which accompanied your logs. All suggestions for future contests will be given careful consideration before next year's rules are established.

Your logs have been carefully gone over, and any change made in your score is for a good reason. First, check your multiplication. Then, check your claimed sections. We use the ARRL section list, which is available from the V. P. for an s.a.s.e. Some of you worked contacts only in the U.S. and Canada. Both of these countries are divided into ARRL sections, and cannot also be counted as countries.

To the top 12 scorers — congratulations! To the more than 300 who took time to submit a log, our thanks. Illegible logs were used for confirmation. Before you send in a log next year, look at it again, and make sure you'd be willing to plow through at least 300 just like it. You'll have the sincere gratitude of the V. P. who has to check it.

Feb. 19–20, 1966

YL Phone

	Score
KØEPE, Marte Wessel	116,896
WA5NVY, Patricia Dyer	78,678
WA4HOM, Brenda Garlough	77,342

OM Phone

K5MDX, David Thompson	7,336
K2EIU/5, Ken E. Keeler	5,288*
W9LNQ, Bob Trulilar	3,754*

Pat Dyer, WA5NVY, had never seen a transmitter until August 1965, passed her Novice the next month her General the next, and entered her first ham contest this year. She's the 2nd place winner of the phone portion. This busy mother of three has also earned, WAS, WAC, has 96 countries, is active in Navy Mars, and conducts code classes for her OM and 8 other students.

Mar. 5-6, 1966

YL C.W.

	Score
W1YYM, Ellen White	53,346
WA4HOM, Brenda Garlough	52,480*
WA6OET, Jessie Billon	50,540*

OM C.W.

W9WGQ, Kenneth Bauer	4,046*
K2EIU/5, Ken E. Keeler	3,250*
W8AJW, Jack Siringer	3,218*

YL PHONE

K1GSF	1,563*
W1YPT	455*
W2EEO/2	741
K2KQC	7,993*
WB2NCG	225*
K2YMJ	350*
WA3DQG	32,635*
W3UTR	450
WA4FEY	29,240*
W9GHO/4	14,570
WA4HOM	77,342
W5ONP	8,326
WA5NVY	78,678
K6DLL	29,438*
WA6OET	75,985
WA6PQI	21,613*
WA7BAB	37,440*
WA7EEX	11,424
W7GGV	4,760
K7KSF	19,341
K7MRX	18,354
K7RAM	18,982
K7TLP	765*
WA8FSX	1,733*
W8LGY	1
WA8KMT	390*
K8ONV	28,724
K8ZNC	13,802
WA9IYG	26,370
K9LUI	38,994
WA9MZD	31,421*
KØEPE	116,896
KØJFO	7,200
WØJUV	21,912
KH6FQU	9,856
VE3BII	14,773*
VE3EZI	14,149*
CE6CC	9*
DJ2YL	14,291*
DJ9VYC	10,693*
PY2SO	33,580
VK3KS	709*
XE1HHH	288*
YV1QN	713*
ZL2JO	23,404*
ZL3AO	330*

YL CW

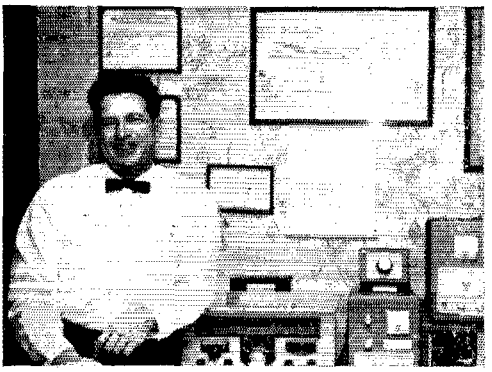
K1IJV	24,390*
K1NEI	12,629
K1QFD	17,925*
W1YYM	53,346
W2EBW	17,487
K2ETC	3,528
K2JBX	25,670*
WB2JCE	9,880*
WB2PYI	7,238
WA2WHE	13,740*
W3UTR	7,650
WA4BVD	5,760*
WA4EPM	3,588*
WA4HOM	52,480*
W4NGE	36,865*
WA4PAE	7,920*
K4RHU	3,240*
K4VDO	11,718
K5FXX	20,475*
WB6KVG	49,248
WA6OET	50,540*
W6WDL	9,515*
WA7BAB	23,253
WA7BDD	9,940*
WA8KMT	13,905*
W8MIBI/8	5,125
WA8OFW	10,912
K8ONV	36,675
K8VFR	22,050*
W8WUT	3,713*
WA9EZP	16,470*
W9KSE	17,258*
WA9MHU	17,028*
W9MLE	15,113*
KØGIC	12,994*
WA2WBA/Ø	39,655*
VE1AQI	6,100*
VE1EH	744*
VE3BBO	10,203*
VE3BII	30,433*
VE3EZI	47,970*
VE6ABV	6,960*
VE7BPM	36,660*
DJ9SB	10,850*
LA6ZH	110*
OH2DI	135*
OH2YL	144
OH7YL	4*
PY2SO	32,544*
SP6AYQ	1,573*
SP6AZY	3,565*
VK3KS	4,830*
ZL2JO	4,869*

OM PHONE

W1BAB	1,913*
K1DII	468
W1FDW	2,868*
W1HOZ	336
W1HQV	100
K1IIK	100*
W2COB	234*
W2CQP	9
K2IQH	124*
K2PXX	1,148*
W2QKJ	266
K2RAR	714
K3BNS	551
W3BVL	1,536
W3MNE	16
K3TOQ	1,219*
K4JIG	2,681*
W4JUJ	276*
K5MDX	7,336
W5NQR	3,150*
K2EIU/5	5,288*
K8YCM/5	949*
K6IMT	1,036
WA6JDT	53*
W6MTJ	378
W6RQZ	143
WA6TKQ	1,760*
W1PYM/6	764
WA7BTU	138*
W7ENA	1*
W7KOI	608*
K7SAS	775*
W7ULC	1,995
W8BTW	210*
WA8DNT	920*
W8DWP	110*
W8ETO	304
W8JM	216
W8WT	748
W8WUO	2,364*
K9EAB	884
W9KXK	572
W9LKI	725*
W9LNQ	3,754*
W9QWM	570*
WØAQE	816
KØETA	990*
WØGNX	1,305
WAØGZA	792
WAØHSX	594*
WAØKGD	125*
WØPLN	210*
WØRJF	840
KH6BIH	285
WA4MFS/KP4	380*
VE2CK	356*
VE3BJK	609*
VE3OL	193*
VE4ZX	182
VE7AKB	1,125*
VE8BB	456
DJ8EN	70*
DL9HC	44*
OZ5EU	3*
PY2CQ	56
VK3XB	1*

OM CW

W1AQE	1,320
W1BGA	1,840*
K1DPB	641*
WA1DWE	709*
W1ECH	2,574
W1FPS	1,131
W1HOZ	2,124
W1HTE	418
W1OPZ	1,821*
W2AAU	2,680
K2DDK	1,240
WA2DSR	188*
WB2FRE	1,156*
K2GDP	1,232
W2HAE	368*
W2IP	80
WB2MRA	840
WB2NZU	618*
W2RPZ	1,218
W2UAP	595*
W2WL	713*
W3ADE	208
K3BNS	315
WA3BSP	204
WA3CFK	325*



Bob, W9LNQ, earned 3rd place phone honors this year using an RME 6900 and Valiant II with s.s.b. adaptor. Well known in many contests, Bob is also a member of QCWA, ISSB, OTC, CHC, Hamfesters Radio Club and DXCC (240 cfmd) Photo courtesy of W9NLF.

Ken Keeler, K2EIU/5, is a Lt. and instructor pilot in the U.S.A.F. at Webb AFB. His high scores in the 1960 YL/OM contest made him a big winner that year, and he's done it again as this year's 2nd place scorer in both the c.w. and phone portions. He has also earned 12 YL certificates as a result.

K3CUW	1,880*	W9HDR	1,215*
W3DKT	1,610	WA9ITB	2,450*
WA3EEQ	2,432	WA9KGX	2,125*
K3FOQ	83*	W9LKI	2,080*
W3MSR	580	WA9LHH	2,683*
K3PIE	500	W9LNQ	2,868*
W3RYV	165*	WA9LPT	863*
K3SLP	1,540*	W9QWM	473*
K3VSV	1,235*	W9RKP	1,197*
K3WWP	1,559*	W9SFM	999
WB4CAP	11*	W9TCU	420*
K4GSX	1,395	W9UTQ	1,156*
W4HOS	288	K9WDY	2,196
W4JUJ	2,030	W9WGQ	1,046*
W4KMS	891	KØAZJ	1,344*
K4OTT	293*	KØBXF	80*
WA4WAO	1,767	WAØCTX	625*
W4ZOK	744	WØGNX	1,904
W5AWT	1,364	WØJDM	1,063*
W5BUK	1,204	WØJGG	1,094*
WA4KOI	1,031*	WA0JNF	1,064*
W5RIT	108	KØJPL	720
K2EIU/5	3,250*	WAØKDS	2,228*
W8BZY/5	360*	WØRJF	1,470
K8YCM/5	1,950*	KH6BIH	513
W6AWY	2,035	VE1AE	467*
W6CLM	1,200	VO1AW	333*
K6DQB	1,181*	VE2AQJ	720*
W6MTJ	1,334	VE2AQO	1,463*
W6OED	1,500*	VE3BJK	2,538*
W6OUL	375*	VE3DXD	2,269*
W6PGM	1,120	VE3EMA	1,350*
K6QCF	1, 26	VE3FUV	2,131*
WB6QMF	975*	VE4ZX	858
WA6TKQ	1,249*	VE6UP	1,734
W1PYM/6	2,418	VE7BDJ	980
WA7CAQ	2,779*	VE7BLO	776*
W7ENA	450*	VE8BB	132
W7RGL	1,160	DJ1VI	163*
K7SQD	357	DL1QT	255
W7ULC	2,394	G3WP	20*
W7UUU	31*	IT1AGA	553*
W8AJW	3,218*	LA1H	546*
W8AQ	1,821*	OH2YV	12
W8DJS	70*	OH3MF	105*
W8DWP	410*	OH3MU	1*
WA8GUF	888	OH5VT	96*
W8JM	1,363	OK1AIR	16
K8KPM	1,744*	OK1HA	16
WA8MAM	990*	OK2QX	138*
WA8MCQ	25*	PAØVB	38*
K8NQP	525	PY2CQ	221
W8VDF	361*	SM3CNN	88*
W8YGR	1,904	SP5AHL	9
WA9CYG	300*	SP6AAT	143

The YLRL Forum at the National Convention provided this coast to coast meeting of YLRL's Pres., Kayla, WØHJL, and V. Pres., Edie, K1EKO.

SP8MJ	195	VK3XB	20*
SP9ADU	1*	YU1MV	113*
UR2DE	11*	YU1NOL	1*
VE1AFD/SU	12	* Low Power Multiplier.	

1966 ARRL National Convention

April 23 and 24 found Boston's Prudential Center filled with between three and four thousand of the best conventioneers you could ever find — all radio amateurs. Activities for all were well planned by The Federation of Eastern Mass. Amateur Radio Assoc. who sponsored another of their successful conventions.

The willingness with which many YLs assisted added greatly to the success of the YL program which began with a fashion show completely organized by Millie Doremus, W1SVN. Many YLs enjoyed the bus tour of historical Boston and Cambridge which followed and was well managed by Eunice Gordon, WØKEH, ex-W1UKR.

YLRL President, Kayla Bloom, WØHJL, from Denver, Colorado, conducted the YLRL Forum. Her excellent talk urged clubs and individuals to assist in an all out YLRL membership drive; explained all that's being done in connection with YL Harmonic's changes in order to make

(*Continued on page 148*)

This passport picture of Marlene Kaniuk, WA9FRW, of Morton Grove, Ill. will enable her to attend summer school at St. Andrews College in Dundee, Scotland, with visits to both England and France also planned. Marlene (now 17) is an active member of the Eye Bank Net and has had her General license for four years. Photo courtesy of W9CDQ.

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

Which?

We hadn't heard from our old pile-up buddy Grommethead Schultz for some time, so it was a delight to run into him recently on his way home from an appointment with his psychiatrist. No new problem, it seems; just the old unshakable obsession that he's fate's favorite football. Schultz blames his current jitters on the rebirth of 10-meter DX.

He tells us that, a few years ago during ten's last heyday, he fell heir to some spools of copper and began playing around in his back yard with various beam antenna ideas. Nothing really high or fancy, just a few spidery webs, modified inverted vees, mutually coupled dipoles and the like. He'd doodle up a design on paper, run outside, hook it up, and return to the shack for a QSO or two to see how it went. This is no scientific approach, but Grommethead Schultz is one of the most dedicated cut-and-try men in the game.

Well, just about the time he thought he had something really interesting cooked up, 28 Mc. apparently took one of its patented nosedives. His finalized configuration for Model 87G should have been a killer but nobody answered a full morning's CQ DXs. So Grommethead tore it down, went on to Nos. 88, 89, and so forth. A day or two later he discovered his receiver had subtly conked out while he was testing No. 87G. By this time he was out of fresh copper, anyway, so he quit fooling around, threw away his scribbles and went back to the old quad.

A few days later the s.w.l. cards started showing up. This didn't faze Grommethead at first because a few watts and a decent wire on ten always brought him mail. *Some* batch, though, and the income continued. Weeks later, with the stack getting out of hand, his local ARRL QSL Manager called collect and told him he'd better get over there fast. Schultz was pleased, for he had six tough ones still unconfirmed. But he returned with a station wagon full of s.w.l. cards.

Considerably shaken now, he took a week off from work to study the situation. For the first time he considered dates and locations on those listeners' reports. Every one fell between 1300 and 1700 GMT on March 15, 1961! As for the whereabouts of the listeners, the majority were in central Asia—you know, Tibet, Sikkim, Nepal, etc. What reports! "Loudest American signal ever heard." "Blocking entire 28-Mc. band here." "You break up local Himalayan rag-chew net." Ad infinitum. Grommethead grabbed his log, turned back to the 15th of March, found mention of 87G, 163 unanswered CQ DXs, and the terse entry, "band lousy."

Poor guy naturally hunted high and low for details on Antenna 87G but, as we said, he had scrapped all his notes. Tried a memory mock-up, too, but no soap. Now Schultz spends part of each week and much of his paycheck on a headshrinker's pad striving for total recall. Moral, if any: Maintain *and retain* a thorough operational/technical log, OM.

What:

Current declarations on the state of short-wave propagation often include the word *strange* on one hand, and *stabilizing* on the other. "Strange" to some, perhaps, because DX paths long closed are beginning to reopen; "stabilizing" to old-timers, maybe, because familiar prop patterns of the past are growing discernible once more. Take midnight Europeans on 20 meters for example — mighty unusual if this is your first trip around the sunspot cycle, but just like old times if you're a DX vet. So there's no paradox. It *does* seem strange after the lean years to see 14 Mc. stabilizing toward delicious 'round-the-clock DX! Let's inspect a few samples of stuff worked, called, heard, heard worked or heard called by "How's" reporters across the land and beyond. . . .

20 *c.w.'s turn to lead off, treated by dispatches from* **Ws** 1AYK 1CNU 1DYE 1ETV 2ICO 3HNK 4YOK 6KTW 7VRO 8PKU 8TRN 8YGR 9LCG, **Ks** 1CDN 1ZJA 2UPD 3SLP 7UHE 9CZV, **WAs** 3ATX 3AZI 4WIP 4YDR 6JDT 7BOA 7BOB 8GGN 8MGD 8PKG 9IBT 9NSR ØCQI, **WBs** 2NLH 2TGA 4CAP 6KIL, **DL4NG**, **WN9PQY** and R. Johnson: **BVIs** USA USF, **BY9SX** (2) 7 meaning 14,002 kc. at 0700 GMT, **CEs** 1AD 1AV 6EF 9PM ØZI/mm (63) 0, **CM2BL** (10) 8, **CN8s** CF FV, **COs** 2BL (10) 8, 2BO (20) 13, 2JB (56) 19, 2KG (28), 2RL 5EG 6JH (45) 23, **CP5s** AQ EZ (30) 1, **CRs** 3AD 22, 4BB 21, 6AI 6FE 6IH 22, 6IK (10) 20, 7IZ 17, 8AA (20), 8AF (60) 13, 9AH, **CTs** 1IL (30) 23, 1IW 1LL 1SQ 1VB 20, 2BO (20) 21-23, 3AQ (42) 22, **CX3BF**, **DMs** 3YYA 6AA ØLMM (20) 12, **DU1OR** (70) 17, **EA6BH** (47) 22, **EI4AZ**, **ELs** 2AO (70), 2D (40), 2Y (60) 23, 7A (55) 19, **EP3AM**, **ET3AC**, F8TT/**FC** (10) 19, **FB8s** WW (65) 21, XX (21) 12, YY (85) 6-7, ZZ (5) 9-10, **FG7s**

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

DU1TNM, assisted by DU1TA (standing), joined the DX fraternity in March with this Manila layout. DU1TA lately concentrates on 14,250-kc. s.s.b. with occasional c.w. DXcursions. (Photo via E. Evangelista)

TD XF 22, XJ (31) 21, XX (21) 12, **FK8**AH 4, **FL8s** MC RA (54) 1–2, **FM7**WH (79) 22, **FR7**ZN (56) 5, **FS7**RT 19, **FY7s** YD (20) 12, YG (67) 4, YK (55) 23, YJ (50), GC4LI 21, **GD3s** HQR TNS (43) 22, **HAs** 1KSA 15, 1KVM (49) 5, 4KYB 1, 7PG 8KUC 4, 8UG, **HC1s** CG (15) 22, JQ, **HI8s** LC (90) 20, RVD 14, XAL 22–3, **HKs** 2DP 4, 3ADO 3BAE 3HY 3RQ 0AI (65) 0–15, **HL9s** KB KF TH (50) 10, TT US (58), **HMs** 3CG 5BF 12, **HP1s** BR (42) 19–22, IE (10), **HRs** IJZ 22, 1KS (15) 21–22, 5LB (70) 21, FCC/ITU-banned **HS1**CW (20) 14, HV1CN (45) 10–11, **HZ3s** AC (25) 20, TYQ (14) 4, **IS1s** FOL (35) 11, PEM (46) 21, **IT1s** SBT SEU, **JAs** 1BMD 1DMI 1HZN (30) 23, 1IAE 1IBX 1KVG 2CIR 2JW 3CWV 3GZN 4AHW 4BZH 5AB 6BXA 6BY 6EBY 6MW 7CEK 8AA 8ADQ 8QA 0BVO, **JT1s** AG (27) 2, KAA (18) 12, KAE (95) 15, **KAs** 2DJ 2, 7AB 1, 9AS, **KØ**LUZ/**KV4**, **KB6**CY (10), KC4AAA/mm (65) 0–3, **KGs** 4CX (10) 22, **6IG** 3–7, zippy **KH6IJ** (40) 3, **KJ6**DA (35) 18, **KL7s** FFQ (50) 12, LJ, **KM6**BI (32) 14, **KP4s** BFF BJM, **KR6s** BF CU (11), GF JZ (50) 0–1, MM QC, **KV4s** AA (81) 22–23, CI, **KW6s** EJ EK (20) 3, **KX6s** BQ ER (70) 5–6, **KZ5s** BC FX (50), **LA3s** P/p (30) 11, VB/p, **LJ2T**, **LUs** 1DAY 1HBS (38) 2, 1ZA 2, 1ZG 2, 2DAW (110) 22, 5AQ, **LZs** 1DF 1KPZ 1KSV 2KAD 2KSK 2KSL 20–22, **MP4BEU** (3) 19, **OA4s** BR (50) 6, KF (20) 22–23, PF PQ 15, QZ TJ 23, **OD5s** AI (31) 13, ED EJ 19, LX, **OH0**NF (20) 14, **OXs** 3KI 7, 3LP 3UD 5AX, **OYs** IL (25), IX (42), 2J 7ML 8P (45), **PE2**EVO 18, **PI1s** KM KMA 15, **PJs** 2ME (8) 13, 3AH 3CI (100) 22, **PYs** 1BLG 1CIP (30) 23, 2GDB 2SO (35), 7BX (40) 4, **PX1**BL (20), **PZ1s** BE BI (40) 22, CM, **SLs** 6BH 6BK 7AZ, **SU1s** DL DQ (55) 19, **TA2s** AZ 21, BK (11) 8–9, **TF2s** WJF (45), WJP WJQ 11, WJU (26) 18–22, **TIs** 2CJT 2KR (60) 0, 2MIE 21, 2PZ (40) 22–23, 4JH 9CA (48) 15, **TL8**SW, **TN8AF**, **TR8AG** (30) 10–22, **UAs** 1KED (70) 2 of F.J.L., 2KAP 2KAW 2KBD 2KCE 2KHS 2KWA 9FW (22), 9HM (5) 2, 9JH (25), 9KCF 3, 9KHA 9KMC 9KOA 9MIX (13, 85), 9OH 9PG 9PP (70), 9RD 9TM 9UC 9VB 9VX (75), 9WS 9YH (64), 9YO 0BP (20) 1, 0EQ (18), 0EV 0GA 0IK 0IM 0KAD 0KAE (72) 2, 0KFG 0KKB 0KZD 0KZG 0KZW 0AID 0NR 0QU 0RC 0RK (50) 0, 0TD (52) 1, 0UC (71) 2, 0YE 0ZK (70), **UB5s** IF 4, KAA KDA KOM ML MT 4, TJ WJ, **UC2s** AW (27) 20, KAB KAC KIM 5, KMZ OM (45) 19–20, WP (34) 4–5, **UD6s** AM AY 4, BV (31) 3, CE (75) 1, **UF6s** DR BD 4, FB (6) 0–1, HG 5, KAF 16, KPA KUF, **UG6s** AD (15) 21, AW SG, **UH8s** BO DH (38) 3, DC 17, **UI8s** AI AX (9) 1, LC LK (20) 3, ME (40) 2, MF (20) 2, MU (38) 3, OV UG (105) 2, **UJ8s** AB (60) 2, AC (40) 1, AE, **UL7s** BF BG 3–4, JE JZ KLD LK PB XC 3, **UM8s** AP (65) 1, IE (40) 2, KAI (40) 12, **UN1**BC, **UO5**PK 4, **UP2s** CV KBA 19, KBC 19, KCF KCU KNP (46) 11, NN NR PT 5, **UQ2s** AB GQ HT IC KBC KCT 14, KFG (13), MK (48) 21, **UR2s** FR FU (48) 20, KAC 17–20, **UT5s** BQ (92) 5, KSG MV, **UV9**OC (42), **UWs** 1KAZ 1BG 3BN 3FD (20) 4, 3IW 3MQ 6AQ 9EA 9EX (48), 9OH (53) 1, 9OR (30), 9WB (13), 0AF 0IE (46) 6, 0IJ 0JG 0KJA, **UY5**CW (71) 12–13, **VEs** 1AED/SU (75) 20, 8AA 8MK 20, 8YU 0NG (80) 23, 0NM 0NO, **VKs** 9CJ (58) 13, 9GN (36) 12, 9NM (17) 12, 9WE (36) 12, 0MC 0MI (32) 10, **VOs** 1AW 1HP 14, 2AG 2DK, **VPs** 1LP (80) 3, 1PV 2AZ (65) 22, 2DAG 2, 2GLE (25), 2KJ (58) 21, 2MIU (23), 2MIV (50) 9, 2SJ (55) 1, 2VI 3YG 5BP 6AK (20) 23–0, 6AP 6FW (50), 6PJ (30) 22, 6RG (50) 22, 6YL 7NP 7NW (15) 23, 8FX 8HJ 1, 8IV (75) 23–0, 8IY 9FO 9FW (50), 9FX, **VQs** 8AW 8BJ 9TC (50) 23, **VRs** 2EK (20) 10, 2ER (50) 10, 2DK (3) 12, 4CR (89) 12, **VSs** 5JC (30) 16, 6FE 6FM (45) 14–15, 6FO (19), 9ADF (40) 7–8, 9ARS 9ARV (3) 18–19, 9MP (45) 20, **VU2s** DIA (32) 0, GW (22) 2, LE (25) 1, WB2PXZ/**VP9**, **XEs** IEK (60) 6, IGY (80) 1, IMMU 2, IXQ 1–2, IZ 16, 2DD (40) 13, 2PMK 3, 9YL (78) 18, **XW8**BM, **YAs** 1AN 1BRF (65), 3TNC (90) 11, **YJ1**DL 7, **YNs** 1CJD (38) 21, 1SL 3CTD 3KMX, **YOs** 2KAB 2IS 4WR/mm 5DH 5KAI 17, 7KAJ 7KFA 7KGF 8CF (35) 19, **YS2**RC, **YUs** 1NOH 4, 3FS (88) 5, **YVs** 1DP 1RF 4, 3CD 4MC, **ZB2**AM, **ZC4**GB 4, **ZDs** 7IP (15) 1, 8AM 8AR 8G 8J (20) 22–23, 8WG (5) 23, 9BC (8) 17, **ZL5**AA 2, **ZP5s** EC (40) 21–22, ML (55) 21–22, OG 1–2, **ZSs** 1XR (60), 5BV 5SY 5UP (10) 23, Marion's **ZS2**MI (60) 15, **4S7s** DA EC (39), RN (25) 17, WP (20) 17, **4U1**ITU (20) 17–18, **5A3**TX 21, **5T5**AB, **5W1**AZ (60) 9, **5Z4s** BM (25) 21, IR (50) 18, **6Os** ICQ 6BW 21–22, **6W8**DG (10) 23, **6Y5**BB (60) 10, **7G1A**, **7Q7**LC (20), 7X0AP (30) 11, **7Z3**AB, **8J1**AF (35) 18, **8P4**AG (106), **9G1s** FQ 23–0, FY 22, **9H1**AD 19, **9K2**AD (15) 15, **9L1**TL, **9Ms** 2AV 2RN 2YY 13–16, 6DH 6KS (10) 15, 8NB (35) 0, 8RS (42) 12, **9V1s** JY (40) 14, LP MT (25) 15, NN RS (75) 15, **9Y4s** LZ (78) 21, RA 0, VT 1 and VU.

20 phone keeps **Ws** 3HNK 4YOK 6OUN 8YGR, **Ks** 3FOP 3SLP 7YDZ 9CZV, **WAs** 4WIP 4YDR 6JDT 8GGN 0JTB, **WB4**CAP, **KL7**FEF/1, tuner **WN2**-PQY and P. Kilroy contented with **BV1s** USA USF (240) 13, **CEs** 1DX 1, 1ZC 4GT 6EQ 6FK 0, 6IL, **CN8s** BB MR 16, MT 23, **CO1**AF* 21, **CPs** 1CY 1EJ (310) 23, 1EO 1EZ (332) 20, 5AR 5BK 5CF 5EB (110) 23, 6FR 6GA 8AB (333) 3, **CRs** 4BB 5SP (110), 5UR 6CN 6HG 19, 7GF 11–12, 9AH (240) 12, **CTs** 1IK 1PK 2BO 3AV (136) 14, **CXs** 7AAK (124) 22, 9AAK (120) 19, **DU1s** BSP 13, FH LM (230) 13, **EAs** 6AR (235) 15, 6BG* (120) 12, 8AH (206), 8AR (232) 19, 8DI* 20, **EIs** 4RY 15, 6AH 6AI 21, 7D 7M 12, 8H (110) 21, **EL2s** AF (332) 20, AG AH D O (231) 9, R, **EP2s** AX (215) 11, TR 3, **ET3s** AC (232) 20, USA (250) 23, WH 16, F9RY/**FC**, **FB8s** WW YY 2, **FG7s** XL (110) 22, XT (120) 23, XX (103) 11–21, **FK8s** AZ 8, BJ, **FM7**WQ (150) 21, **FO8s** AA (115) 6–7, AB 6–7, AG (255) 4, AQ (136) 18, **FR7ZD** (115) 3, FS7RT, **FW8**RC (220) 5, **FY7**YB 23, **G5s** AAB/W3MDI ABT/-DJ6BS 12, GB2DX, **GCs** 2AAO (220) 16–17, 8IIT (132) 16, **GD3**RFK 23, HA5AM, **HCs** 1KV 5, 1SM (284) 23, 5EJ 5MP 5NW (125) 22, **8F**N 2–4, **8J**G (105) 0, **HH9s** DL (335) 0, GR (339) 12, **HI8s** GAC (350) 22, JGM* 21, JSM (140) 23, XMT 23, **HKs** 5DE (155) 23, 7BCN* (120) 22, 0AI (124) 12, **HL9s** KH (240) 16, US (254) 5, **HMs** 1AB (233) 1, 9CK 1, **HPs** 1JC (135) 22–23, MC 22, **HRs** 1GM (115) 21–22, 1SR 1SO (115) 21–22, 2GK (154) 1, 2JH (332) 21–22, 5MR/2 (332) 22, taboo **HS1**AK (232) 15, **HZ1**AB (250) 20–21, **ISIs** TVW 15, VAZ (115) 19, IT1TAI (114) 18, **JAs** 2ANX 4AN 0, 7DY 8AA (232) 22, Ks 1YPE/**XV5** (195) 15, 2GGN/**KL7**, **KCs** 4USE 3, 4USV (261) 2–3, 6BE 3, 6BO (225) 15, 6BW (290) 12, 6BY, **KGs** 4AA 4BD (320) 4, 4CL (332) 23, 4CX 6AAY (239) 12, 6APF 6APD (230) 11–12, 6IC 6IG (250) 12, 6SA, **KH6s** FGA FRT OR WU, **KJ6s** BZ CE (325) 7, CF DA (322) 10, **KL7s** EBK 23–4, LJ WAH (230) 8–10, **KM6s** BI CE (250) 7, CU, **KP4s** AOD AXC* BCL BKS CKU*, **KR6s** BD (281) 16, BH BM BV (230) 14, BX DI (280) 18, DN (208) 7, FQ (250) 18, LL (120) 17, UL (240) 12, USA (230) 17, **KSs** 4CA 20, 6BM 6BX 6BV (230) 14, 6BO (230) 13, 6BR (205) 12, KV4CQ, **KW6EJ** (213) 12, **KX6s** BQ (235) 12, BU BW (240) 13, DC (200) 12, DQ, **KZ5s** LC MM (332) 21, PW, **LA3P/p**, **LU2XW**, **LX1s** DB DP (120) 21, PH 20, **LZ1**BZ 18, **MP4s** BFS (280) 8, BFT (240) 22, BFU (235) 18, TBM (272) 18, TBO (200) 0–1, **OAs** 1W (140) 21, 4BQ (140) 2, 4EM (304) 6, 4PQ (140) 2, 4TJ (320) 23, **OD5s** AC* (120) 21–22, BV (110) 20, BZ (120) 4, EE LX 4, **OEs** 1ER 1GUA 17, 2EGL 2WK 14, 3EX, **OKs** 1ADP 1MP (213) 13, 3CAD, **OXs** 3JV 12, 3SE 5BO, **PJs** 2BW 2CE (115) 21, 3AV* (125) 22, 3CD 4AC (155) 23, 4AO, **PYs** 2OY 3BPV 5AM 6NW, **SLs** 5AQ (331) 21, 6BH, **SMs** 1CJV 2BHX (256) 13, 2CZT 22, **SP9**ANH 13, **ST2s** BSS 21, SA (110) 15, **SV1s** BH 2, BL (120) 20, **TFs** 2WJK 2WJS (268) 12, 3EA, **TGs** 8CJ (332) 21, 9EP 1, **TIs** 2CHV 19, 2EVA 23, 2KR 13, 3SS 4JP (105) 6, 6AL 0, 6EC/**W4** 14–15, **TN8AG*** (200) 21–22, **TU2s** AN AW (125) 18, BA 0–7, BD (102) 8, **UAs** 2AO 20, 2KAK 2KBD (228) 16–19, 9HA 9KCE 9TE 9VH 0AI (230) 3–12, 0YE 0YP (115) 12, **UB5s** SJ UN (216) 20, WJ (140) 16, **UD6**BR, **UF6**UB (204) 5, **UG6s** AW (222) 4–16, KAA 15, SG, **UH8s** BO (204) 2, DP 17, **UJ8**KAA (262) 16, **UL7s** AY (207) 17, FA (112) 12, **UM8**FZ (200) 3, **UP2s** CK CP 15, OK*, **UQ2**AN 6, **UR2s** AR 13–16, DL, **UWs** 9CC 9FH 0AA (140) 17, 0IA (118) 2, 0IN (130) 7, **VEs** 1AED/**SU** (220) 0–1, 8MD 0MY 0NE, **VKs** 1BG 18, 9CJ (162, 205) 22, 9DJ (210) 11, 9DR 14, 9GN (213) 10, 9LF (252) 13, 9JK (224) 13, 9MK (207) 13, 9XI (130) 11, 0GW 16, **VPs** 1JKR (215) 13, 1JU (230) 1, 1LB (245) 2–3, 1PV 1WS 13, 2AA (125) 21, 2AC* 14–15, 2AZ (105) 22, 2GAJ 2GLE 2KD (140) 22, 2KJ (255) w, 2KL (250) 6, 2KY (245) 12, 2ME 2MV (106) 10, 2MW* (105) 10, 2SJ 22, 2SU (165) 2, 2VE (113) 20, 3AA (140) 21, 5LV 18, 5RS (332) 20, 6WR (140) 22, 7CD 7DE 7NA* (125) 15–22, 8CW 1, 8HZ 9BP* (110) 21, 9FK (110) 19, 9HI (332) 19, **VQs** 8AR (195) 11, 8AX (222) 11, 9HB (252) 18, 9TC (105) 18, **VSs** 6AZ (120) 14, 6DS (215) 0, 9ABL 15, 9AFR (331) 21, 9AJC 15, 9AJT 18, 9ARV (331) 22, 9OC (200) 0, **VU2s** CK (120) 12, FN 11–12, Ws 4GJU/**KS4** 8, 5HWR/**VP9** (272) 13, 5YRM/-**DU1** (242) 15, 6FHM/**DU1** (150) 17, WAs 4EJU/**KS4** (286) 2, 7EZW/**KH6** on Kure isle, XE1TL 2, **XP1s** AA (207) 17–18, AB, **XV5**AA (194) 13–14, **XW8s** AX (225)

13-14, AZ (260) 17, BM (120) 19-20, **YA**1s AG (270) 17, AN (261) 15, AW (212) 2, KC (230) 2, 3TNC (240) 17, **YK**1AA (240) 17, **YN**s 1CML (120) 21-22, 1OH 22, 3KM 22, 6BF (150) 22, **YO**s 3LM 22, 9VT, **YS**s 1AG (130) 21, 1SAM 22, 2JG (115) 23, 2MG (105) 23, 2NRF (110) 22-23, 3DME 5, **YU**3s BC (272) 11, LC 20, **YV**s 1DP 3RC 4EN* 4GD 7AI 7AV 19-1, **ZB**2s A* (120) 12, AK 21, **ZC**4s CI (218) 23, SS (240) 22, **ZD**s 5D 5R 20, 8AR 8HL (242) 23, 8RD (260) 21, 9BE, **ZE**1AX, **ZF**1GC (130), **ZL**s 4CH (233) 7, 5AA (118) 11, 5AB 6, 5AD 8, **ZP**s 5DH (338) 23, 5KT (150) 22, 7BJ (290) 23, 9AY, **ZS**s 6UR 8OL 18, **4U**1s ITU SU (125) 17, 4X4s DL FQ (231) 19, JU 16, **5A**s 1TS (252) 21, 3TP 5TJ (248) 18, **5H3**JR (116) 19, **5N2**s AAE (231) 1, AAW (250) 23, **5Z4**s FB (140) 18, IR 19, KW 20, **6O**s IAU 22, 1GB 6BW (215) 19-20, **6Y5**s AR (135) 23, OF MJ (130) 22, UC (115) 13, **7Q7**s BN 19, LA (140) 18, PQ, **7X**s 2AH (246) 20, 2MD (331) 20, 3RT (150) 22-23, 9GL 17, **7Z3**AA (225) 0, **9J2**s AB (124) 21, VB (260) 6, **9K2**AM (116) 13, **9L1**HX (125) 18, **9M**s 6AP (141) 16, 6NQ (105) 14-15, 8AB (213) 15, **9Q5**s EG 18, FV HD 21, JP, **9U5**s BB (138) 20, DP (220) 20, JY 22, KY 19, **9V1**s JK (112) 13, ME (110) 14, MX (115) 21, MZ (229) 14-15, **9X5**CE (103) 19, **9Y4**s TJ TX (264) 11-12, VP (140) 21, VT (140) 2, VU and VY, the asterisks for non-s.s.b. holdouts. Transpolar paths are more productive lately on 14 Mc. — note the increase in U.S.S.R. listings.

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Our next "What" will deal with other bands thanks to (15 phone) **W**s 1DYE 3HNK 8PKU, **K9**CZV, **WA**s 7BOB 8GGN 8MGD 9NXP, **WB**s 4CAP 6KIL; (15 c.w.) **W**s 1CNU 4YOK, **K**s 3FOP 9CZV, **WA**s 7BOA 7BOB 8GGN 8MGD 8PKG 9NXP, **WB**s 2GTA 4CAP 6KIL, **WN**s 1FML 3DSD 3EGM 8SQA; (40 phone) **WA**8GGN, P. Kilroy; (40 c.w.) **W**s 1DAL 4YOK 8PKU, **K5**JVF, **WA**8GGN, **WB**s 2GTA 2NLH 6KIL, **WN**s 3DQR 3DSD 8SQA; (80 c.w.) **W8**PKU, **WB**s 2NLH 6KIL; (10 phone) **WA**s 2VFA 7BOB 8GGN; (10 c.w.) **WA2**VFA and other "How's" helpers now at their mills. How's DX over your way?

Where:

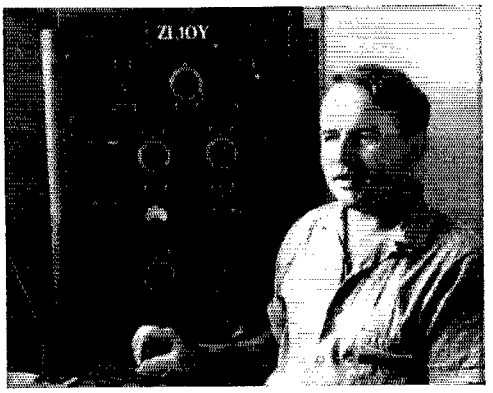
HEREABOUTS — A doff of Jeevesie's headset to your "QSLers of the Month": CRs 4BB 6LAS, CT1EE, DJ3PV, EI9N, EL2D, FS7RT, G2ATM, GC8HT, GD3RFK, HK0AI, HL9s KB KF, HS1AK (darn it), I1ROS, KA2DJ, KC4AAA/mm, KG6IG, KL7FKL, KM6CE, KP4BJM, KR6DN, KW6EK, LA1H, MP4s BEU BFU, OH4OP, PY4ATG, TG9BM, TI2RO, TL8SW, TU2BA, UAs 4KHP 9WS, VPs 2DAG 2VI 6LN 6PJ 7NW, VR1Z, VS9KRV, W6FHM/DU1, WB6QOE/VP9, WP4CPG, XE2IK, ZD8AR, ZK2AF, ZL1HW, 5Z4IR, 6Y5BB, 9G1FQ, 9L1JW and 9V1LP, plus QSL tenders Ws 1BPM 2CTN 2GHK 2YTH 4ECI 9WHM and 0NGF, all sponsored for quick QSL comebacks by "How's" correspondents Ws 2IP 4VZD 6OUN 9CRN, K9CZV, WAs 2HIU 6JDT 7BOA 7BOB 8PKG, WBs 2NLH 4CAP, WN3DSD and dialer Kilroy. Anybody we passed over? . . . . . *Alp!* K9CZV could use clews toward coaxing cards from UA2KAW worked in 1962, UO5GN '63, VS9MB '63; KØTRG seeks results from JT1CA '63, SP9s FR UJC '64, UO5WS '64, UP2KFT '63, VK9LA '63, 5R8BX '64, 7X2SQ '64, 9M2GV '63; WB2TGA wonders about 5J4RCA of last year, HW NW? . . . . . Ws 5OER ØJTC, WB6KIL and W. P. Kilroy, P.O. Box 6779, Washington 20, D.C., volunteer QSL managerial services to overseas ops in need of such assistance . . . . . WA9LCY tells W7s 8OA and BOB he has no KS4 QSL connections . . . . . W6OAQ adduces, "On checking my confirmed countries for the past ten months I find 69 cards came via QSL managers, only 52 direct or via bureaus. It pays to watch those QTH columns." . . . . . OT DX hound W4FIJ remarks, "I'm a stamp collector who buys up collections, accumulations, etc., so I have large quantities of obsolete postage — regular, commemorative and airmail — which I dispose of at face value. I generally can furnish postage of this nature in any quantity up to several hundred dollars worth. Most of these U.S. stamps date from the early '40s including fractionals (1-½s, 1-¼s, etc.) There is no question that plastering your direct-route QSLs with out-of-the-ordinary postage helps returns." . . . . . WB2GTA hears that somebody took recent c.w. liberties with ZF-1BP's call. Noel usually sticks to phone.

ASIA — "I'm 600 cards behind but will be caught up in July," guarantees KA7AB (K1KTH). "All QSLs are answered via bureau unless accompanied by self-addressed stamped envelopes or International Reply Coupons." . . . . . If K1RAW becomes active in Vietnam as hoped, his QSL chores will be performed by WA1-AZW, according to VERON's *DXpress* . . . . . The JH prefix is said to be forthcoming for Japan but there are plenty of unassigned JA suffixes . . . . . WA6IVM, in NCDXC's *DXer*, points out that many an old-time U.S.A. DX hound gets careless and unresponsive in the QSL department. Overseas DX chasers now pursue a variety of W/K/VE/VO certifications. Lack of your humble pasteboard may be holding them up, so let's balance our books.

AFRICA — W1MRQ advises, "I have the logs for all G3STF's operation as 7Q7PS since he started up from Malawi last October. I continue to receive them about twice monthly." . . . . . "I'll be handling QSLs for ET3AC QSOs dating May 8, 1966, and thereafter," notifies W4NJF. "No more cards should be sent to his K8 address because we wish to relieve his parents of the job." . . . . . 9Q5TJ QSLs should go via DJ4OP plea is DL4OP. Bob is relaying many a missent card . . . . . ZS1CZ tells K2MGE of LIDXA he has received ZS2MI logs and is plenty QRL dispatching Marion island confirmations . . . . . DARC's *DX-MB* says 8P4AG is displaying the new Gambia label to DXcellent advantage on 20 meters.

SOUTH AMERICA — Word from the British Antarctic Survey in the far south through W6KTW: "VP8IV says it will be about a year before any QSLs can be sent out. He's icebound on Adelaide island." And W7MVC adds, "VP8IY states his next incoming mail will be along in eleven months — patience for those QSLs."

OCEANIA — KW6EK's confirmations now are obtainable from W2CTN for contacts on or after February 26, 1966. Prior QSOs may be verified through W7WLL who also handles KC6CE's QSLing . . . . . VE6AKV says that VR2CC, a voice-only chap, still receives unaccountable QSLs for c.w. VR2CC communications. Ungood, ungood . . . . . "S.a.s.e., *please*," requests K6JAJ concerning his new QSL managership in behalf of KR6BD . . . . . "Our club station, KG6AAY, has been reorganized and we hope to improve its QSLing," writes K3SWW/-KG6. "While I visited the Philippines earlier this year my XYL, K3TAH, kept my own cards moving. More than 5400 sent out from K3SWW/KG6 so far with 200 more going into the mails tomorrow." . . . . . Ex-KR6EU, now DL4OP, welcomes QSL inquiries regarding his 1962-'64 Okinawa DX campaign . . . . . KB6CY writes W1ECH of ARRL Hq., "The way things look here at present I doubt if I would be in much of a position to aid [Canton QSL deliveries]. Former KB6 personnel have scattered considerably. I, too, will be leaving shortly." . . . . . W6PQT learns, "VS5JC has fresh QSLs on order and will ship through the 9V1 bureau in Singapore."

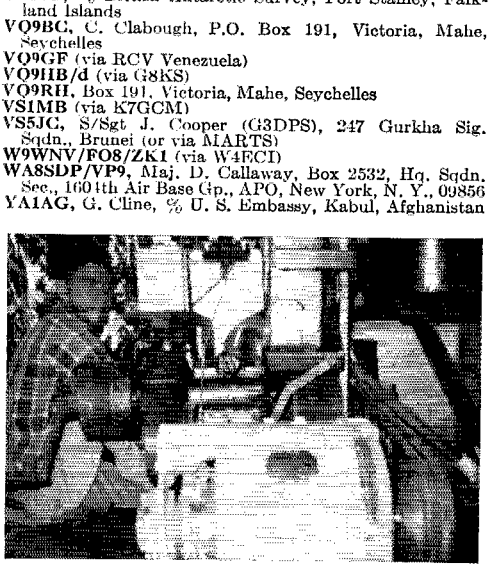


ZL1OY, a Down Under regular from 'way back, enjoyed touring the U.S.A. this spring. Ken is carting back single-sideband gear to supplement this rugged homespun c.w./a.m. outfit. (Photo via K6JAJ)

EUROPE — Springtime 4U1ITU QSOs scored by guest operators I1s RB and RBJ can be confirmed through their home addresses. This from VERON's DX journal . . . . . *Never* give up — EA3TF recently confirmed a 1956 QSO for W4YOK . . . . . NEDXA's *DX Bulletin* has it that W6NJU still stands by for QSL inquiries concerning CT2BO contacts in February and March, 1963 . . . . . We receive requests from time to time for a years-back alphabetical presentation of old "How's" QTH specifications. Space considerations and the rapid obsolescence of a high percentage of past "Where" material preclude this. We do rerun address items after six months or so if evidence comes to hand that the info remains valid. As to the following catalog, keep mindful of the fact that each datum is necessarily neither "official", accurate nor complete. . . .

CN8s FB FF (via W2GHK)
CR6IK, P.O. Box 261, Benguela, Angola
DL4OP, R. Chapman, P.O. Box 3523, APO, New York, N. Y. 09057
ET3AC (via W4NJF; see preceding text)
GD5ACH/W6KG, *Yasme* Foundation, P.O. Box 2025, Castro Valley, Calif.

GM5AA/WA4LPH (via W4SZE)
HC1GC (via W2CTN)
HC1TH, P.O. Box 583, Quito, Ecuador
HL9TS, Box 1143, APO, San Francisco, Calif. 96264
IG1KDB (to I1KDB)
IS1FOL, Calle Marini 24, Cagliari, Sardinia, Italy
K0UTO/VE5, Box 911, Melville, Sask., Canada
KA7AB, J. Lawrence, CMR No. 1, Box 860, 1955th Comm. Sq., APO, San Francisco, Calif. 96529
KR6BD (via K6JAJ)
KR6DN, L. Butcher, 58th Sig. Co., USADO, APO, San Francisco, Calif. 96248
ex-KR6EU (to DL4OP)
KW6EK (see preceding text)
MP4BFU (via K1NGJ)
PJ4AC, Box 560, Aruba, N.A., W.I.
SV0WF (via W2PCJ)
TF2WJU (to W4VBB)
TT8EKS (via REF)
UA9HA, S. Yury, Box 130, Tomsk, U.S.S.R.
VP1RC, Box 641, Belize, British Honduras
VP2KQ (via VP2KR)
VP5RS (via K6UTO)
VP8IV, N. McLaren, % British Antarctic Survey, Port Stanley, Falkland Islands
VP8IY, % British Antarctic Survey, Port Stanley, Falkland Islands
VQ9BC, C. Clabough, P.O. Box 191, Victoria, Mahe, Seychelles
VQ9GF (via RCV Venezuela)
VQ9HB/d (via G8KS)
VQ9RH, Box 191, Victoria, Mahe, Seychelles
VS1MB (via K7GCM)
VS5JC, S/Sgt J. Cooper (G3DPS), 247 Gurkha Sig. Sqdn., Brunei (or via MARTS)
W9WNV/FO8/ZK1 (via W4ECI)
WA8SDP/VP9, Maj. D. Callaway, Box 2532, Hq. Sqdn. Sec., 1604th Air Base Gp., APO, New York, N. Y., 09856
YA1AG, G. Cline, % U. S. Embassy, Kabul, Afghanistan



Tom Christian checks out power gear for VR6TC, the voice of Pitcairn. Other VR6TC photography appears in "How's" for December, 1961. (Photo via K2MGE.

YS1GEC, 9 Calle Pte. 3811, San Salvador, El Salvador
YS2NRF, P.O. Box 148, Santa Ana, El Salvador
YV1RF, Pampan, Estado Cujillo, Trujillo, Venezuela
YV1UI, Box 467, Maracaibo, Venezuela
YV4NP, Box 18, Maracay, Venezuela
ex-ZC4XX (to VS5JC)
ex-ZD8BC (to VQ9BC)
ZD8CR (via K3FLS)
ZF1BS (to VE3BS)
ZF1FM (to 6Y5FM)
ZF1RX (to VE3RX)
5W1AX (to KS6BT)
7Q7PS (via W1MRQ)
9G1KM, Box 4274, Accra, Ghana

If this rundown helps you to a new one or two you can thank contributors **Ws** 1CNU 1DAL 1DYE 1NTH 1WQC 1YYM 2ADP 2HAE 2PCJ 4YOK 5KGJ 6KTW 6OUN 6PQT 6QFU 7MVC 9LNQ, **K5JVF**, **WAs** 3ATX 6JDT 6PQI 7BOA 7BOB 8GGN 9NXP, **WBs** 2NLH 6KIL, **CN8FV**, **KV4EM**, **VE3CJ**, **VP2KR** and P. Kilroy, along with DARC's *DX-MB* (DLs 1EP 3RK), DX Club of Puerto Rico *DXer* (KP4RK), Far East Auxiliary Radio League *News* (KA2LL), Florida DX Club *DX Report* (W4MVB), Japan DX Radio Club *Bulletin* (JA1DM), Long Island DX Association *DX Bulletin* (WB2HXD), Newark News Radio Club *Bulletin* (L. Waite, 39 Hannum St., Ballston Spa, N. Y.), North Eastern DX Association *DX Bulletin* (K1IMP), Northern California DX Club *DXer* (Box 608, Menlo Park, Calif.), Puerto Rico Amateur Radio Club *Ground Wave* (KP4DV) and VERON's *DXpress* (PAØs FX LOU TO VDV WWP). Grab your pen and give a push, OM!

Whence:

SOUTH AMERICA — HK3RQ of LCRA announces this year's all-mode Independence of Colombia DX Contest due to run from 0000 GMT July 16th to 2359 the 17th on 10 through 80 meters. North American stations earn 3 points per HK contact, 1 point per non-HK contact, and for final score multiply contact-point total by the sum of HK call areas and DXCC countries worked (no crossmode work allowed). Swap the usual RS- or RST001, RST002, etc., serials. Logs, a separate sheet for each band and mode, go to Colombia Independence Contest, % LCRA, Box 584, Bogota, Colombia, for arrival no later than September 30, 1966, to be eligible for possible certificate awards . . . . . "OA4TJ of Lima is often operated by W4YGT (OA4WD)," says WB4CAP. "He keeps contact with his Florida homeland by Tuesday and Thursday skeds on 14,320 kc. around 2300 GMT."

EUROPE — Results of last year's 11th WAE DX Contest, released by DARC (Germany), lists these winners by continent: (phone) DJ6QT, EA8CR, OD5BZ, OX3JV, VK3TL and YV5BJ; (c.w.) W3GRF, CR6AI, DJ3KR, PY7AKQ, VR2DK and UA9DN. Among 31 U. S. voice entrants, K1HVV, WB2FON, W3WJD, K4AQQ, W5LZZ, K6ERV, W8FRJ, K9VPY and KØQCT led their call areas, with the ten highest Yank totals turned in by Ks 1HVV 9VPY, Ws 3WJD 1CKA, Ks 3BNS 4AQQ, W3AYD, WB2FON, K1s UDP and VXU in that order. VEs 1AFY 6UM 8BB, VO1AQ and VE4ZX finished in that Canadian sequence on phone. Mike toppers per country: CR7FR, EAs 7ID 8CR, F7DO, FG7XL, FP8CA, G3OEV, GW3NWV, HA5DU, HK4RCA, HP1JC, HS1F, I1LCK, JA6NP, KV4CX, LA7VE, LZ1UF, OA4KY, OD5BZ, OE5CK, OHs 2XA ØNI, OK1ADP, ON4ZC, OZ5GT, PAØIIBO, PY2CFM, PZ1BW, SM2BJI, SP8AJK, SVØWBB, TJ1AC, UAs 3KAG 9EU, UB5ARTEK, UC2BF, UH8BO, UL7KDT, UP2OK, UQ2KHE, UR2KAE, VK2APK, VS6AJ, XE1EH, YA4A, YO3JU, YV5BPJ, ZC4MO, ZD8TV, ZE1JE, 4X4SO, 4W2AA, 5A2TR, 5X5IU, 7X2AH, 7Z3AB, 9J2FK, 9Ms 2OV and 4LP. DJs 2YA 7JC, DL1UR, DJ3GI, DLs 9LW 8DX 7BQ, DJ2HH and DL9PU followed DL6QT in that order on the home voice front. DL4s AN LG and OV ran 1-2-3 among Yanks-in-Germany on phone. There were 57 Stateside c.w. entries with W1BPW, WB2CKS, Ws 3GRF 4KXV 5WZQ, WA6SBO, Ws 8VSK 9OIP, KØDQI and W7SZM/KL7 call area champs, ten highest scores filed by W3GRF, WB2CKS, Ws 2JAE 4KXV 9IOP, Ws 3GOQ 8VSK 1BPW 1WLZ and 4SNU in order. VO2NA, VEs 3IR 8BB 1ZZ 1AE 3FID, VO1AW, VEs 4ZX 3AAZ and 6VO competed from Canada in order of magnitude. Code highs per country: CR6AI, CX1OP, EA2CR, EI5F, F8TM, G2DC, GI3RTS, GM3SDZ, HA1KSA, HB9ADM, HK3RQ, HL9KB, HP1AC, I1LAO, JA1VX, KR6UD, KV4CX, LA3XI, LU8DQ, ON5AZ/LX, LZ1KAA, OE1ZK, OHs 5UQ ØVF, OK1KUL, ON4XG, OZ4RT, PAØGMU, PY1ADA, SM2BJI, SP6AAT, TF3AB, UAs 3UJ 9DN, UB5KIX, UC2WJ, UD6BD, UF6FE, UH8BO, UI8LB, UL7CT, UO5KAG, UP2NK, UQ2KDM, UR2FD, VK3TL, VR2DK, VS6BJ, YO8DD, YU3BC, ZB2AM, ZD8TV, ZL2AWJ, ZS6OS, 4W2AA, 4X4MR, 6O6BW, 7Z3AB, 9G1FN, 9J2BC, 9M2OV and 9Q5TJ. Germany's top ten telegraphers were DJs 3KR 2YA, DL7AA, DM2ATD, DJ2BW, DL8FR, DJ3SM, DLs 5FL 1TA and 7EN. W3WJD, assisted by K3JJG, turned in a whopping multiop c.w. score from our side. Fine turnout both on phone and c.w., considering we were battling the sunspot minimum. This year's WAE brawl occurs on the 13th-14th of August (c.w.) and September 10th-11th (phone). Plan not to miss it; rules 'n' stuff next "How's" . . . . . Wallpaperers might check with DM2ACB and OK1AKW for data on DMCA and 700 Years *Ceske Budejovice* certifications, respectively . . . . . HB9s ABS ADP and YS, signing HBØ, scored 1500 QSOs with 110 countries on their March-April Liechtenstein lark. An SB-200, SR-150, HW-32, TH-3 jr. and dipoles did the job . . . . . UA4KED gives our beatle-beatles a new RTTY country around 14,085 kc.

AFRICA — "We CN8s have noticed the extra three to six db. we get with the Morocco prefix," chuckles CN8FV (W1NTH). "Two new ones active from Kenitra are CN8s FB and FF (K1BEB). We're hoping for more licenses to come through for personnel stationed at Sidi Yahia." Walt keeps busy as an officer of both the Kenitra and Sidi Yahia ham clubs, maintaining contact with home on 15 and 20 phone and c.w. . . . . "I expect to begin operation as a Malawi 7Q7 on 14 and 21 Mc. around August 1st," warns W5GIQ. Neighbor 7Q7PS (G3STF) will knock off in October, says W1MRQ . . . . . W3HNK notes 5A3TX busily jamming his 10- and 15-meter DX log before leaving Libya this month . . . . . WB6KIL understands that W6NKT and WB6KIM, due for Stateside return in August after a steamy year in Zambia, had no luck at all in applying for 9J2 tickets . . . . . After completion of training in the Virgin isles KØUVL goes to Guinea for twenty months. "I intend to be active on 10, 15 and 20 with an s.s.b./c.w. transceiver and Tiny Tiger

DM4PKL hits 20 c.w. consistently from his ham corner on the other side of the Wall. (Photo via W1YYM)

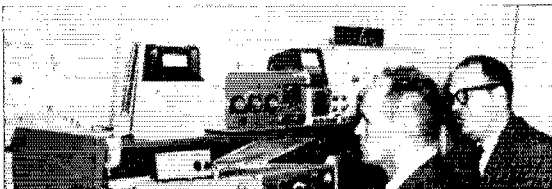
power unit." .–.–.– Culled from publications of DX clubs and groups: CR7GF and ZD8HL were set to invade the Glorieuses, Comoros and/or Aldabra beginning last month. Watch for Jose and Harold around 7005, 7100, 14,050, 14,110, 14,200, 21,050 and 21,420 kc. . . . EA2CA and others still haven't given up on Rio de Oro. . . . VQ9HB/d apparently was swamped by the 20-meter phone crowd in April Desroches doings. Harvey retreated to 21-Mc. c.w. to thin the pack. . . . FB8YY of Adelieland is a rare DUF-4 item for 14-Mc. sidebanders. . . . ZD9BE (GW3SWG) hits 20 almost daily, 1800–1915 GMT, from Tristan. . . . After a Suvorov stop in May as W9WNV/ZK1, restless Dr. Miller revisited the States. Don may still hit Heard hard after a few rare African warm-ups. WØMLY is said to be joining this summer's DXpeditionary trend toward the brightening Dark Continent. Now where're Gus and Angus?

ASIA — Clouds still hover over amateur radio in the far east, although it's almost business as usual elsewhere. From WA9DGM aboard USS *Rupertus* off Yokosuka: "Can't operate ham radio in the western Pacific now due to a 7th Fleet directive. I hope to have a station going later from the mid-Pacific. Meanwhile we do occasional listening on R590s and URC32s. Watch for the KA gang on 1910 kc. with their 200-watters." .–.–.– "HL9TS can operate every third day," observes WA6PQI. "Chuck is found around 14,235 kc. at 1300–1800 GMT or until the band goes out. His KWM-2 puts a very good signal into the States." .–.–.– Ex-SVØWF of Rhodes, according to W2PCJ, goes to Thailand next month. FCC-licensed amateurs, remember, still are not permitted to work HS-prefixed stations .–.–.– Not too early to mark your calendar's middle October weekends for ARSI's 3rd VU2/4S7 Contest, OMs. Details here in good time .–.–.– NEDXA's organ says K5CEL has a beam and NCX-5 available in Yalova, Turkey, when and if .–.–.– New or renewed FEARL memberships are held by KAs 2DL (WB6ELH), 2IJ (KH6IJ), 2NA (W5KDT), 7DJ (W9BLV) and 8JJ (W9GMN).

OCEANIA — "VS5JC, with the military in Brunei, has been licensed since mid-April and expects to stay for about a year," says W6PQT. "His next stop will be Malaya, probably as 9M2XX. Jack formerly signed D2IZ, GM3DPS and ZC4XX. Watch for VS5JC near the low end of 20 c.w. at 1400–1600 GMT." .–.–.– Canton color from KB6CY via W1ECH: "When I arrived here there were a large number of KB6 hams, all employed by FAA. Bendix, my company, took over the island last July, relieving FAA whose personnel is now dispersed, one in Nevada, several on Wake and some on Guam. Only K4OSR/KB6 and myself on c.w. remain active. K4OSR was due for reassignment to Tananarive in June." Lean DX days ahead for Canton hunters? .–.–.– "I was recently deployed to the P.I. for six weeks," reports K3SWW/KG6. "Had a chance to visit Manila where I met DU1s MR and OR. Returned to Guam via Okinawa where I chatted with many KR6s including CU U MM TW and UD. Over the past few days my new beam, another 'ZL Special' model, has been working into the eastern U.S. well. But *where* are Vermont and New Hampshire DX men? Still need 'em for WAS, sideband or c.w. Lots of new hams arriving on Guam lately, so KG6 activity will be increasing. By the way, I've received a number of letters about my antenna article in December, 1965, *QST*. Most have asked for additional building instructions. I'd like to hear more on the results." .–.–.– NZART announces the 1966 VK/ZL/Oceania DX Contest for the first and second weekends of October. This one's always a stomper, you know. Watch "How's" for more timely participation particulars.

HEREABOUTS — ARRL Canadian Director VE3CJ (ZF1BP) affirms that ZF1GC is the only resident amateur on Grand Cayman. Seven other ZF1 licenses had been issued through April for the transient trade .–.–.– W8PKU says that W8WGR keeps personal score on the improving sunspot situation from his observatory in the back yard .–.–.– W7AZG relays OX3LP's plea for a Nevada QSO, "Seems he hasn't heard a Nevada Seven in fourteen years and, but for this, would have had his WAS ten years ago. OX3LP is on 20 c.w. almost daily around 1900 GMT." .–.–.– KZ5HO returns to the mainland from Gamboa and concludes a 25-year Federal service career .–.–.– Back at it after a long DX layoff, W2IAE reports, "After fooling around with coax-fed dipoles and their narrow one-band frequency limits I went back thirty years to a 136-foot flattop fed with open TV ladder line through a matching network. Just great on all bands." Art's an old far-end hand, by the way, formerly C3NR, DU1NR and KR6GL .–.–.– VP2KR's newly licensed XYL, VP2KQ, should go nicely with your distaff DX collection .–.–.– WA8MQE edged out K8YSO and WA8NQC in a hot DXCC race among Cleveland locals .–.–.– WA2DIJ, first licensed long ago as 2AQG, reminds us that DXpeditions are "new" in name only. "They go back at least to December, 1919, when Godley was sent over to England, financed by contribution, for the first Transatlantic Tests." And don't forget those famous DXpeditions by some tinkerer named Marconi at the turn of the century .–.–.– From 160-meter buff VE3DU: "W8DGP goes to Shemya in the Aleutians this month where he will be active for a year on most bands as W8DGP/KL7. When finished in Alaska Earl will try Turkey for eighteen months." .–.–.– K3ARL, WA4s HOM JJY and YO8CF claimed DX Club of Puerto Rico's 8X8X8 sheepskin .–.–.– WB2HXD concludes his arduous term as LIDXA's *Bulletin* editor. Now back to DX, eh, Gerry?

QST



HC1EY/WØMBD was the first station licensed in Ecuador under new reciprocity rules. Here HC1EY handles logging while WØMBD mans the mike. A regular HC call is assigned only for a stay exceeding three months.

Strays

I would like to get in touch with

. . . hams who are Boy Scout radio and electronics merit badge counselors. Those interested in exchanging ideas on techniques and in the possibility of starting a radio and electronics merit badge newsletter should write James Grubs, W8GRT, 6817 Maplewood Ave., Sylvania, Ohio 43560.

. . . those interested in forming a stamp collector net. The purpose of the net will be to find and trade needed stamps, both foreign and U.S. Net control station will be WA4VCY and the net will meet every Saturday at 4:00 P.M. CST on 21.350 s.s.b.

Hamfest Calendar

Alberta — Don't forget the International Glacier-Waterton Hamfest July 23 and 24 at Apgar, Montana.

Arizona — The Amateur Radio Council of Arizona announces their fourth Hamfest at Fort Tuthill, near Flagstaff, Arizona. The dates are July 29, 30, and 31. There will be a swapfest, and entertainment. Accommodations are available in Flagstaff or camping is permitted at the site. Fort Tuthill is south of Flagstaff in the Coconio County Fairgrounds, just north of the Flagstaff Airport. For more information write the ARC of Arizona, P.O. Box 3073, Scottsdale, Arizona 85257.

California — The San Fernando Valley Radio Club, W6SD, will hold its 10th Annual Hamfest Picnic, Sunday July 24 from 10:00 A.M. to 6:00 P.M. at the Lockheed Employees Recreation Center, 2814 Empire Ave., Burbank, California 91504.

Idaho — The WIMIU Hamfest will be held at Mack's Inn, Idaho on August 5, 6, and 7. Write W7DHD, 119 S. Lloyd Circle, Idaho Falls, Idaho, for information.

Indiana — The Wabash Valley ARA will hold its eighteenth annual VHF Picnic on Sunday, July 31 at Turkey Run State Park, about 40 miles north of Terre Haute, one mile off of U. S. 41 and on Indiana Route 47. One dollar registration charge at gate only. Swap tables, eye-ball QSOs, entertainment for the ladies and mobile check-in on 52.525 Mc.

Indiana — The Indiana Radio Club Council, Inc. will hold its annual Hamfest and family picnic on July 10, at Brown County State Park, near Nashville, Indiana.

Illinois — The Jacksonville Area ARC, Ind., will hold its annual Hamfest this year on July 10. More information from WN9OXH, 1010 Dayton St., Jacksonville, Ill.

Illinois — The Quad-Co. ARC, Inc. will sponsor the 9th Annual Hamfest of the Breakfast Club on July 16 and 17 at Terry Park, ¾-mile east of Palmyra. There will be dancing and movies Saturday night. Bring your own basket lunch . . . sandwiches and soft drinks available on the grounds. Mobile talk-in on 3873 kc. from noon Saturday to 11:00 Sunday morning. Games, contest, golfing and fishing. Bring your swap gear. Camping facilities open from Friday afternoon until Monday morning. Pre-registration until July 8 is $1.50, $2.00 at the gate. Write to Hamfest, Quad-Co. ARC, Inc., Box 323, Chatham, Illinois.

Kansas — The HamButchers picnic will be June 18 and 19 at Warsaw.

Kansas — The association of North American Radio Clubs will hold its convention in Kansas City from July 29 to July 31. The ANARC is a federation of 11 SWL clubs. For further information write James J. Howard, SWL Publications, P.O. Box 9768, Kansas City, Mo. 64134.

Kentucky — The annual Hamfest of the Henderson ARC will be held on Sunday, July 31, at the Audubon Raceway in Henderson, Ky. Rain will not stop this Hamfest since everything will be inside. For more information contact WA4WTE, Box 83, Henderson, Ky.

Louisiana — The Central Louisiana Hamfest is to be at the Harold Miles Park, 6 miles west of Alexandria, La., on July 16 and 17. Pre-registration is $1.00. For further information write K7YUC/5, 4124A Royce Drive, Alexandria, Louisiana 71301.

Michigan — Annual picnic of the Buzzards Roost Net, Michigan Emergency Net, and Michigan Wolverine s.s.b. Net will be held July 16 and 17 at Palmer Park at Grand Rapids, Michigan. Golfing Saturday and Sunday, tour of WOOD f.m./a.m. studios and Picnic Sunday. Installation of Net officers Sunday afternoon.

Michigan — The U P Hamfest is August 7 at Marquette.

Minnesota — The Golden Shovel picnic will be held at Gunn Park, near Grand Rapids, Minn. on July 10.

Minnesota — July 17 is the date for the Piconet members picnic at Lake City, Minn.

Minnesota — The Mankato Area Radio Club picnic will be at the Blue Earth County Fair Grounds in Garden City, Minn. Garden City is located 12 miles south of Mankato on Highway 169.

Montana — The 32nd Annual Glacier-Waterton International Peace Park Hamfest will be held July 23 and 24 at Apgar, Glacier National Park. For information write P.O. Box 655, Anaconda, Mont. 59711.

Montana — The Northcentral Hamfest is being held at Bear Paw Lake, Beavercreek County Park, South of Havre, Montana, on July 17. Mobile call-in on 3.910 Mc. for directions. To find the Hamfest, go south on Fifth Ave. past the new Border Patrol Headquarters and then follow the signs. The lake is to the left of the main road through Beavercreek Park, about 20 miles south of Havre.

Nebraska — The Central Nebraska Radio Club will hold its Annual Steak Fry at Victoria Springs State Park (18 miles N.W. of Broken Bow, Nebraska) on Sunday July 24. Registration will be $1.00. Bring your family and a covered dish. Club will provide steaks and soft drinks. Additional information from Lawrence Lindly, WØIRZ, Anselmo, Nebraska 68813.

New Brunswick — Don't miss the Ham Get-together at Royal Canadian Legion Hall, St. Stephen, N.B. July 10 starting at 10:00 A.M. ADT. Transmitter hunt, swap shop, and other family activities.

New York — The Southwestern New York VHF Association will hold its eighth annual field day and picnic July 16 and 17 at Wades Sign Shop, Ellicotville, New York, on Route 242. WB2GXE will monitor 50.40 and 145.05-Mc. a.m., and 146.94 Mc. f.m. for talk-in. There will be a transmitter hunt and auction on Sunday.

New York — The Long Island Hamfest and picnic sponsored by the Federation of Long Island Radio Clubs will take place Sunday July 17 at the Hemstead Town Park, Point Lookout, L.I. Auction, swap shop, technical talks, manufacturer's displays and activities for the entire family. Starting time is 9:00 A.M. and ending at dusk. For further information write P.O. Box 304, Long Beach, N.Y.

North Dakota — The Third Annual International Hamfest will be held at the International Peace Gardens on the border oetween North Dakota and Manitoba on Saturday afternoon, July 16 and Sunday July 17. Technical discussions, manufacturer's displays, inspection of mobile rigs, and a special program for the ladies and children. For further information contact WAØHUD, Willow City, North Dakota.

Ohio — The Wood County ARC will hold its annual Ham-A-Rama, Sunday July 10 at the fairgrounds Bowling Green, Ohio. For additional information contact W8PSK, 324 South Grove St., Bowling Green, Ohio.

Pennsylvania — The Annual East Penna. Section Picnic and Hamfest will be held on July 31 at Frantz's Grove, New Ringgold, Pa., from 9:00 A.M. till? Program consists of forums on traffic handling, section appointments, emergency session by W3ELI, How TCC works by W3EML, contests, and activities for the ladies. Bring a basket lunch and stay for the day. Fireplace is available. Registration is $1.00 per call.

Pennsylvania — The Two Rivers ARC, Inc. of McKeesport will hold its Second Annual Hamfest on July 17 at Balkan Hotel, 801 Coulter Rd., McKeesport.

Saskatchewan — The big Hamfest in Regina will be held on the July 1 weekend.

Tennessee — The Oak Ridge annual Crossville Hamfest is tentatively scheduled for July 16 and 17.

Utah — The Utah Hamfest, sponsored by the Utah Council of ARCs will be held July 16 at Liberty Park in Ogden, Utah. Registration is at 9:00 A.M., program at 10:00. Details from W7RQT, Box 276, Providence, Utah.

(Continued on page 148)

COMING A.R.R.L. CONVENTIONS

July 2–3 — West Virginia State, Jackson's Mill

September 16–17 — Ontario Province, Niagara Falls

October 15–16 — Hudson Division, Tarrytown, New York

October 21–22 — Great Lakes Division, Muskegon, Michigan

January 21–22, 1967 — Florida State, Miami

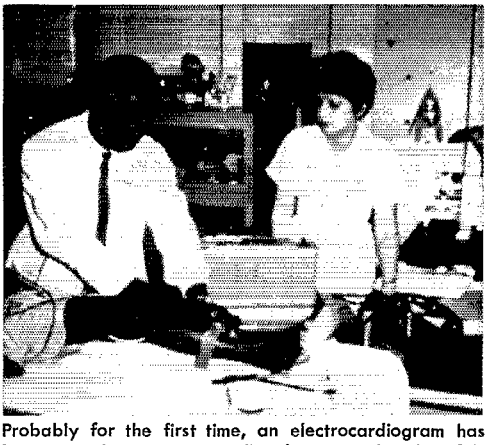
Prospective convention sponsors are urged to check with ARRL Hq. to avoid possible date conflicts.

Strays

Ralph Barber, W2ZM, (r.) is shown with a transceiver presented by Robert L. Johnson, WA2KFE. Ralph has been off the air since September, 1964 due to health. His fellow members in the 4,500-strong QCWA have now put Ralph back on the air with their gift. He is now a resident at the A. Holly Patterson Home for the Aged, in Uniondale (N.Y.). The installation of W2ZM at the home was approved by the Deputy Commissioner of Welfare, and Ralph is enthusiastically back in business.

"Miss Amateur Radio 1966" of the Great Lakes Division, is Phyllis Lin Servis of Saginaw, Michigan. Miss Servis, daughter of Lin Servis, K8SWQ, was crowned during the ARRL Great Lakes Division Convention on March 18. Mr. and Mrs. Servis, the Queen's parents, were host and hostess at the convention.

Bruce Robbins, 15-year old asthmatic patient at the National Jewish Hospital in Denver, talks to his father, VE1DW in Yarmouth, Nova Scotia, via a ham-radio link. Roden Rogers, WØNNI (1.), provided the station at the Denver end. Bruce has had asthma since early childhood and, according to his father, was rapidly losing ground when a doctor advised him to enter NJH in Denver. Other hams providing rigs for the 2,000-mile hook-up are WØEZO and KØRGU.



Probably for the first time, an electrocardiogram has been sent by amateur radio—between the ship S.S. *Hope*, stationed on Conakry, Guinea, West Africa, and WA4JTS. Miss Gloria Hammond, WB6QEK, shown in the photograph, was the electrocardiograph technician who helped send the EKG to Dr. Tom Baker, WA4JTS, in Miami via the amateur radio equipment on the *Hope*. Dr. Baker then relayed it to a cardiologist colleague who read the cardiogram. Mr. Donald Wright, W7HH, helped arrange the amateur equipment on the *Hope* and Dr. Chester Weed, WA1BDS, monitored the procedure on another receiver in another part of the ship.

Operating News

F. E. HANDY, W1BDI, Communications Mgr.
LILLIAN M. SALTER, W1ZJE, Administrative Aide
ROBERT L. WHITE, W1WPO, DXCC Awards
GERALD PINARD, Club Training Aids
GEORGE HART, W1NJM, National Emergency Coordinator
ELLEN WHITE, W1YYM, Ass't. Communications Mgr.
PETER CHAMALIAN, W1BGD, Communications Asst.

Emergency Principles Determined in New Orleans Meeting. We consider as top news this month, the highlights of discussions taking place in April in a Gulf Coast meeting dedicated to AREC objectives. W5GHP, local RM, moderated the meeting. W4BVE, manager of the Weather Amateur Reporting Net (WARN) indicated the net's objectives, results, and procedure. We're indebted to K4UBR/5, assistant SEC Miss. and EC, for his good report on all the deliberations. Notables present at the gathering were W5LDH ARRL Director, W5PM SCM, K5KQG SEC, K5USU Medical Association, W5LHS Pres. New Orleans West Side Radio Club, and W5BJG ORS.

1. Nets in the gulf states will be alerted by the SCM and/or the AREC alerting systems and net managers whenever a call for special emergency requirements appears imminent. A need for AREC members to monitor the net and emergency frequencies and the NCEF's, preferably all through every day, will be stressed.

2. Effort will be made to commence training AREC-net members in message preparation, format, and net procedures. Designated members should assist in setting up lectures for clubs in meetings and on-the-air. Specific traffic handling procedures and coordination in plans as outlined in the new ARRL *Public Service Communications* and in section AREC plans will be followed and traffic given routing over AREC and NTS nets.

3. Emergency power provisions (back-up power) for fixed as well as mobile elements in the designated stations in the advance plans will be urged.

4. In extension of the practical AREC plans drawn up ECs should inform Section Nets their part, i.e. set up contacts between local groups and outlets to state and region.

5. Messages of the *highest precedence* will be passed on circuits first.

6. Outlying section stations in a net may gather and hold incoming welfare inquiries for later relays into effected areas, as the controls there specify. General traffic *into* an emergency zone will be handled by nets as outlined in the AREC plans. The out-going traffic will be routed according to plan.

7. Key city stations and net controls will be asked to establish sufficient depth of reserves in personnel in their plans to have at least one additional operator to maintain logs, answer phones, and deliver messages, at the important stations and points.

8. All personnel will be briefed on the urgent necessity of having traffic in the proper format and refusing messages unless authenticated.

9. SCMs will be notified of any emergency situation by any amateur. The SCMs in turn will activate portions or all of AREC and section plans, as necessary.

10. ARRL Emergency Coordinators will keep rosters of all their AREC members up-dated and have every SEC notified of the EC's correct phone number, address and normal frequency of operation. ECs will maintain the same information on nets and the contact information for SEC *and* SCM.

11. There will be prepared by SECs and ECs Gulf Coast lists of both elected and appointed city-county-state civil defense officials, Red Cross officials and those of other agencies that may originate and receive disaster area emergency traffic to facilitate the matter of authentication and routings. (Agreed that messages in such matters as deaths, funerals, casualty lists or property damage, all of which information will be authenticated by responsible authority before release of messages, will be routed via c.w. if possible, to avoid unnecessary interception by the public and disinterested amateurs to reduce the incidence of incorrect rumors.)

Clubs To Be Certified in W.U. Program on Disposal of Surplus Teleprinters. Under a plan worked out between the ARRL and Western Union, teleprinters and related equipment declared surplus may be made available in certain areas *through accredited amateur radio societies* and at no charge to licensed amateurs. Mr. Frank White of W3PYW is the national coordinator of this program. At present he is in the process of "certifying clubs in each major area." Some thirty clubs have been named. The process of certifying continues. Inquiries in a given area should be directed to the certified club. Club groups in large cities in a position to handle details may write W3PYW, 2706 Harmon Road, Silver Spring, Maryland. He will need names and address of club officers, statement of purpose of club, and a sworn statement to the fact any releases will be only to persons licensed for communication on amateur frequencies or training purposes.

Meet your SCMs

New Mexico SCM WA5FLG dates his amateur radio interest back to his 7th grade days when he began to SWL. In past years, he has had varied occupations as design engineer, NASA psychologist, station engineer and announcer and now teaches for the Alamogordo Public Schools. His operating interests are varied, from 75 to 2 meters and he particularly likes QRP and the challenge it offers.

Overseas Viewpoint. ZL4GA, writing ARRL recently, congratulates the gang, and the League on the high operating standards of 85% of the operators heard. He concludes with some well-meant advice from the viewpoint of one who represents DX.

"The odd men out are the ones that truly lower the good general operating effect by malpractices. The bad mannered few (1) are continually breaking in on top of stations, persistently calling and gumming up copy. (2) When the DX station returns a call he is many times "clobbered" by W's calling, so that any chance of a decent exchange of communications with his station is lost. (3) We deplore stations calling when we have sent "CQ Africa" (no attention to directional CQ's!) (4) The mistake many amateurs make who want QSOs is not spreading out a few kc. (It is hopeless to try to copy dozens of stations working on exactly the same frequency.)"

Official Observer Work Up in '65. By anticipating monitoring notices, OOs saved many individual amateurs from citations during the past year. The League commends all its dedicated OOs supporting this particular effort. Some 263 observers reported a total of 24,349 friendly advisory notices. The operation was up 17% from the previous year. Top men were W2BLT (1096), K8PJH (563) and W7KTG (544), but the overall increase was from substantially more mailings per observer. The special thanks of ARRL is given to all assisting. We present this month as a special Honor Roll, the calls of those leading in each call area, and the 27 Observers who sent over 300 notices each. Also, in the '65 frequency measuring exercises, 549 persons sent in 5300 measurements to be compared and checked for precision with the Umpire's reading. W6GQA and W4JUI have taken part successfully for 12 and 8 years of FMT's respectively without missing the dates once!

HONOR ROLL

Call Area Leaders		*Over 300 Notices Sent*		
W1AUQ	K8PJH	W2BLP	W3NNC	W4NTO
W2BLP	W7KTG	W7KTG	K8YEK	W8GIU
K3HNP	K9YRA	WA6YMY	W7HDL	K3HNP
W5NGW	KH6EEM	WØPFG	K8NYN	K9YRA
WA6YMY	VE3EGG	W8YPC	W4RLS	K3FFJ
W4NTO	WØPFG	K3GKF	K8PJH	K8HLR
		W8IBX	W1AUQ	W1NF
		W4UF/KP4	W8CQN	W2TPJ
		K6KA	K3MYS	W9GFF

ARRL Official Observers Wanted. It is a pleasure to honor publicly all OOs for assisting amateurs by advance tips of signal or other deficiencies. This work helps better operating conditions in all the different bands, and keeps individuals from FCC/DOT trouble. Active operators who are League members are invited to apply to SCMs, if qualified by experience and interest in Observer work, for SCM appointment. The League provides special forms to Observers for sending their mail notices. Unless requested to do so, OOs rarely describe signal difficulties or call attention to them over the air.

Amateurs generally expect their OOs to have lots of know-how and experience before presuming to send them notices. So, four years of licensed amateur experience is prerequisite to making application for the OO post. This form-application queries the knowledge and aptitude of a prospective Observer for the work he may do. ARRL Observers are appointed by SCMs (see address, page 6 *QST*) only in the League's field organization territory, the U.S.A. and Canada, of course. Candidates for OO posts must hold amateur tickets, FCC's General or Conditional Class license, in Canada DOT's equivalent. New observers as appointed receive Standing Information for OOs (CD-100) as a guide to system operations, also their initial supply of the ARRL Observer forms to assist in their effective notification work. Quarterly bulletins are sent to observers. These cover the subject of Frequency Measuring Tests as well as the current Observer problems. Ask your SCM or headquarters for the CD-45 application form if you have the essential licensed-experience and are interested.

New Training Aids

Two new ARRL slide collections have just become available in the Training Aids Program. Both of these are revisions of previous slide collections on the same subjects. For all practical purposes, however, they are completely new.

"The Amateur Radio Public Service Corps" (SC-3) comes in four versions, each complete with its own taped commentary. SC3-1 is 88 slides, lasts 45 minutes and contains complete details of organization and operation of both AREC and NTS. It is designed for clubs having public service as an avowed purpose. SC3-2 is an abbreviated version lasting 25 minutes, useful primarily for club meetings to introduce the general subject of public service and hitting the high spots of both AREC and NTS. SC3-3 abbreviates the AREC discussion but gives full treatment to details of operation of NTS; this one lasts about 35 minutes and will receive its principal use by NTS-interested groups. SC3-4 abbreviates the NTS discussion and gives full treatment of details of AREC operation and will be more popular with groups interested in organizing for local emergencies.

As an exception to our general rule of making these programs available to affiliated clubs only, we are making a couple extra copies of SC-3 and their tapes for use by AREC and NTS organizers — first come, first served. This slide collection is already in quite widespread use, so if you want to use it, get your booking in, and don't expect to get it on a "tomorrow night" basis.

The slide collection entitled "The ARRL Headquarters Station" has also been revised and updated to include the new renovated W1AW, and is also complete with taped commentary. If you saw it before, you will want to see it again to get full details of what's new at W1AW — and plenty is! This is SC-2, contains 86 slides, some in color, and lasts approximately 35 minutes. Book it through your affiliated club.

A complete new Training Aids list (TA-21) is now available from the ARRL Communications Department.

Some Hints on Originating Traffic. Bill, K4LND, Route Manager, in *South Carolina Amateur News* has some good points for the uninitiated, concerning traffic handling. He says, "Traffic handling via c.w. is something like smoking. If you try it and like it you are hooked . . . when originating traffic try to limit the amount of words in your text to less than 25. Make the text as simple and to the point as possible. Try not to use unusual or uncommon words unless absolutely necessary. When *receiving traffic* always aim for accuracy. *If any doubt*, always ask for confirmation. If the sending operator is too fast, he will be glad to adjust his speed if you ask him to QRS . . . Seasoned operators mostly agree that when it comes to speed and accuracy c.w. is out in front. No phonetics are required. Many c.w. traffic men can use full break-in. This means they may interrupt the transmitting station instantly for fills when they miss part of a message."

We subscribe to the thought that for pleasure

C. D. ARTICLE CONTEST

A Communications Department article contest, a continuation of the very successful *QST* Article Contest during the 1964 anniversary year, needs your best ideas (in 800–1200 words) relating to League organization, clubs, training exercises, and operating techniques. Periodically, the best articles submitted for the "CD Contest" will be chosen to appear, with the winner electing to receive (a) a bound 1966 *Handbook* or (b) a *QST* binder, League emblem and the ARRL DX map. Our winner this month is William R. Hennigan, W3TXQ (ex-W5KKL), and his article appears below.

DX Operating Procedures

FOR AT least eight years I have been wanting to write the following concerning some of the abuses and downright unethical operating procedures practiced by some of the Amateur Fraternity. In particular with respect to the operating habits used in calling DX stations. These procedures, or lack of good operating habits, reach their climax during the annual DX contests. Their intensity seems to be directly proportional to the relative scarcity of the country being called. Certainly a good percentage of it is due to the operators overeagerness to get another rare one QSOed, and confirmed for credit towards DXCC. However, this still does not make it good procedure, and is hardly a good excuse.

Some of the peculiar, and downright unsporting operating procedures that follow make one's blood boil. For example, let LX9XXX call CQ and you will hear a few or many stations call him in the normal manner. Then further suppose he comes back to W9XXX and QSO follows in normal way, but not for long. It won't be long till you hear such shenanigans as DE W7——, DE W4—— etc., or some who just send their call only a few times, before the QSO has officially ended. It may very well have ended abruptly, and prematurely due to QHM. My advice to LX9XXX would be to refuse to QSO any of the above, and politely but firmly tell them so. I have heard operators at some rare spots do precisely that and it has helped considerably.

During a recent DX contest I heard a VK3 and many stations calling him, also many stations simply sending DE followed by their call — all while the VK3 was trying to copy a particular station he was in QSO with. In several instances the VK3 had to ask for a repeat as he was QRMd by the bedlam on the frequency calling him. Once the VK3 stood by for the requested repeat he was met by an avalanche, apparently many stations thought that this would be a good time to call. Quite obviously it was not, but this did not matter. Also the DE only boys, thinking they might be left behind, joined the chorus, along with what I thought was the climax — a station on an electronic keyer sending a long series of dashes as he slowly swept the frequency with his VFO to attract attention. Or was it to sweep the frequency clean, followed by DE and his call? Needless to say the poor chap who originally was in QSO with the VK never had a chance.

Others who call a DX station after that station stood by for a specific station are just as obnoxious. Or you may hear a ZP9—— give a report, and stand by for let's say a W1, and be deluged by calls from many stations in other call areas. Obviously these other stations don't know their call, or else they think the ZP9 had their call letters and area number all wrong. Who are they fooling?

Then we meet a rarer type but the most optimistic of all. Hearing a DX station give a signal report to a specific station, he will call the DX station then follow the call with a signal report, in the hope that the DX station will answer him, our optimistic pal.

It is also true that many times you hear a station in a contest who continually answers the tail enders only, and the chap who calls after the QSO has ended doesn't stand a chance: however, this still does not make it proper procedure.

Times do change, for I see a large change in operating procedures in the last 26 years that I have been licensed, but must we go backwards instead of forward? Our equipment has changed for the better, can't our operating procedures keep pace or at least be as good as it was twenty years ago? It would be a blessing if more of the DX stations refused to answer the stations who habitually make a nuisance of themselves by QRMing everyone, and cause the DX to continually ask for repeats. Can't we have the patience to wait until the DX has sent his QRZ before transmitting? Everyone would benefit and less time would be wasted in needless repeats.

I don't mean to imply that the WK stations are the only ones at fault. By and large most of them are good operators but overeager at times. I have, on several occasions, heard a DX station tell the gang to call one at a time. This would be fine, but a miracle to perform, for who is to say just who is to call at a particular time.

If the intensity of the above practices continue at the present pace, what will the DX contests of 1980 be like? Will everyone be transmitting and no one listening? I wonder. . . .

and efficient use of ones time, one can hardly do better than to join a section-level net. To do so strengthens the emergency-communication capability of the whole fraternity. A net that interconnects all major towns and cities of a section is the type net that can best serve local Amateur Radio Emergency Corps and RACES organized needs, when the chips are down. To belong to a net also is to attach ones interest to a close-knit friendly and fraternal group. Practically all nets function on a designated time and frequency. By reporting in to the NCS (Net Control Station) at the start of a designated net period and after listening to the simple procedures, you are automatically made a member of the group until the net is free (QNF) or has been dismissed for a given reason. "The latch string is always out" is a standing NCS policy! Accept that invitation today. —*F.E.H.*

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for Apr. Traffic:

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
K6BPI	234	2980	2852	128	6194
K6MCA	649	1529	1501	28	3707
W3CUL/4	97	1306	1219	43	2665
K5TEY	7	1106	1099	7	2219
WØLGG	14	1051	970	21	2056
K6WAH	151	895	891	4	1941
W4LEV	103	905	841	64	1913
K6EPT	156	803	513	290	1762
KØONK	121	809	785	7	1722
W6ZJB	36	731	710	21	1498
W7BA	9	603	535	62	1209
W4PF	398	390	18	383	1189
WA4SCK	13	487	490	18	1008
K7TCV	32	481	430	59	1002
K9IVG	20	522	417	6	965
W9JOZ	19	454	454	0	927
WB6JUH	22	397	359	38	816
K6YVN	11	401	370	17	799
W3EML	58	406	287	2	753
WB6QXY	17	355	0	352	724
K9KZB	29	336	320	16	701
WA2GPT	31	321	234	76	662
W6VNQ	15	324	319	0	658
WA4NEV	119	219	162	157	657
WA4NBT	171	247	73	165	656
WB6GMM	19	71	516	40	646
WA9CCP	9	365	265	6	645
K8KMQ	43	304	255	34	636
WB6BBO	61	300	249	15	625
W7DZX	12	337	271	3	623
W4TUB	10	281	270	9	570
W5OBD	22	275	269	0	566
WA9CNV	23	302	204	29	558
W6BSY	155	190	185	27	557
W1PEX	35	268	232	17	552
W7EHA	15	258	254	2	529
WA4TPB	46	252	205	19	522
WA4WWT	22	256	234	2	514
K8LNE	4	253	244	7	508
K8YSO	57	229	198	21	505
Late Reports:					
WØLGG (Mar.)	8	1032	953	10	2003
WA2GPT (Feb.)	46	332	227	87	692
WA2GPT (Mar.)	58	315	261	34	668
WA2RUE (Feb.)	36	267	201	26	530

More-Than-One-Operator Stations

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
W6IAB	1536	2146	1612	534	5828
W6YDK	4497	369	296	73	5235

BPL for 100 or more *originations-plus deliveries*

WA4YDT 274	WAØJKT 144	WA6OQM 168
WA3DKJ/4 251	WA8QND 143	WA2RUE 107
WA3ATQ 236	K7CTP 138	W3TN 106
WA4HJM 209	W4PQP 121	K4FLR 105
WAØHWJ 202	WAØDEM 119	WA9GJU 105
WA7CFN 170	WB2RBA 112	W4BNE 102
K6IOV 157		W4BAZ 100

More-Than-One-Operator Stations

Late Report: W1KBN (Mar.) 104

BPL medallions (see Aug. 1954, p. 54) have been awarded to the following amateurs since last month: K1ESG, K4EVY, WA4TID, K5GDH, W6TXJ, WB6JFO, WA9NFS, WAØFLL, WØKON, WAØMKF, VE3BII.

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.

APRIL CD PARTIES

Wow! Sections and contacts galore on both modes; a 200-K plus c.w. score by K9ELT at the key of W6YRA; W1s BGD and JYH pulling a KFC-style 100-K in exactly 3 hours and 43 minutes apiece; the return of W1ARR slant four; HZ3TYQ trying to check in as ex-SCM Connecticut; Connecticut's own W1ECH with the highest multiplier: the walloping lead by K1WJD on c.w.; W1YYM getting edged out by almost everyone at Hq. (sorry about that chief!); the fine phone turnout in spite of many appointees appearing instead at the National Convention in Boston. (In fact, K2AJA kept a check list of in-person QSOs and claims 47 in 14 sections for the Boston affair!)

We note too that more phone stations topped 10-K than topped 5-K last April!

— *W1YYM*

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High-Claimed Scores

The following are high-claimed scores, QSOs and sections. Final results will appear in the *July CD Bulletin*.

C.W.

K1WJD	263,580-757-69
W1MX[1]	228,135-674-67
W9AQW	226,320-656-69
K1YKT	217,750-644-67
W1ECH	217,700-615-70
W1ARR/4	216,580-630-68
K2AJA	208,325-634-65
W1DYE	207,400-605-68
K3QDD	206,250-619-66
W6YRA[2]	206,040-600-68
WB2ALF	202,640-590-68
W9YYG	200,970-604-66
W9LNQ	198,990-589-67
W4DVT	197,685-566-69
K2EIU/5	191,420-556-68
KØAZJ	185,300-541-68
W6DGH	184,280-535-68
WB2CPV	179,225-532-67
K1ZND	176,220-527-66
W3EIS	176,120-512-68
W8SH[3]	173,195-510-67
W6ASH	171,120-489-69
W9QQQ	169,620-507-66
K4RAD/2	166,495-492-67
WA6SLU	162,690-487-66
K3HNP	157,815-496-63
W1AW[4]	157,410-473-66
W1YYM	154,375-468-65
WA9NFS	153,780-462-66
K4IEX	153,095-450-67
WA2SRQ	152,830-488-62
WB2FIT	152,750-470-65
W4VRD	149,500-460-65
VE7BDJ	145,530-434-66
WA9MIO	145,280-450-64
W4BZE	144,300-476-60
WØCXN	142,230-431-66
K4RIN/5	140,250-421-66
W4LK	136,290-413-66
WB2MRD	133,875-421-63
K1USD/2	131,840-408-64
K4SXD	131,670-412-63
W1WFZ	131,520-405-64
W9NPC	127,710-381-66
K3YQJ	126,555-424-59
W3NEM	126,270-407-61
WA8GYX	124,740-391-63
W8CKX	124,110-394-63
WA9IZR	121,800-400-60
WØNYU	119,660-379-62
K2SIL/8	116,800-358-64
WA8HVR/8	116,700-383-60
W1EOB	116,480-357-64
K3URZ	114,800-405-56
W8VPC	111,600-353-62
WAØCVS	111,325-362-61
W4WHK	110,410-357-61
W2SEL	108,990-339-63
WA4PWF	107,160-369-57
W2GKZ	104,280-309-66
W9YT[5]	102,375-321-63
W4SQE	101,870-330-61
W1BGD	101,565-326-61
W1JYH	100,500-293-67
W4KFC	100,200-327-60
WA8CFJ (K8BPX, WA8CFJ)	200,445-581-69
W8UM (W8, CØN FAW, K8QKY)	175,120-534-64

PHONE

W9EWC[6]	68,200-248-55
W1AW[4]	59,360-220-53
W9YT[6]	41,850-182-45
W4TFL	29,400-140-42
K2QDT	28,310-145-38
W1BHV	28,140-128-42
K1YSD	26,640-143-36
K4TTN	26,240-128-41
W9NPC	25,800- 43-114
K3RFH	22,200-120-37
VE3EUM	21,960-119-36
WB2EMJ	20,130-119-33
W8WUO	20,000-100-40
W1PYM/6	18,720- 91-39
WB2KTO	16,000-100-32
K3KMO	15,980- 87-34
W9LNQ	14,875- 80-35
W3KJJ	14,720- 86-32
W1FJJ	14,560- 85-32
WA8GRE	14,040-100-27
K1HXG	13,500- 70-36
K1ZND	13,095- 90-27
W3HC	12,880- 87-28
WB2MDH	12,600- 72-35
W6DGH	12,400- 73-31
W1BGD	12,090- 71-31
WB2IYO	10,125- 78-25

[1] WA8ENO, opr. [2] K9ELT, opr. [3] K8NHC, opr. [4] WA1FPS, opr. [5] K9LBQ, opr. W9AQW, opr. [6] K9LBQ, opr.

Gotcha Net Registered?

The deadline for registrations to make the 1966 net directory is *July 15*. If your net has not been registered during the past year, or if changes in net information have occurred recently, better get on the stick. See pages 66–67, June *QST* for details.

SUGGESTED OPERATING FREQUENCIES

RTTY 3620, 7040, 14,090, 21,090 kc.
WIDE-BAND F.M. 52.525 147.94 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.

A convenient conversion card is available, free of charge, from the ARRL communications Department, 225 Main St., Newington, Conn. 06111.

DXCC Notes

Announcement is hereby made of three additions to the ARRL Countries List. These additions are *DESROCHES, MARIA THERESA and MINERVA REEFS.*

Desroches, formerly one of the Seychelles, is now one of the islands making up the British Indian Ocean Territories. Contacts made with Desroches stations November 10, 1965 or later will be counted as separate from the rest of the Seychelles. Maria Theresa, French territory, is located in the South Pacific at approximately 152 degrees West and 36 degrees South. Minerva Reefs are located in the South Pacific at approximately 179 degrees West and 24 degrees South. Honor Roll credits may be claimed for Desroches. Maria Theresa and Minerva Reefs in September, all others in accordance with DXCC submission rules announced in January, 1966 DXCC Notes.

Briefs

In the June VHF SS report, the club total for the Dayton Amateur Radio Assn. should read 86,428 while the Miamisburg Wireless Assn. become 19,431, with W8GGE taking the Miamisburg club award.

DX CENTURY CLUB AWARDS

From April 1, through April 30, 1966 DXCC Certificates and Endorsements based on contact with 100-or-more countries have been issued by the ARRL Communications Department to the Amateurs listed below.

New Members

G4MJ.....324	W4JVU.....143	W4ZSH.....119	W3FWI.....105	DL4LG.....102	K3MUB.....100
WB2F8W...278	K4KJD.....140	W5HTY.....118	WB2MDU..104	DL6CT.....102	K4SXD.....100
PY2CO.....269	I1RL.....130	ZD4AM.....113	G3RWQ.....103	DM3YPE...101	K7IIU/6....100
PY2SO.....269	WB2OAE...125	W6GTE.....110	K6VTC.....103	HK7UL.....101	OE8RT.....100
W4AXE.....240	W6ZER.....123	K9AWK.....109	VP7NA.....103	K3NWD.....101	W1YCH.....100
K6HZP.....239	DM3SBM...122	JA3ZO.....106	W5MOQ.....103	W1MDX.....101	WA4EII.....100
W8ROC.....209	VE3DBB...122	OH5PX.....106	WA6GCP...103	JA7KW.....100	WA0HXW...100
W9NNX.....146	I1PPI.....120	DL8BL.....105	9Q5HD.....103	K3KMO.....100	W0PJB.....100

Radiotelephone

K3YBR.....218	PY3BAD...139	K4KJD.....114	WA5IEV....110	WA4NGO...106	VK3SM.....100
W8ROC.....177	I1RL.....128	OE8KI.....113	W0QKO....110	PY2BGL....102	W4AVL.....100
PY2CQ.....143	CE5EF.....125	DL8CH.....110	OZ5GT.....108	G3PFE.....101	W7UJX.....100
EP3AM.....141	W5HTY.....118		W6OSU.....107	W3FWI.....101	W2ZIA/ZK1 100

Endorsements

Endorsement listings through the 300 level are given in increments of 20, above the 300 level they are given in increments of 10. The totals shown do not necessarily represent the exact credits given but show only that the participant has reached the endorsement group indicated.

340		260	220			140	120
W7GBW	W8QJR	K9WTS	DJ5LA	SM7TV	W9PWM	DL1GK	K1ZHJ
	300	W1DGJ	K2KBI	W6EUF	160	DL6KK	K6PJT
320	K4HNA	WB2FMK	K4GSS	W6RGG	DJ2AJ	EP3AM	LA6EF
PAØLOU	VE6JR	W5LEF	K4YFQ	W7FUL	DJ6RX	K4THA	PY2BBO
VE2NV		W5LGS	K4YYL	W8HEV	G3RFE	K6JAJ	VE2CK
W1BIL	280	WA6KNE	W5LZG		K1DFC	VP6PJ	VE6MF
	DL7AB	ZS6YQ	W7LZF	180	DL1LD	WA2MTI	VS6BJ
310	HB9KB		W8IQS	K4PVZ	KØWKE	WB2CKO	W1GF
DL1KB	W1QJR	240		K4RLO	VK3BG	W3KJ	W3HTW
G6XL	W5EZE	HB9PL	200	KØBHM	W8SH	WA4NGO	W3VHN
W1VG	W6BUO	JA1BN	DJ1QP	LA1K	W8TRN	WA6CAL	W8QBG
W2PDB	W6PHF	OH3UO	G2AAN	VQ8AI	WA4WAO	WA6YVW	XE1KKV
W4PAA	W6PQT	VE3TB	KR6BQ	WA2RUB	WØCVZ	W8MSG	
W6DQH		W6OF	OE2EGL	WA8GUA	WØLBS		
					9J2IE		

Radiotelephone

320	260	220	200	180	160	140	120
K6LAS	F2MO	DJ5LA	K2KER	I1PP	GW3NWV	W1HOO	I1YRK
		K9PPX	K3HHY	IT1GAI	K4YYL	WA4WAO	VE4SK
310	240	SM5CZY	ON4BX	K8AXG	K9WTS	W3KJ	W1EJE
K9KYF	WB2HXD	W6KUT	WA5KBK	W5JWM	WØOMH/5	K3PDC	W1TZ
W8MPW	ZS6YQ	ZL3NS			KØWKE	ZS4OI	W4JVU
W8QJR					WA6GLD		

A.R.R.L. ACTIVITIES CALENDAR

Dates shown are in GMT

July 7: CP Qualifying Run — W6OWP
July 9–11; CD Party (c.w.)
July 13: CP Qualifying Run — W1AW
July 16–18: CD Party (phone).
Aug. 5: CP Qualifying Run — W6OWP
Aug. 18: CP Qualifying Run — W1AW
Sept. 8: Frequency Measuring Test
Sept. 9: CP Qualifying Run — W6OWP
Sept. 10–11: V.H.F. QSO Party
Sept. 16: CP Qualifying Run — W1AW
Oct. 8–9: Simulated Emergency Test
Nov. 12–14: Sweepstakes Contest (phone)
Nov. 19–21: Sweepstakes Contest (c.w.)

OTHER ACTIVITIES

The following lists date, name, sponsor, and page reference of *QST* issue in which more details appear.

July 2–3: Alabama QSO Party, Huntsville ARC (p. 134, last issue).
July 2–3: Venezuelan Independence Contest, RCV (p. 62, this issue).
July 2–4: Korea QSO Party (p. 93, last issue).
July 16–17: Independence of Colombia Contest, LCRA, (p. 94, this issue).
July 17: Minnesota QSO Party (p. 106, this issue).
Aug. 6–7: YO Contest (next issue).
Aug. 13–14: South Carolina QSO Party, Low Country ARC (next issue).
Aug. 13–14, Sept. 10–11: WAE DX Contest, DARC (next issue).
Aug. 13–15: Indiana QSO Party, Michigan City ARC (next 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 July 13 at 0130 GMT. Identical tests will be sent simultaneously by transmitters on c.w. listed frequencies. The next qualifying run from W6OWP only will be transmitted July 7 at 0100 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, 0130 GMT July 13 becomes 2130 EDST July 12.

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 2330 and 0130 GMT and are sent simultaneously on all c.w.-listed W1AW frequencies, with about 10 minutes practice given at each speed: 5 7½ 10 13 20 and 25 w.p.m. on Sun. Mon. Wed. Fri (GMT days) from 0130 to 0235; 15 20 25 30 35 w.p.m. on Tues. Thurs. Sat. from 0130 to 0220; 10 13 and 15 w.p.m. daily from 2330 to 2400 GMT.

To make the practice more beneficial the order of words in each line of the text is sometimes sent reversed. The 0130—0220 GMT runs are omitted four times each year, on designated nights when Frequency Measuring Tests are made in this period. To permit improving your fist 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 1030—0220 GMT practice on those dates.

Date — Subject of Practice Text from May *QST*
July 1: *It Seems to Us*, p. 9
July 12: *The "Stanley Steamer"*, p. 18
July 18: *Is One of These Your Problem?*, p. 26
July 19: *Checking RTTY Shifts*, p. 35
July 21: *Electrical Interference*, p. 39

Date — Subject of Practice Text from *Understanding Amateur Radio*, First Edition
July 25: *How Receivers Work*, p. 48
July 27: *Amplification*, p. 49

W1AW SCHEDULE, JULY 1966

The ARRL Maxim Memorial Station welcomes visitors. Operating-visiting hours are Monday through Friday 1 P.M.–1 A.M. EDST, Saturday 7 P.M.–2:30 A.M. EDST and Sunday 3 P.M.–10:30 P.M. EDST. The station address is 225 Main Street, Newington, Conn., about 7 miles south of Hartford. A map showing local street detail will be sent upon request. The station will be closed Independence Day, July 4.

*GMT**	*Sunday*	*Monday*	*Tuesday*	*Wednesday*	*Thursday*	*Friday*	*Saturday*
0000	.....	CW-OBS[1]	CW-OBS[1]	CW-OBS[1]	CW-OBS[1]	CW-OBS[1]	CW-OBS[1]
0020–0100[4]	.....	.....	3.555[6]	14.1	14.1	7.08[6]	14.1
0100	.....	Phone-OBS[2]	Phone-OBS[2]	Phone-OBS[2]	Phone-OBS[2]	Phone-OBS[2]	Phone-OBS[2]
0105–0130[4]	.....	145.6	3.945	145.6	50.7	1.82	21.41
0130	**Code Practice Daily[1] 15-35 w.p.m. TThSat., 5-25 w.p.m. MWFSun.**						
0230–0300[4]	.....	.....	3.555	7.08	1.805	7.08	3.555
0300	RTTY-OBS[3]	.....	RTTY-OBS[3]	RTTY-OBS[3]	RTTY-OBS[3]	RTTY-OBS[3]	RTTY-OBS[3]
0310–0330[4]	.....	.....	3.625	14.095	3.625	14.095	3.625
0330	Phone-OBS[2]	.....	Phone-OBS[2]	Phone-OBS[2]	Phone-OBS[2]	Phone-OBS[2]	Phone-OBS[2]
0335–0400[4]	.....	.....	7.255	3.945	7.255	3.945	7.255
0400	CW-OBS[1]	.....	CW-OBS[1]	CW-OBS[1]	CW-OBS[1]	CW-OBS[1]	CW-OBS[1]
0420–0500[4]	.....	.....	3.555[6]	7.08	3.945	7.08[6]	3.555
1700–1800	.....	21/28[5]	21/28[5]	21/28[5]	21/28[5]	21/28[5]	.....
1900–2000	.....	14.28	7.255	14.28	7.255	14.28	.....
2000–2100	.....	14.1	14.28	14.095	21/28[5]	7.08	
2200–2300	.....	21/28[5]	21.075[5]	14.1	7.255	14.28	.....
2330	**Code Practice Daily 10, 13 and 15 w.p.m.**						

[1] CW. OBS (bulletins, 18 W.P.M.) and code practice on 1.805, 3.555, 7.08, 14.1, 21.075, 50.7 and 145.6 Mc.
[2] Phone OBS (bulletins) on 1.82, 3.945, 7.255, 14.28, 21.41, 50.7 and 145.6 Mc.
[3] RTTY OBS (bulletins) on 3.625, 7.045 and 14.095 Mc. 170/850 cycle shift optional in RTTY general operation.
[4] Starting time approximate. Operating period follows conclusion of bulletin or code practice.
[5] Operation will be on one of the following frequencies: 21.075, 21.1, 21.41, 28.08 or 28.7 Mc.
[6] W1AW will listen in the novice segments for novices on band indicated before looking for other contacts.

Station Staff: W1QIS W1WPR W1NPG. *All times/days in GMT, general operating frequencies are approximate.

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

EASTERN PENNSYLVANIA—SCM, Allen R. Breiner, W3ZRQ—SEC: W3ELI. RMs: W3EML, K3YVG, K3MVO. PAMs: WA3BYH, W3SAO. The PTTN reports a QNI of 393 with a QTC of 262. The EPA Emergency Phone & Tfc Net had QNI of 564 with QTC of 265. NCSs are reminded to get their QNS reports to their respective net managers as quickly as possible. W3OML is now OPS. W3AEQ, Lehigh University, has achieved ORS/OPS/OES. K3ABC constructed a half-kw. linear for s.s.b. K3HLN, EC for Montgomery County, erected an 80-meter dipole for traffic work. W3FAF and W3NOH spent some time in the hospital. K3WEU and W3ZRQ were week-end visitors in Pittsburgh at a MARS convention. K3FSV is the new representative for 3RN. The Pottstown ARC has been reactivated with K3AOH the new treasurer. New Gear Dept.: K3RZE has an SB-300. K3MVO picked up an s.s.b. generator at the Boston Convention. WN3DMH added a Viking Challenger, WA3BBI acquired an HQ-110, WA3BSV added a Ranger I, K3FLT, Milton ARC, added a Utica 650, WN3FRF is a new Novice in the Hazleton area. WA3FGU and K3YVP are chasing DX on 20 c.w. K3SLP acquired YLCC and DXCC certificates. New officers of the Ivyridge ARC are K3YLX, pres.; W3EIK, vice-pres.; K3-FOQ, secy.; W3MIC, treas. The traffic bug has bitten WA3BFR. WA3FIR uses a DX-60 and has plans for an 80-meter antenna for traffic work. *R.F. News*, printed by the RF Hill ARC, is quite an informative club sheet. The Germantown Radio Club using the calls W3LUW/3 and K3MTK/3 planned two Field Day groups, a junior division 50 miles from the club site at Easton. The EPA Section Traffickers Picnic will be held July 31. If you're not on the net's mailing list, information and details can be obtained from the net managers on 3610 and 3917 kc. or drop a line or QTC to your editor. Traffic: W3-EML 753, K3MVO 372, K3MYS 358, WA3ATQ 309, W3AIZ 246, W3AEQ 223, K3PIE 173, W3JKX 170, K3YVG 141, K3FSV 128, W3FGQ 117, W3MPX 113, W3ZRQ 105, W3-FAF 101, K3TNL 97, W3RV 89, K3SLP 76, WA3BYH 75, WA3AFI 72, W3KJJ 70, K3RZE 55, K3ZSK 49, W3VAP 45, WA3CFU 39, K3LPT 38, W3OY 33, K3WAJ 31, K3-WEU 31, K3MDG 30,W3CBH 24, K3KTH 23, WA3BBI 19, WA3CCC 19, W3BUR 17, WA3BFR 16, WA3BSV 14, K3-KKO 13, W3ADE 10, WA3QDW 10, W3BFF 9, K3HLN 9, K3HNP 8, W3ID 5, W3OML 5, W3BKF 3, K2BIG 2, WA3CKA 2, W3KEK 2, W3PVY 2, WA3CUI 1, K3NYX 1.

MARYLAND-DISTRICT OF COLUMBIA—SCM, Bruce Boyd, W3QA—SEC: W3CVE. RMs: K3JYZ, W3-PRC, W3QCW, W3UE, W3ZNW. PAMs: W3JZY, K3-LFD.

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QTC*	*Avg.*
MDD	3643	0000Z	Daily	30	403	13.4
MDDS	3643	0130Z	Daily	30	52	1.7
MEPN	3820	2200Z	M-W-F	22	31	1.4
		1700Z	S-S			
MSTN	50150	0100Z	Daily	—	—	—

W3QA, in New Mexico again, is striking for Rommel's nickname, "The Desert Fox." WA3CFK forges to the front in traffic this month. W3TN scores in the BPL again with his O-and-D count. WA3BTA goes long wire with 200 feet on 160 meters. K3IPX finds a new QTH with a ready-made antenna farm in Virginia Beach and leaves a fine record on MSTN. K3LFD is QRX on MDD and MEPN for message traffic to W3QA. W3ZNW says MDDS is doing fine and he is on his way to 2 meters. W3QCW QSYs to England with the USAF in Aug. WA3BNL gets FB reports with a Galaxy V mobile. W3CDG works part-time on 40 meters. WN3EOP is building that long-needed pipeline to Western Maryland with his Cumberland Valley Net. K3QDD and the power company operators meet on the "Power Leak Net" whenever it rains. K3EJF is guarding v.h.f. frequencies for band openings and says K3OYC has TPL and Voice Commander on 2-meter f.m. W3PQ moves his traffic on the Morning Watch Net. K3NCM's MEPN is ready for all traffic and any emergency. K3LLR is reaching for the moon with work on a 2- and 1¼-meter receiver. W3CDQ has been waiting for good weather to put up a new antenna. W3JZY keeps his signal way up out of the mud but had trouble keeping his antenna out of the snow, even in April. TCC could use some seasoned c.w. operators from MDDC: Contact your SCM. We credit WA3BK and MEPN with a save on the activity report from W3MCG as we went to press. Either MDD or the postman also brought us news from K3TJE, K3JYZ, K3GZK, K3UXY, K3ZIX, W3PQT, WA3CEK, W3PRC, K3URZ, K3ZSX and K3OAE. Traffic: WA3-CFK 160, W3TN 137, WA3BTA 120, K3JYZ/3 99, K3TJE 99, K3GZK 98, K3UXY 85, K3IPX/3 61, K3ZIX 59, K3-LFD 58, W3PQT 56, K3OAE 52, W3PRC 39, W3ZNW 36, W3MCG 31, W3QCW 29, WA3BNL 26, W3CDG 24, K3-ZSX 19, WN3EOP 13, WA3CEK 12, K3QDD 9, K3EJF 8, W3PQ 7, K3NCM 6, K3LLR 2, K3URZ 1.

SOUTHERN NEW JERSEY—SCM, Edward G. Raser, W2ZI—SEC: W2BZJ. RM: WA2BLV. PAM: W2-ZI. NJN reports for Mar.: 31 sessions, traffic 261, QNI 471 with 57 different stations. N.J. Emergency Phone & Tfc Net reports for Apr.: 30 sessions, QNI 525 stations and 129 traffic total. Your SCM attended the E. Pa. Section Spring business meeting at Glenside, Pa., as well as the 1st Annual Joint NNJ/SNJ ARPSC and Traffic Seminar at South Amboy, N.J. W1BGD, K2FZI, W3EML, WB2AEJ and W2ZI were speakers. W2CVW chairman. I regret to report the death of W2AVC on Apr. 9. K2ARY transmitted 5 Official Bulletins during April. W2BZJ is your new SEC. He will be back on the air with new Hallicrafter gear soon. Other new appointees: WB2FVW as OES, WA2UPC as EC for Mercer Co., WB2RVE as OES. WA2IHN is a new station in Princeton. K2JKA has moved to Delran, N.J. WA2CUM has been appointed Navy MARS Area Coordinator for S.N.J. and Del. W2-FYT, W2VCX and WA2DVU participated in the Feb. FMT with good results. WA2UPC is high-man traffic scorer this month. W2HDW returned to NJN and will have a new SB-400 working soon. *SCARA News*, Matt Lefkowitz, editor, was received from the Southern Counties Amateur Radio Assn. W2VX is handling reservations for the SJRA 50th Anniversary Banquet, Sept. 10 at the Ivystone Inn. Traffic: (Apr.) WA2UPC 302, WA2-KIP 74, K2MBW 60, W2RG 56, WB2MRD 47, W2ZI 35, W2YPZ 24, WB2SBD 19, K2JJC 14, W2GIW 12, W2ZVW 8, W2HDW 4, W2GTE 2, (Mar.) W2RG 60, W2ORS 40, W2GIW 9, WB2SBD 9.

WESTERN NEW YORK—SCM, Charles T. Hansen, K2HUK—SEC: W2ZRC. PAM: W2PVI. RMs: W2RUF, W2EZB and W2FEB. NYS C.W. meets on 3670 kc. at 1900, ESS on 3590 kc. at 1800 NYSPTEN on 3925 kc. at 2200 GMT, NYS C.D. on 3510.5 kc. and 3993 kc. (s.s.b.) at 0900 Sun. and 3510 kc. at 1930 Wed., TCPN 2nd Call Area on 3970 kc. at 0045 and 2345 GMT. NYS County Net on 3510 kc. Sun. at 1000 and 3670 kc. at 1700 Sat. WB2RHJ and WA2HSB have been appointed OPSs. K2-RYH was endorsed as ORS. The RAGS Hamfest was a definite success, with attendance most encouraging. W2-WS again won the c.w. receiving test, with W2MTA a close second. WB2USB and WB2SHP got their Generals. The Penfield HS ARC will be at the school's Diplomat Fair to take messages, reports WB2TAG. WB2STA has been appointed NCS for the Wed. early session for NYSPTEN; WB2RHJ has been appointed manager of the early session which starts at 2100Z all year. K2DNN reports that communications tests are being performed in the Ten County Lakes district, namely Steuben, Schuyler, Tompkins, Ontario, Seneca, Wayne, Yates, Chemung and Tioga. W3EMW is up to 239 worked on his DX total with only 90 watts. Five members of GRAMS now have RTTY. W2QWS spoke on s.w.r. at a recent GRAMS meeting. The Squaw Island ARC had W2SAW speak at its annual OM/XYL night. The NF-DXA and Rochester DXA held a joint meeting to hear W4BPD relate his experiences at all those rare countries. Almost the entire membership from both clubs turned out. The UARC bulletin advertised home-brew night with pictures of jugs with XXXs on them. I won-

der! W2ELF spoke at a recent ARATS meeting on Ham TV. The CVARA reports that WB2MKD has half a dozen students attending his code classes. Feb. FMT participants were W2YRH, W2PZI, W2OSL, WB2CSP and WA2RHW. W2YRH had an average error of 0.5 p.p.m. Traffic: WB2GAL 302, W2SEI 216, K2IMI 161, WB2IJF 137, W2GVH 108. WB2SIA 94, W2FEB 85, K2JBX 77, WB2TAG 75, WB2RHJ 49, W2HYN 39, WA2ANE 36, W2RQF 30, W2UYE 22, W2MTA 21, W2FCG 20, K2EQB 16, K2MQN 11, W2PVI 10, K2DNN 9, K2HOH 7, WA2GLA 5, W2EMW 2.

WESTERN PENNSYLVANIA—SCM, John F. Wojtkiewicz, W3GJY—Asst. SCM: Robert E. Gawyrla, W3NEM. SEC: K3KMO. PAMs: W3TOC, K3VPI (v.h.f.). RMs: W3KUN, W3MFB, K3SOH, W3UHN. Traffic nets: WPA, 3585 kc. 0000 GMT Mon. through Sun. KSSN has closed for the summer. Thanks to all who participated in the Slow Speed Traffic Net; to W3SMV and K3SOH along with all NCSs who participated. K3KAP has a new Mosley TA-33. WA3BGE amassed 87K points during the recent CD Party. Congrats to WA3AKH and WA3CAS upon completing WAS. WA3EWP is the call of the Bobstone Memorial Amateur Radio Club. W3KQD assisted KN3FDJ with his new antenna. K3FNG uses an HA-650 for emergency work on 6. K3KMO and K3CXZ provided communications for a local parade while holding a Centre County AREC drill and all participating did a superb job, with 25 stations checking in. K3CFA has won an unprecedented second *QST* cover plaque. The Coke Center ARC reelected the full slate of incumbent officers for 1966. K3BTF runs code and theory classes at the Bell Telephone garage in Connellsville. K3HTR has gone S/Line. W3JHG lost his home and all radio equipment in a fire. K3SAA has a new NCX-5 and an NCL-2000; W3KWL a new NCX-5 and W3GIL bought a Globe King 500. KN3FDJ is unable to use his new station gear because he is hospitalized. His XYL is KN3ETY. W3KPJ put up a new six-element widespread beam. K3VBF moved to New York. K3ZHH finally received a QSL for his Cuban QSO on 6. How about your tickets, fellows? Have you checked the expiration date on them lately? K3NLL is with the U.S. Army in Korea. K3RQV uses an Eico 777 on 28 Mc. W3MIW put up a new vertical Minibeam. Ex-W3UHJ is now W4YIM in Florida. K3SIX serves with U.S. Air Force and K3ZCO with the Army. K3RLB purchased a Heath Marauder. New appointment: K3ZOB as EC Crawford Co. Endorsements: K3ZGI as OBS/OPS. Traffic: (Apr.) W3KUN 212, W3LOS 109, W3SMV 90, WA3AKB 87, W3BLZ 78, K3SOH 78, W3AUD 70, WA3AKH 62, K3PYS 52, K3EXE 49, K3KMO 41, W2GJY 40, W3OEO 18, W3KQD 14, K3SMB 14, WA3BGE 13, WA3EPQ 11, K3EDO 10, K3FNG 4, W3KNQ 3, WA3DGI 1. (Mar.) K3KMO 18, K3TEZ 5.

CENTRAL DIVISION

ILLINOIS—SCM, Edmond A. Metzger, W9PRN—Asst. SCM: George J. Nesbed, W9LQF. SEC: W9RYU. RM: W9EVJ. PAMs: W9VWJ, WA9CCP and W9KLB (v.h.f.) EC of Cook County: W9HPG. Net reports:

Net	*Freq.*	*Times*	*Days*	*Traffic*
IEN	3940	1400Z	Sun.	No Report
ILN	3760	0000Z	Daily	262
NCPN	3915	1300Z	Mon.-Sat.	
NCPN	3915	1800Z	Mon.-Sat.	
Ill. PON	3925	1700	Mon.-Fri.	434
Ill. PON	50.28	2000	M & Thurs.	12
Ill. PON	145.5	2000	M-W-F	44

W9WYB, W9GFF, W9NPC, K9RAS, K9WMP, K9VVL, W9HPG, W9JUV/K9OSO, W9ING, K9QED, W9ZQT, K9WEH, W9TGN, W9VOX, K9QKB, WN9QXT, W9REC, W9DGV, WA9EHE, W9JJN, WA9JAV, WA9JXT, W9KEZ and W9DVJ participated in ARRL's recent Frequency Measuring Test. The mother of K9TVA and XYL of W9ACE was a recent patient at the Mayo Clinic. WA9AJF has a new car and an SR-160. WA9MRU is building a new linear. K9FTJ has been appointed Asst. EC for Douglas County. A very successful Annual Midwest YL Convention was held May 13, 14 and 15 at the Flying Carpet Motor Inn with the Chicago LARKS as the hostess club. W9HPG and W9PRN were speakers at the event. W9BOI, WA9MQY, WA9FGP, W9NWK and W9SRX were elected officers of the Wheaton Community Radio Amateurs. K9QPJ is vacationing in Europe and visiting ham friends there. W9QLZ reports that the Starved Rock Annual Hamfest was very successful and had the largest attendance in its history. W9EVJ, the Illinois section RM, invites check-ins on the ILN nightly. W9EDY reports that the Ill PON on 3545 kc. will be discontinued for the summer and will resume again in the fall. The Jacksonville Area Amateur Radio Club will hold its 2nd Annual Hamfest Sun., July 10, 1966. This column is written on the 3rd of the month because of your writer's attendance at the ARRL Board of Directors' meeting at Newington. Reports that were not received will be published in next month's column. K9KZB, WA9CCP and WA9CNV are the BPL recipients for the month. Traffic: (Apr.) K9KZB 701, WA9CCP 645, WA9CNV 558, W9EVJ 445, K4OJY/9 211, W9DOQ 112, WA9GUM 111, W9EET 100, W9CGC 75, W9JXU 70, W9HOT 58, K9BTE 57, K9WMP 56, W9NXG 54, K9AVQ 43, W9ELL 42, K9RAS 38, K9RFU 37, W9HPG 24, W9IDY 18, W9HJM 11, WA9MRU 11, W9UHD 11, WA9AJF 10, W9PRN 10, W9SKR 10, WA9GUS 9, W9LNQ 8, K9HSK 7, W9MSD 6, W9DUA 3, K9DQU 1. (Mar.) WA9CNV 220. (Feb.) W9FVJ 253.

INDIANA—SCM, M. Roberta Kroulik, K9IVG—Asst. SCM: Ernest Nichols, W9YYX. SEC: K9WET.

Net	*Freq.*	*Time*	*Apr. Tfc.*	*Mgr.*
IFN	3910	1330Z daily, 2300Z M-F	276	K9IVG
ISN	3910	0000Z daily, 2130Z M-S	523	K9CRS
QIN	3656	0000Z daily	186	WA9BWY

W9QWI, of Hoosier v.h.f. nets, reports Apr. traffic of 103. K9EFY, mgr. of PON, reports Apr. traffic of 47. RFN mgrs. report Apr. traffic of 93. QIN Honor Roll: K9HYV 28, K9VHY 28, W9QLW 27, WA9IQV 24, W9RGB 21, W9ZYK 20, W9HRY 19, WA9FDQ 19, WA9BWY 17, K9WWJ 15, W9QLW, RM of 9RN, reports that Indiana was represented 100% in Apr. Congratulations to W9DNQ, who received the Amateur of the Year award at the Dayton Hamvention. The Tri-State ARC is sponsoring a project to raise money for a public address system for the Evansville Assn. for the Blind. Cary Hall is the only residence hall on the Purdue Campus having its own amateur station, W9CLY. Aug. 28 is the date of the Evansville Hamfest. W9TVV is building an s.s.b. rig. Congratulations to WA9NGO, WA9AOS, WA9IPS and WA9PIV on receiving their General Class ticket; the same goes to WN9RYG for the Novice ticket. Welcome to W9IWJ, new in Kokomo. WA9ITB is now a member of the A-1 Operator Club. RFN will be known as the Ind. Weather Net from now on. New equipment is being enjoyed by W9DUD, K9DIU AND K9FZX (s.s.b. of course). New at W9CLY: A Novice rig and an electronic keyer. *Amateur radio exists because of the service it renders.* Traffic: K9IVG 965, W9JOZ 927, W9QLW 309, WA9BWY 306, W9ZYK 181, W9RGB 133, W9HRY 119, WA9LGQ 93, WA9CJR 86, WA9IZR 79, W9HRB 78, WA9NDN 73, W9SNQ 65, K9ZLB 62, K9CRS 61, WA9BWT 60, K9RWQ 59, W9MM 50, K9VHY 45, W9RTH 39, K9EFY 38, K9GLL 31, WA9LUG 30, W9BUQ 27, K9BSL 27, W9DZC 23, K9FHQ 23, K9KTL 23, W9CC 22, WA9JHH 22, W9DGA 20, W9FWH 20, WA9NGN 19, W9YYX 19, WA9CHY 18, K9GBR 18, K9FUJ 17, WA9CFW 15, WA9OYI 15, WA9BGI 14, K9ILK 13, K9DHN 11, W9PMT 11, W9BDP 10, WA9GJZ 9, K9QVT 9, WA9BHG 8,W9GFS 8, W9BZI 7, WA9GKF 7, WA9BNX 6, WA9JWL 6, W9JPX 5, WA9ABI 2, W9JSV 2.

WISCONSIN—SCM, Kenneth A. Ebneter, K9GSC—SEC: K9SPP. PAMs: K9IMR, K9HJS, W9NRP. RM: Still looking.

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*	*Mgr.*
BEN	3985 kc.	1200Z	Mon.-Sat.	25	210	42	W9NRP
BEN	3985 kc.	1700Z	Daily	30	533	72	K9HJS
WSBN	3985 kc.	2215Z	Daily	30	1116	335	K9IMR
WIN	3662 kc.	0015Z	Daily	30	400	95	W9KQB
SWRN	50.4 Mc.	0200Z	Mon.-Sat.	24	324	11	W9CIU

Net certificates went to WA9NDV for WSBN and WA9QKP for BEN. New appointees: WA9NPB and W9GOC as ORSs, WA9MIO as OPS, K9JVP as OO. Renewed appointments: W9ONI, W9CFS and K9UTN as ECs; W9NRP and K9HJS as PAMs; W9WJH and W9YT as ORSs; K9IMR as OPS; W9RKP as OO; K9HJS as OBS. The WNA Picnic will be held July 10 at Stevens Point. W9VSO led the OOs with 25 notices sent. WA9GJU made the BPL in April. W9BRV is mobile with a homebrew transceiver. The Fond Du Lac ARC Club house caught fire and is being rebuilt. WA9MER and WA9NPB were selected to attend Badger Boys State. WA9OMO is looking for more participation in the net on 21.15 Mc. at 1130 CDT Sat. mornings. W9ZAD and K9ZPP appeared on a local TV station. WA9EZU passed the General Class exam. FMT results: W9BCY 2, W9KCR 13.5, K9DWS 27.4, W9RKP 27.6, W9DJE 76.6, WA1BWF/9 121.1, K9VSY 193.7, K9GDF 196.1 p.p.m. error. The Milwaukee AREC assisted with the Made in Milwaukee Parade. Traffic: (Apr.) WA9MIO 219, W9CXY 211, W9DYG 177, WA9GJU 153, WA9NPB 138, K9IMR 133, W9KQB 65, WA9LWJ 57, W9SUF 56, W9NRP 47, K9GSC 30, W9MWQ 30, WA9NFG 30, WA9NDV 28, W9AYK 27, W9HQT 24, W9GOC 22, K9QKU 22, K9RCK 20, W9YT 20, W9APB 15, K9DJY 15, K9HWQ 13, WA91VH 12, WA9QKP 12, W9KBT 11, K9DBR 10, W9HPC 10,

K9FHI 9, W9IRZ 7, WA9GJH 6, K9REC 4, W9GGN 3, W9RTP 3. (Mar.) W9IFS 102, W9GOC 28.

DAKOTA DIVISION

MINNESOTA—SCM, Herman R. Kopischke, Jr., WØTCK—SEC: WAØBZG. RMs: WØISJ, WAØEPX. PAMs: KØQBI, WAØJKT, WØHEN, WAØDWM. MSN meets daily on 3595 KHz at 0030Z. MJN meets M-S on 3595 KHz at 0100Z. Noon MSPN meets M-S on 3820 KHz at 1805Z and Sun. at 1500Z. Evening MSPN meets daily on 3820 KHz at 2300Z. MSTN meets M-F on 50.4 MHz and Sat. at 0200Z. Minn. Co. Hunters Wx Net meets Sat. on 3820 KHz at 1500Z. The Post Office Net meets Sun. on 3812 KHz at 1830Z. Remember that during DST all nets meet the same local time but one hour earlier by GMT. WØAZR was appointed EC for Mower Co. WAØLVG is a new OPS. KØHKA and WØFFX renewed their EC appointments and WØUMX his OPS. Don't forget to participate in the first Annual Minn. QSO Party to be held from 0001 to 2400 GMT July 17. Thanks to WAØKQU and WAØIIJ for reactivating this annual party. Picnic dates coming up are the Golden Shovel at Gunn Park near Grand Rapids, July 10; Piconet at Lake City, July 17; Mankato at the Blue Earth Co. Fair Grounds in Garden City, July 31; Minneapolis Radio Club at Lake Nakomis, Aug. 7 and St. Cloud at Wilson Park Aug. 14. WAØCQG plans to send Bulletins on v.h.f. RTTY. WAØKFJ has a new MT-1 and MR-1 for c.w. work. WAØLMK went to a pair of 4-400s in his linear. LeRoy also has gone mobile with a Swan 350 and Band Spanner antenna. KØJFV went mobile with an Eico 753. WAØIDB stacked a pair of DB62 beams 75 feet up and WØTZB put up a GPG6 5/8-wave ground plane. KØICG is mobiling on 6. WAØJKT made the BPL. Traffic: (Apr.) WAØBWH 404, WAØJKT 389, WAØKQU 242, WAØEPX 141, WAØIAW 132, WAØILX 102, WAØLOB 82, KØPIZ 76, WØTCK 54, KØQBI 50, WAØKFJ 48, WØGRW 43, WAØFUR 35, WAØDOT 29, WØISJ 27, WAØLVG 27, WØHEN 24, WAØLUT 18, KØZRD 18, KØFLT 16, WAØMMV 16, WAØDFT 14, WAØLOH 14, KØSRK 14, WAØEDN 13, WAØLCF 13, KØICG 12, KØHJC 11, WØUMX 11, WØFHO 10, WAØIIJ 10, WAØIUJ 10, WAØJPR 10, KØLWK 10, KØSXQ 10, WAØLVK 7, WAØLLX 6, WØSZJ 6, KØIGZ 5, KØFKU 5, WØKLG 4, WØFKC 3, WØHRM 2, WAØLMK 1, WNØOIO 1. (Mar.) WØISJ 35, WAØFUR 22, WAØIKP 14, WØSZJ 7, KØHJC 6, WAØKWO 3.

MINNESOTA QSO PARTY

July 17, 1966

All amateurs are cordially invited to participate in the first annual Minnesota QSO Party.

Rules: 1) Contacts are to be made during the period of 0001 GMT to 2400 GMT July 17, no time limit. 2) All bands and modes and the same station may be worked on different bands for extra points. 3) General call of "CQ Minnesota" and Minn. c.w. stations will sign a "de Minn" after their call. On phone use "Minn. calling." 4) Exchange number, RS(T) and County for Minn. stations; state, province or country for all others. 5) One point per QSO, multiplied by the number of states, provinces or countries for Minn. stations. Out of state stations will use the number of different Minnesota counties worked as a multiplier. 6) Frequencies: phone, 1820 3820 7220 14220 21320 28820; c.w.; 3595 7095 21095 and 28095, plus or minus 15 kc. 7) Awards to each Minn. county winner and to the top two stations in each state. 8) Logs with date, time, band, mode and location of call of station worked (with claimed score) to be mailed with SASE no later than Aug. 15, 1966 to Roland Dohmen, WAØKQU, 208 E. Main. St., New Prague, Minn. 56071.

NORTH DAKOTA—SCM, Harold L. Sheets, WØDM—SEC: WAØAYL. WØPQW has resigned as Radio Officer of RACES for North Dakota and KØSPH will replace him. Congratulations, Mac, and thanks, Paul, for a job well done. The flood waters of the Red River have gone down and left in its wake a fine group of 2-meter enthusiasts in Greater Grand Forks. Two meters was used almost exclusively in the flood emergency work which lasted for three weeks. The Turtle River Radio Club of the Grand Forks Air Base held a four-day QSO Party to let the world know that there was a North Dakota station to be had for the elusive 50th state. 325 contacts were made, much to the joy of many in the United States and far-off places. KØZZK, pres.; W2YTO/Ø, vice-pres.; WAØKRT, secy.-treas.; W1ZIP/Ø, activities; W5GHY/Ø, WØJBC, WAØHRP and K7LAY/Ø kept the stations on the air for this event. The club extended an invitation to the Forx Radio Club to attend its meeting and auction. The NDSU Radio Club also staged a QSO Party in May. WØDM finally got the 40-meter vertical in operation so will be active on that band. He recently became a member of The Old Timer's Club, which requires a minimum of forty years of station operation. Traffic: WAØKSB 121, KØITP 50, WØDM 8.

SOUTH DAKOTA—SCM, Seward P. Holt, KØTXW—SEC: WØSCT. KØLKH will be operating portable from Ames, Iowa, until Sept. 1 on 75 meters. WAØDEM reports April QNI on the S.S.B. Net of 1223, total QTC of 347. New calls include WAØMYH, WAØNHJ and WAØNHK, of Huron, and WAØONL, of Centerville. WØIGG has returned to the University of Minnesota Hospital for further surgery. The morning net has taken over on 3870 kc. at 0800 CST until the Weather Net resumes operation in the fall. Be sure to get your order placed with the Mitchell ARC for the new South Dakota directory. Traffic: KØGSY 455, WØZWL 394, KØVYY 95, WØSCT 89, WAØLYO 72, WAØLLG 47, KØAIE 30, WAØBZD 17, KØYGZ 11, WØDIY 4, KØKOY 4, WAØDNG 3, WØRWM 2, KØLKH 1.

DELTA DIVISION

ARKANSAS—SCM, Don W. Whitney, K5GKN—The sympathy of all Arkansas hams is extended to the family of Lt. Cmdr. U.S. Navy retired, William L. W. Webster, W5CAC, of Lake Hamilton, Ark. Bill joined Silent Keys Fri. Apr. 29. Summertime has arrived in the Arkansas section and activity has slowed considerably. I am receiving numerous reports from a few "brave hearted" that DX on 10-15-20 meters is "good" and getting better.

Net	*Freq.*	*Time*	*Day*	*Sess.*	*QTC*	*QNI*	*Time*
RN	3815 kc.	0001Z	Daily	30	58	648	597 min.
AFN	3885 kc.	1200Z	Mon.-Sat.	26	36	1,042	1,766 min.
OZK	3790 kc.	0100Z	Daily	?	?	?	?
APON	3825 kc.	2130Z	Mon.-Fri.	21	113	351	630 min.

Traffic: W5OBD 566, W5NND 246, K5ABE 35, K5VBF 16, WA5KUD 5, K5GKN 4.

LOUISIANA—SCM, J. Allen Swanson, Jr., W5PM—SEC: K5KQG. RM: W5CEZ. V.H.F. PAM: W5UQR.

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QTC*	*QNI*	*Mgr.*
LAN	3615 kc.	2330Z	Daily	30	122	10	WA5FNB
Delta 75	3900	1230Z	Sun				WA5EVU

The BRARC Hamfest was bigger than ever. It was nice to meet K5OKR after two years of net operations. WA5FNB pleads for more traffic on LAN. W5MXQ has emergency equipment ready to go with the throw of a switch. WA5OVX is having a ball on 20 and 15 and is now an OPS. W5FMO, her OM, is not heard on 75 as often as before. K5KQG has designated the Delta 75 as Phone AREC Training Net. K5EYP has moved to Lafayette. W5KC handled emergency traffic after the Jackson, Miss., tornadoes in March. K5WOD reports three members of the SHRC have taken their Novice exam. W5MBC has a new t.r. switch and a new Matchbox. W5JYA is interested in contacting a 2-meter station in Jonesboro. W5GHP has completed a 2-meter converter. WA5JOL is using RN5, CAN and PAN to obtain a very nice monthly total. WN5PDN, W5CEZ's son, is now on the air. W5CEZ will operate from Camp Edgewood as W5QEG for seven weeks helping out the Boy Scouts. WA5DES has changed his OBS service to 0000Z Mon., Wed. and Fri., 7110 kc. WN5NYY is now General Class. WA5JVL is now an OPS. W5BBV reports the Rapides Parish Emergency Net is growing weekly. W5LDH, our Director, held a meeting of League Officials and club presidents at the Baton Rouge Hamfest prior to the Annual ARRL Meeting. W4WHN also spoke a few words of wisdom to the gathering. W5BUK has recovered from two surgical operations within the last eight months. W5CZ, licensed in 1919, won the prize for the longest licensed amateur in the State at BR. Traffic: W5GHP 554, WA5JOL 318, W5PM 67, WA5DES 55, W5MXQ 55, K5OKR 54, WA5FNB 37, W5CEZ 36, W5MBC 33, W5KC 19, WA5OVX 18, K5KQG 13, W5JYA 3.

MISSISSIPPI—SCM, S. H. Hairston, W5EMM—SEC: W5JDF. It was gratifying to see W5VRH, K5SYG, W5IHP, WA5CAC, W5OYH, W5EPT, K5MDX and others at Baton Rouge. The 6-Meter AREC net is working beautifully all across the Gulf Coast now. K5TYP, at Kessler, is doing a fine job. W5CUU is really doing a job on 20 meters for the boys down in Antarctica. Meridian

is proud of new amateurs WA5NLO, WA5MKG and WA5MKH. Other new calls in the state are WN5PDU, Laurel; WA5PEU, Biloxi; WN5PFQ, Pascagoula, and WA5PHD, Jackson. W4MRV/5 is back in Mississippi and on 15 meters. W4SJP/5 has formed a club at the vocational school. W5BW has built a beautiful new keyer. W5OKQ is a stalwart on both amateur and MARS frequencies. W5SPX, after some health problems, is back on 75. WA5EZQ is living near Picayune. W5JDF moved from Aberdeen to Columbia. W5RWV is on with a big linear. W5EPT, W5PPI, W5IZS, K5GEI and others are doing a big job with RACES.

TENNESSEE—SCM, William A. Scott, W4UVP—SEC: K4RCT RM: K4UWH. PAMs: WA4GQM, WA4-EWW, W4PFP.

Net	*Freq.*	*Days*	*Time*	*Sess.*	*QNI*	*QTC*
TN	3635 kc.	Daily	0100Z 0230Z	60	418	225
TPN	3980 kc.	M-S Sun.	1245Z 1400	31	1102	340
TSSB	3980 kc.	T-Sun.	0030Z	26	1263	222
ETPN	3980 kc.	M-F	1140Z	21	438	100

W4MXF has resigned as RM after finding rig trouble discouraging over a period of time. Our thanks to Wilson for over two years of active, loyal service. K4UWH has agreed to take over. All EC reports should be forwarded to K4RCT, our new SEC, who is found on TSSB and TPN. AREC application in areas with no EC should be forwarded to Harry as well as EC applications. WA4-YDU deserves the thanks of 4th district DXers for supplying the Bureau with an air conditioner. Don't forget the 5"x9" SASE envelope to the Bureau. Congrats to W4WBK on becoming qualified as Class II OO. WA4-HGN, new in New Johnsonville, wants 2-meter s.s.b. skeds. The Knox County Six-Meter Net again is active with WA4NUJ looking for QNI. Traffic: W4FX 409, W4OGG 306, WA4YDT 305, W4PQP 164, K4SXD 139, W4RUW 115, W4SQE 115, WA4UCE 109, K4UWH 107, W4IDY 105, W4UVP 99, WA4EWW 96, WA4IBZ 65, WA NUJ 64, WA1AFP/4 62, W4WBK 62, K4RCT 56, W4CXY 49, W4TZJ 28, W4PFP 27, WA4BNL 23, K4UMW 23, W4TZB 21, K4WWQ 21, W4MXF 19, WA4GQM 18, WA4-HGN 15, WA4GLS 12, W4VTS 9, WA4CGK 7, WA4GOL 7, W4LLJ 6, W4TYV 6, WA4YEM 5.

GREAT LAKES DIVISION

KENTUCKY—SCM, Lawrence F. Jeffrey, WA4KFO—SEC: K4URX. Appointments, WB4AIN and W4OYI as ORSs; WA4TPB as OBS. Endorsements, K4LOA and K4WMV as OPSs, W4GSH and W4ISF as OESs, W4-CMP and W4RHZ as OOs.

Net	*Freq.*	*Days*	*EST*	*Sess.*	*QNI*	*QTC*	*Mgr.*
EMKPN	3960	M-F	0630	21	406	72	W4BEJ
MKPN	3960	Daily	0830	30	352	88	WA4KFO
KTN	3960	Daily	1900	30	1007	545	K4YZU
KYN/K8N	3600	Daily	1900/1700	69	620	485	W4BAZ
KPON	3545	Sat.	1300	5	130	110	WA4AVV

Our Director, W8UPB, held a meeting of ARRL appointees in Louisville Apr. 23 with 22 in attendance. WA4-GHQ says Lexington 6-Meter Emergency Net activity is picking up. W4JUI is building new frequency measuring equipment. Those active in the FMT are W4JUI, W4CMP, W4RHZ, K4IAA and K4IFA. K4FPW is putting up a new 6-meter beam and a new rotator. WA4-WWT reports into 7 nets. W4WNH still is active with MS skeds. WN4CYZ is a new Novice in Fleming County. WA4UMR is on with a new Johnson rig. Lots of Viet Nam traffic generated in Louisville with KRC working with the RACES group. The DuPont Manual RC also has a program going to originate traffic. WA4HJM and WA3DKJ/4 are to be congratulated on a fine job of handling traffic for Ft. Knox servicemen. WA4TJS has a new tower and is putting up a new antenna system. Don't forget the Henderson and Louisville doings. Traffic: WA4TPB 522, WA4WWT 514, WA4AGH 351, WA4-HJM 330, WA3DKJ/4 305, W4BAZ 205, WA4KFO 153, K4YZU 141, WA4DYL 134, WA4UAZ 101, W4ISF 92, K4-DZM 84, WA4VCN 77, WA4YDO 61, WB4AIN 60, WA4-IBG 60, WA4GMA 50.W4CDA 48, WA4ZIF 37, WA4-DXA/4 33, WA4TJS 30, W4OYI 27, W4KJP 25, W4RHZ 17, W4BTA 16, K4LOA 16, WA4WQZ 16, WA4BZS 15, K4HOE 15, WA4GHQ 13, W4NBZ 13, WA4ZIR 11, K4-FPW 7, WA4UMR 3.

MICHIGAN—SCM, Ralph P. Thetreau, W8FX—SEC: K8GOU. RMs: W8ELW, K8QKY, W8EU, K8-KMQ. PAMs: W8CQU, K8LQA, K8JED, V.H.F. PAMs: W8CVQ, W8YAN. Appointments: W8EST, K8HPO, WA8LRB as ECs; K8HLR, K8YEK as OOs; WA8PIM, WA8KME, W8UUS as OBSs; WA8CTC, WA8GRI as OESs; W8CQU, K8GOU, W8IWF, K8LQA, W8QPO, W8YAN as OPSs; K8HLR, WA8ROJ, W8YAN as ORSs; K8KMQ and K8LNE made the BPL again. New officers: Stu Rockafellow ARC (Plymouth)—K8SKZ, pres.; WA8MJT, vice-pres.; K8TEI, secy.; WN8QCV, treas. Kincheloe ARC—WA8MNF, pres.; K1DEU/8, vice-pres.; WA8FSS, secy.; WA0FDJ/8, treas. The Detroit ARA has sent in its second hundred bucks to the ARRL building Fund. How's your club doing? Kincheloe painted its clubhouse, and found a cracked lightning arrester had caused the high noise level. W8CJW retired Apr. 1 ('no foolin'). W8FLW has a new KWM-2. The U P Hamfest will be held Aug. 7 at Marquette. C U there. Michigan AREC Net is operating again Thurs. at 0145 on 3935. Hear about the four stations in Detroit area bragging they were running from 5 to 10 kw!? Calhoun ARC now meets in Newtown #2 school. WA8ROJ is building a 4-250A kw. final. W8SWF converted his NCX-5 to a Mark II. Living on the same side of the same street in the same block are W8OIY, K8YCP, WA8IKP, WN8SYZ has a fine new leader. W8GJH retired. The Saginaw local net frequency is 52.525-Mc. f.m. W8HRL has a new TR-4, operating mobile c.w. WA8SGW sports a completely home-built station, a la ARRL *Handbook*, including a receiver. K8GHS now has an NCX-3 and K8TEI a Heath keyer. K8UDZ is active on 160 mobile, all home built. W8NIT found that a transistorized v.f.o. still has a drift problem. K8SME came home from Saginaw with a new TR-160 transceiver. K8PWA says converting a HW-32 to a tri-bander is for the birds. Silent Keys: K8KJZ and W8MRO. Traffic reports are due here on the fifth, not later. Traffic: (Apr.) K8KMQ 636, K8LNE 508, K8QKY 290, WA8BQK 177, K8NJW 171, WA8MQT 148, K2SIL/8 145, WA8PIM 123, K8GOU 96, WA8IML 88, W8ELW 85, W8EU 83, K8ZJU 79, WA8-OEE 70, W8UFS 65, WA8KME 60, WA8OGR 60, W8-EJR 56, WA8MGM 52, W8CQB 50, K8BYX 49, K8HLR 49, WA8CUP 45, W8RTN 45, W8IWF 44, W8IUC 40, K8VDA 40, W8FX 38, WA8LRC 36, W8BEZ 29, W8MPD 26, WA8ROJ 26, WA8HGE 20, W8FWQ 18, K8JED 18, W8SWF 16, W8IBB 12, K8KBN 12, W8WVL 11, WA8GRI 10, W8ZHB 10, W8TBP 9, W8AUD 8, W8DSE 7, K8AQA 4, K8QLL 3, WA8LXY 2, W8WNX 2. (Mar.) K8NJW 191, WA8IML 53, W8IBB 28, WA8PII 26, W8UM 7.

OHIO—SCM, Wilson E. Weckel, W8AL—Asst. SCM: J. C. Erickson, W8DAE. SEC: W8HNP. RMs: W8BZX, W8DAE, K8LGB. PAMs: W8VZ, K8UBK. K8EJN received his WAC and WAVE awards.

BN	3580 kc.	2400Z	30 sess.	QTC	311	10.4%
OSSB	3972.5	1530 & 2345	56		858	15

Great Lakes Director W8UPB, SEC W8HNP and your SCM attended the Dayton Hamvention. Greater Cincinnati ARA's *The Mike and Key* tells us the club held an antenna clinic under the direction of W8PZX, under WA8HBX the club is helping the blind students and had a picture of K3YZN/8 seated in his shack. Eleven took the Novice Class exams conducted by K8LFA, according to Mt. Vernon ARC's *K8EEN Newsletter*. Columbus ARA's *Carascope* informs us the club toured the OSU laboratory conducted by K8SCM. WA8BND received the Faulkner scholarship in journalism. WA8FSX received the A-1 Operator certificate and W8LVZ joined the Silent Keys. Mr. R. J. Brandt, formerly of R. L. Drake Co., spoke to the Massillon ARC. Kettering ARC heard a talk by an Ohio Bell employee on Amazing Laser. Miamisburg Wireless Association's *The Spectrum* relates that the club heard talks on Navy MARS by K8RCC and WA8COA and K8ZQQ has a new SB-300. Toledo's *Ham Shack Gossip* celebrated the 50th year in amateur radio for W8DN, WN8SYD and WN8SYF are new Novices, WA8TCF and WA8TCH are new Technicians, K8LFG has a new baby girl, Toledo RC's 1966 officers are K8RZT, pres.; K8KYB, vice-pres.; WA8-GEL, rec. secy.; K8DTL, corr. secy.; K8GOP, treas. Pioneer employees have organized the Pioneer ARC with W8NJF pres.; W8SML, vice-pres.; W8DKI, secy.-treas.; W8TTA, trustee; WA8SWC, club station. The Cleveland 50-Mc. DX Club's 1966 officers are WA8LJJ, pres.; K8-TOL, vice-pres.; WA8IZC, treas.; K8MIMM, secy. Springfield ARC's *The Q-5er* tells us W8LAB, WA8AEY and WA8LXZ were hospitalized and WA8AEY has a new tower and tri-band beam put up by W8HQX, W8OG, K8IIS, K8MUZ. WA8FZS and WA8HVK. WA8-KLH is operating mobile on 160 meters. Canton ARC's *Feedline* says W8QMH was in the hospital, code and theory classes were started with 29. Ohio placed first in the nation along with Alabama, in the last SET. WA8QXD joined the Silent Keys. Inter-City RC's *IRC News Bulletin* informs us the club visited the new Planetarium, W8DVM was in the hospital and 33 enrolled in the code and theory classes. Southeast ARC's *Ham-Fax* names its 1966 officers as K8TOL, pres.; K8AXC, vice-pres.; K8SVN, treas. and editor; WA8AHU, corr. secy.; W8TGX rec., secy.; K8AYT, K8SQC, K8TSI, WA8OBY, directors. Parma RC's *P.R.C. Bulletin* states

the club had a demonstration on the use of frequency measuring equipment by K8SLF. Westpark Radiops' *The Radiops Log* says WA8PJA spoke on the city tower legislation and W8IMF spoke on SCR devices. New appointees: W8QMT as OO, WA8JXM as ORS, WA8OWQ as OES. W8WEG says W8DDG has a TR-4, WA8HCK has a new Invader and the Lima Area ARC started a 10-meter emergency net. WA8RXU says WA8OSD received his General Class license, WA8PCH has a new TA-36 beam, K8AXU would like to sked contacts on 220 and 432 Mc., Marietta ARC has a new 10-kw. generator and a BC-610, the Washington County Emergency Net meets every Sun. at noon on 3825 kc. The *Scuttlebutt of Ohio Navmars* tells us K8UFU moved to Kansas City and K8YSK has a new baby girl. K8YSO made the BPL. K8BXT says WA8PTA has a new Swan 350 and an SX-117. W8KJE has a new SB-100. K8JLK put up a quad, WN8TJL is a new Novice with an Adventurer and an NC-300, W8TTQ is in Viet Nam and K8CTQ is in Japan. Queen City Emergency Net's *The Listening Post* reports that W8VXR is in the hospital after being hit by an auto. Traffic: (Apr.) K8YSO 505, W8UPH 479, W8RYP 341, W8CHT 204, WA8CFJ 200, WA8PMN 196, W8DAE 165, WA8FSX 164, WA8BUW 136, W8FSM 131, W8DQD 127, WA8JXM 108, K8LGA 105, WA8AUZ 96, W8HZX 83, K8UBK 79, W8QCU 78, WA8CXY 75, K8-BYR 67, WA8BTE 59, WA8HTR 52, K8EZJ 44, WA8LAM 43, K8YDR 43, WA8FKD 41, W8IFC 37, W8OE 34, W8-WEG 31, W8HII 30, W8PVS 28, W8TV 24, W8QZK 23, W8LAG 21, W8LRK 21, W8LZE 19, WA8MHO 18, W8-FGD 16, K8BNL 12, W8ETO 12, WA8OVC 12, K8LGB 11, K8PVX 10, WA8BNX 9, K8DDG 7, WA8KPN 7, K8-QOJ 6, WA8RWK 6, W8EWP 2, WA8POE 1. (Mar.) W8LT 32, WA8AJZ 13.

HUDSON DIVISION

EASTERN NEW YORK—SCM, George W. Tracy, W2EFU—SEC: W2KGC, RM: WA2VYS, PAM: W2IJG. Section nets: NYS on 3670 k.c. nightly at 2400 GMT; NYSPTEN on 3925 kc. nightly at 2300 GMT; ESS on 3590 kc. nightly at 2300 GMT. Appointments: K2SJN and WA2QEG as ORSs; W2MEK as EC. Endorsement: W2-URP as OO. Schenectady is sorry to lose OO K2IOW, who has moved to Burlington, Vt. W2MEK is the new OO for Schenectady. Congrats. AREC groups in Poughkeepsie, Schenectady and N.Y.C. will handle the Albany to N.Y.C. Boat Race again this year. In White Plains, the Westchester Club heard W2KFB speak on spectrum analysis in s.s.b. A meeting was held at a new location, the Chase Manhattan Bank Building, April was auction time at the Albany Club with K2OTQ as auctioneer. W2-SSK and WB2BZE were named co-chairmen for Field Day. The New Rochelle Club had a guest speaker provided by Navy MARS. Congratulations to K2YRZ, whose engagement was announced in New Rochelle. At Schenectady, WA2SFP, W2MEK and W2ODC held a symposium on antennas attended by 135 members and guests. The ESS Net handled 222 messages in April and W2UC, WB2-JYW and WB2QKJ qualified for net certificates. WB2-TAG won a State Regents Scholarship. Congrats. Westchester County RACES is installing new S/Line equipment in its control center. WB2FVD has been accepted at RPI this fall. A new member of Navy MARS is WB2-NKN. If you have not seen the new *ARPSC Manual*, drop a card or message to ARRL for your copy. It's a fine publication. Traffic: WB2HZY 254, WB2NKN 150, K2SJN 83, WA2VYS 82, W2URP 63, WA2RTZ 24, W2UC 22, WA2JWL 17, K2HNW 13, WA2ZPD 13, W2ANV 10, W2BXP 10, K2ASA 8, WB2FVD 6, WB2FXB 6, WA2-DXB 5, WB2QYZ 4, W2PKY 2.

NEW YORK CITY AND LONG ISLAND—SCM, Blaine S. Johnson, K2IDB—Asst. SCM: Fred J. Brunjes, K2DGI. 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 Daily	WB2DXM	—PAM
NLS (Slo)	3630 kc.	1845 Nightly	WA2RUE	—RM

NYC-LI Nets: *See Dec. 1965 column for schedules.*

Many thanks to K2DGI for running the column last month. *Listen*—the Federation of L.I. Radio Clubs will hold its Annual Hamfest and Picnic at the Hempstead Town Park, Point Lookout, L.I., Sun., July 17, 1966. BPL certificates were awarded to WA2GPT, WA2RUE and WB2RRA for April traffic. WB2RBA picked up a BC-348Q and eyeballed WA2UWA, WB2EMJ, WB2FAJ, WB2-SLM and WB2SLI of the NYCLIPN, all for the first time. WB2SLH has reworked the 14AVS and hopes to snare some DX. WB2FAJ says he beat WB2DXM by 2 contacts in the C.W. CD Party so he's going to enter RPI (W2SZ) in the fall. Hey, new Nassau County police shield No. 338 is none other than WB2NGZ, who also has a new Gonset II! Congratulations to WN2SPV and WN2TCS who passed the exam for General. W2EW is sporting a new Drake R4A receiver which, by the way, reminds me. The 2-Meter Traffic Net can use more of you 2-meter guys in Nassau, Queens, Richmond and Suffolk. Long-haul liaison to the 2-Meter Net is currently supplied by WA2GPT of Mike Farad, WB2NGZ of NYSPTEN and W2WFL of NLI. Let's help these three fine stations! W2GKZ passed his Amateur Extra Class exam and has a new 18-HT which, phased with the old one, does lovely tricks on 80 and 40 meters. W2DBQ has a new T4X transmitter. W2PF has a new subharmonic with the birth of a daughter to his son, W2IVA. WB2-SEQ has the 20-meter inverted Vee up now. WB2UIV says he's staying on standard time because he belongs to a nut net! WA2QJU has a summer job at WRVR-FM. WB2VKQ has a 2-meter Cushcraft seven-element stacked at about 20 feet. K2KYS can't decide what antenna to play with the new Eico 720 and HQ-110AC combo. The Massapequa HSARC and Mid-County Net ARC have affiliated with ARRL. Mid-County now has the call WB2WGP. WA2VKK plans to operate portable at Ithaca College this fall. The Kings County Band Scanners has been formed by WA2HTA, WA2UCP, WB2CKR, WB2AOU, WB2AOV and WB2AOW. WA2JKX, pres. QRP Chapter I, reports the club will present an award to an outstanding amateur in the second call area in 1966. New officers of TARCOM: W2QNL, pres.; W2MUI, vice-pres.; W2GUG, treas.; WA2EXI, secy.; W2EAR, activities. Suffolk County ARC officers are K2OHK, pres.; K2-JKX, vice-pres.; WA2KKD, corr. secy.; K2LOT, rec. secy.; W2DID/W2OKK, treas. WB2FON telephone relayed messages from survivors of the cruise ship *Viking Princess*. WA2KSD picked up a complete station that had been dropped from an airplane for a fiver and it only took a quarter to put it back on the air! W2HAE finally worked Japan after 34 years of trying. We wish to thank those who hastily organized circuits to handle incoming traffic from the NNJ and SNJ PreSET; in particular, WA2RUE, WA2UWA, WB2DXM, WB2EMJ, WB2-RBA, WB2SLI and WB2SRN who maintained a traffic watch for some 6 hours. W2BEB says best wishes to all; he is one fellow who hasn't received QSLs for contacts other than those he made. Traffic: (Apr.) WA2GPT 662, WA2UWA 448, WA2RUE 429, WB2SLI 359, WB2DXM 332, K2UBG 288, WB2RBA 239, WB2SRN 155, W2EW 100, WB2SLH 95, WB2FAJ 86, WB2NGZ 73, WB2FTT 54, WN2TCS 47, WB2PTS 45, WB2QKJ 35, WB2EUH 33, W2GKZ 30, WA2LJS 28, W2DBQ 27, WB2RQF 27, WB2-SIZ 27, WB2TNY 18, W2EC 15, WA2FTS 14, WB2MBU 12, WB2BKS 9, WB2GKX 9, WA2DTY 8, W2PF 8, WB2-SEQ 8, WB2UIV 3, WB2EMJ 2, WA2QJU 1, WB2VKQ 1. (Mar.) WA2GPT 668, WA2RUE 236, WB2SLI 167. (Feb.) WA2GPT 692, WA2RUE 530.

NORTHERN NEW JERSEY—SCM, Edward F. Erickson, W2CVW—Asst. SCM: Louis J. Amoroso, W2LQP. SEC: K2ZFI

NJN	3695 kc.	7:00 P.M. Daily	WB2AEJ	RM
NJ Phone	3900 kc.	6:00 P.M. Ex.Sun.	W2PEV	PAM
NJ Phone	3900 kc.	9:00 A.M. Sun.	W2ZI	PAM
NJ Six	51150 kc.	11:00 P.M. M.W.Sat.	K2VNL	PAM
NJ Two	146700 kc.	10:00 P.M. Tu.Sat.	K2VNL	PAM

The New Jersey Traffic and Emergency Seminar was successful with an attendance of 32. The following NNJites were observed at the National Convention in Boston: W2VQR, WA2CCF, WA2NVG, K2VVE, WB2FIL; in addition, WB2AEJ and W2CVW, who enjoyed frappes at the local ice cream emporium. Congratulations to Frank Haas, South Orange, call not yet issued, on passing the General Class exam. WB2BXK is on 6 and 2 meters with a homebrew rig. W2QNL was elected president of the TARCOM Club. WB2FUW has a new 51OOB and 51SB. WA2CCF reports Amateur Radio Week in Englewood by Mayoralty Proclamation. K2ZFI reports the first traffic on 50,360 kc. at 7:45 P.M. AREC Net daily except Mon. WB2IYO has been DXing on 40 and 20 and is experimenting with a joystick antenna. WB2GFY is building a transmatch. W2JDH still has a noise problem. WB2VCP is working on TVI. W2ABL has a 14AVQ vertical antenna. W2CFB is installing a mobile unit and a gasoline generator. W2NIY is moving to Washington, D.C. Sorry to lose Andy from the section. K2LSX has curtailed his activities because of apartment QTH. The Central N.J. V.H.F. Society ran a trip to ARRL Hq. WA2ZOW rebuilt his 2-meter transmitter completely. K2-KDQ says he replaced his antenna rotor after the old one had a "heart attack." WB2HLH has built a GC1A general coverage receiver and says the XYL uses it for hillbilly music! WA2UDT entered the Air Force. WN2-THT now has a mobile power supply and can operate from either of two autos. WB2MXZ reports 2-meter DX reception during a meteor shower. K2RDX reports miniaturization as the latest accomplishment with the varactor frequency multiplier. WA2OOD built a 6-meter

THE LF-10 preselector for the HRO-500 is an accessory designed to provide maximum performance between 5 KHz and 500 KHz (yes, we too have decided to use "Hertzes"). As you know, the basic HRO-500 will tune the 5 KHz-500 KHz range without modification, simply by connecting an antenna to the VLF input on the rear apron of the receiver — thereby bypassing the HF tuned circuits and inserting signal directly into the first mixer. However, without RF amplification and selectivity, sensitivity varies between 25 and 200 uv for 10 db S/N and spurious signal rejection is relatively poor. A low pass filter (such as described by Bill Scherer in *CQ* a few months ago) will substantially reduce BC band spurious signals, and we understand, has proven to be remarkably effective for ordinary listening in the VLF range if a long (200–400 feet) wire antenna is available.

FOR more critical applications, however, where the maximum in low frequency sensitivity and spurious signal rejection is required, the LF-10 preselector is recommended — particularly when a long wire antenna is not feasible. The LF-10 is a fairly sophisticated device packaged in a 3½" high cabinet with the same depth and width as the HRO — so that in use, the receiver sits on top of the LF-10. Styling, control layout, and control location match the HRO-500. Also, rack mounting flanges with handles are supplied with the LF-10 for use in mounting the unit with a rack-mounted HRO.

THE LF-10 contains an active solid state front end for the 5 KHz-500 KHz frequency range with *Bandswitch* (the LF range is covered in four bands), *Signal Peak*, and *Antenna Match* controls. The latter is necessary because of the extremely wide range of antenna impedances encountered at low frequencies — where a half wave is *miles* long. Antenna switching circuits are provided to permit use of one antenna for both HF and LF operation or separate antennas if available. Antenna selection is performed automatically when the LF-10 is in use.

NOMINAL CW sensitivity in the LF range achieved with the LF-10 is better than 1.0 uv for 10 db S/N, and spurious and image responses are better than 70 db down!

TWO other LF-10 features (which operate in the HF range as well) are a built-in 3" monitoring loudspeaker with its own separate audio amplifier, and an audio filter channel which will accept standard off-the-shelf sharp audio filters.

THE monitoring channel and loudspeaker may be used for independent monitoring of an audio line being fed by the receiver, or if desired, as a separate loudspeaker for general operation. The filter channel permits installation of audio filters of any desired frequency and bandwidth, and also incorporates its own separate level control. As a result of the latter, filtered output may be mixed, if desired, with unfiltered output to provide any desired degree of audio selectivity.

THE extraordinary performance of the HRO-500/LF-10 combination has resulted in its use on the low frequencies in areas previously reserved for specialized LF-only units without the performance and operating convenience of the HRO — not to mention its versatility as a combination HF/LF receiver.

WHILE you may find the combination of a low pass filter and long wire antenna will give you all the performance you need for casual SWL'ing down to 5 KHz, the addition of the $309.50 LF-10 to the HRO-500 should be carefully considered if your application is more demanding. The new six-page HRO-500 data sheet describes it in detail. We'll be happy to send you a copy.

MIKE FERBER, W1GKX

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transmitter from the *Handbook* in order to operate MARS. WB2QMP is a regular member of the NJ 6&2 and the Navesink Net (145.8 Mc. 9:00 P.M. daily). Congratulations to K2AGZ on his OO appointment, inadvertently not announced previously. Dave has joined Air Force MARS and plans to go sideband on 2 meters. W2PEV is back on 2 meters with a homebrew rig after being off that band for 10 years! WB2KTO is experimenting with 20-meter beams. OO reports: (Apr.) W2TPJ 28, K2AGZ 7, W2JAE 6. (Mar.) W2JAE 3. (Feb.) W2JAE 8. (Jan.) W2JAE 8. Traffic: (Apr.) WB2AEJ 213, K2VNL 204, W2PEV 124, WB2FIT 121, WB2JWB 92, WB2OHK 81, WB2BCS 40, W2CVW 39, W2QNL 29, WB2UCS 27, WB2FUW 20, K2JTU 18, WA2CCF 16, K2ZFI 15, W2DRV 14, WB2KTO 14, W2EWZ 13, WB2IYO 13, K2EQP 12, WA2TAF 12, WB2VHG 10, K2KDQ 4, WB2QGB 4, K2MFX 2, WA2ZQH 2, WB2BXK 1, WB2GFY 1, W2JDH 1, WB2QLF 1. (Mar.) WA2ZOW 7, W2DRV 3, WB2HLH 2.

MIDWEST DIVISION

IOWA—SEC: KØBRE. WØLGG had fine traffic totals, making the BPL both for March and April operation. WAØDEM has a fine total, making the BPL on originations plus deliveries and with a fine bunch relayed. The section mourns the loss of KØVEJ, who so recently turned in a fine report in the Iowa QSO Party. WØAXE and WØJAQ say that KØVEJ's passing will especially be felt by the Sioux City Amateur Radio Association, of which he was president. KØTDO reports 30 sessions of the 160-Meter Iowa Emergency Net with 638 QNIs. WAØKYT, operating at WAØJYT, is Tue. NCS for the Teenage Traffic Net and WØAQV has donated a 20-meter beam to the club. KØEFQ indicates that on Mar. 23-24, the 1,815-Mc. Net handled much traffic for Western Union and the MVREC. WØUSL has a tribander. WØJAQ has changed his Tue., Wed., Fri. OBS schedules to daylight time. The ARMS rally-marathon via ham radio Mar. 6 lasted 5 hours, with WØQCB, WØLSF and KØKCJ NTS. WØCXN has returned from Florida and is active as OBS. TLCN handled 8 with 88 reporting in 26 Apr. sessions. The Iowa 75-Meter Phone Net, with 1424 QNIs in 26 sessions, reports a total of 181. Traffic: (Apr.) WØLGG 2056, WAØDEM 472, KØASR 87, WØUSL 72, KØEFQ 23, WAØJYT 23, WØQVZ 14, KØKQD 13, KØTDO 10, WØFDM 3. (Mar.) WØLGG 2003, KØASR 112.

Dennis Burke, WØNTB

Our Iowa section and a wide circle of friends mourn the passing of our section leader who died May 25, 1966. His interest dated from spark days and many recall working him from the time he got his ticket in '32 and in AARS. He held Public Service Awards and had served a number of terms as SCM, was a member of the Story County Amateur Radio Club and other organizations and will be sorely missed.

KANSAS—SCM, Robert M. Summers, KØBXF—SEC: KØEMB. RM: WAØJII. PAM: KØJMF. V.H.F. PAM: WØHAJ. KØYRQ is planning to be married in August. WAØCCW has p.p. 4x150As on 2-meters. KØYLV now is calling a 6-meter f.m. net each Sun. morning in the Phillipsburg area on 52.525 Mc. KØUVH also is operating a 6 meter net Sun. mornings in Seldon on 53.360 Mc. The Arkansas City Amateur Radio Club now is affiliated with the American Radio Relay League. New calls in Salina are WNØOKQ, WAØMJN and KØAWR. WNØOPZ is the 55th Novice licensee in El Dorado since the FCC began issuing them in 1951. By the way the first was WØECD. March net reports:

Net	*Freq.*	*Mgr.*	*QNI*	*QTC*
KPN	3920 kc.	KØJMF	276	56
KSBN	3920 kc.	KØJMF	600	73
QKS	3610 kc.	WAØJII	238	117
KWN	3920 kc.	KØEMB	448	8
Kans PI	145.350 Mc.	KØEMB	69	2
Kans EC	3920 kc.	WAØCCW	51	4
Zone 11	AREC	KØJDD	115	

Traffic: (Apr.) WØINH 178, KØGZP 169, WAØJII 167, WAØMLE 151, WAØCCW 66, KØBXF 62, KØJMF 62, KØEMB 55, KØGII 51, WAØFCO 34, WAØLLC 32, KØKED 27, KØJDD 18, KØUVH 11, WØBMW 10, WØFDJ 10, KØMRI 9, WØTSR 6. (Mar.) KØGZP 82, WAØCCW 38, WAØDZI 17, WØBMW 2.

MISSOURI—SCM, Alfred E. Schwaneke, WØTPK—SEC: WØBUL. WAØELM is PAM as manager of

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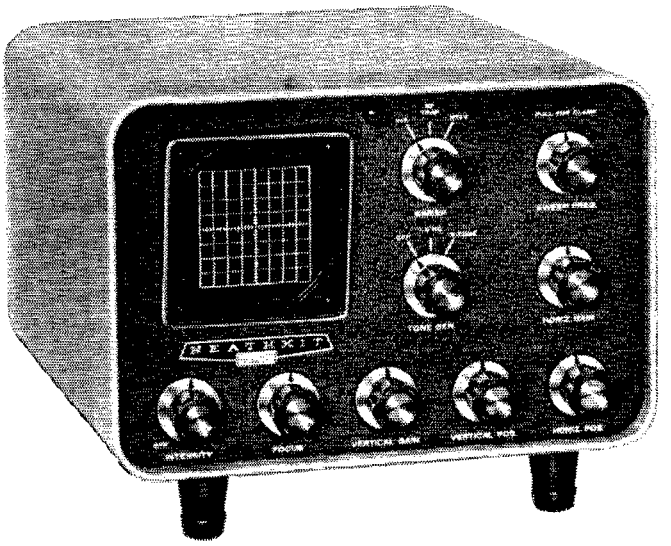

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the Teenage Net replacing WAØCCH, who resigned. I regret to report that WØNLM and WØVNU are Silent Keys. KØYIP renewed as ORS. WAØFLL received a 15-w.p.m. Code Proficiency certificate. PHD Net certificates have been issued to WAØBPC, WAØBVT, WAØDWX, WAØGYS, WAØHOQ, KØIQS, WAØIZN, WAØKQM, WA9KXX/Ø, KØLMS, WAØMOH, WAØMBP, WAØNQU and KØSPE. KØLGZ is custodian of an award for working 5 members of the N.W. St. Louis ARC (KØAXU). KØONK was elected pres. of the Marshall Business Women's Recreation Club. WAØHQR will be operating portable from Boy Scout Camp, Osceola, through July. The Brush Creek Bird-Watching and V.H.F. Society and the PHD ARA became ARRL affiliates. KØDEQ has a new antenna up. WØFLD has a new Galaxy V. WAØENI, WAØIHV, KØIKZ, KØMAT, K9RWK/Ø and KØYIP participated in the Feb. FMT. OES reports were received from WØJTD and KØJWN; OO reports from KØGSV and WØQWS. WA7AMD/Ø, at Stella, is editor of the *Tri-State QBM*. Net reports for Apr.:

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*	*Mgr.*
MEN	3885	2330Z	M-W-F	13	173	23	WØBUL
SMN	3580	0100Z	Daily	24	83	94	KØAEM
MNN	3580	1900Z	M-Sat.	26	45	25	WØOUD
QMO	3580	2200Z	Sun.	4	21	10	WAØFKD
MSN	3715	0300Z	Daily	30	49	18	KØONK
MoSSB	3933	2100Z	M-Sat.	26	562	169	KØTCB
MoPON	3810	2100Z	M-F	20	289	159	WØHVJ
MTTN	3940	2300Z	M-F	20	234	120	WAØELM
HBN	3980	1805Z	M-F	27	790	406	WAØHWJ
PHD	50.4	0130Z	Tue.(GMT 4		116	15	WAØFLL

Traffic: KØONK 1722, KØAEM 271, WAØHWJ 231, WAØFKD 191, WØHVJ 179, WAØFMD 151, KØYGR 126, WØTDR 98, WØOUD 93, WØEEE 87, WØYO 68, WØZLN 44, WØTPK 40, WAØELM 39, WAØKNW 37, KØTCB 37, WØRTO 32, WØBVL 30, KØLGZ 27, WAØBGU 23, WAØCMO 23, WAØHOQ 23, KØJPS 20, WAØLYE 19, WØBUL 12, KØBWE 8, WAØFLL 8, WAØJLJ 5, WAØCHH 4, WAØHQR 4, WAØKCX 3, WØGQR 2, KØYIP 2.

NEBRASKA—SCM, Frank Allen, WØGGP—SEC: KØJXN. Net reports for Apr.: Nebr. Emergency Phone Net, WAØGHZ, QNI 1758, QTC 85. West Nebr. Net, WØNIK, QNI 525, QTC 56. WX QTC 124. Nebr. AREC C.W. Net, WAØEEI QNI 15. Nebr. C.W. Net (Neb) WAØGHZ, QNI 158, QTC 52. 160-Meter WX Net, WAØCBJ, QNI 179. (This net has closed for the season and the NCS thanks all for their FB cooperation.) Nebr. Storm Net, WAØKGD, 1st session, QNI 715, QTC 59, 2nd Session QNI 678, QTC 16. Nebr. Morning Phone Net, KØUWK, QNI 859, QTC 50. WØNYU is sending Official Bulletins on c.w. followed by RTTY Mon., Tue. and Wed. 8 P.M. CST at 3627.5 kc. The new Nebr. Dead End Net, WAØMCX NCS, meets at 2100Z on 3982 kc. Mon. through Fri. It is composed of handicapped amateurs and everyone is welcome, but only the handicapped can be NCSs. Fourteen members of the Nebr. QCWA Chapter attended the funeral of WØUEV in Apr. as honorary pallbearers. Traffic: WAØGHZ 293, WØLOD 210, WØNIK 143, WØFQB 54, WAØHWR 48, KØJFN 44, WØBFV 40, WØGGP 36, WAØIBL 23, WAØIXD 22, WAØKGD 22, KØRRL 22, WØHYD 18, WØRJA 17, WØVEA 17, WØAGK 12, WAØEUM 9, WAØHGY 9, WAØGVJ 8, WØMTI 8, KØUWK 8, WAØEET 7, KØFJT 7, KØBMP 6, WAØIBB 6, WAØBOK 5, WØRAM 5, KØDGW 4, WAØIXF 4, WØLJO 4, KØVTD 4, WØWKP 4, WØYFR 4, WAØLRQ 3, WØCXH 2, WAØDFS 2, WØFHF 2, WAØHSX 2, WAØKFP 2, KØULQ 2, WØWZR 2, WØEQQ 1, KØQKW 1, WØVPR 1, WØWHY 1.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, John J. McNassor, W1GVT SEC: W1PRT. RM: W1ZFM. PAM: W1YBH. V.H.F. PAM: K1RTS. This report was prepared by W1EFW, retiring as Acting SCM. April net reports: CN (3640 daily 1845 EDST) 30 sessions, traffic 212 from 354 QNI, most regular K1LMS, W1KAM and WA1APY. CPN (3880 M-S 1800 Sun. 1000 EDST) 30 sessions, traffic 134 from 515 QNI, most regular WA1DEM, W1NQO, W1YPH, K1LMS, K1SRF, K1OJZ. Our SEC, W1PRT, has been visiting clubs selling AREC and will visit others if invited. Try him, his message is worth it! Thanks to Asst. SEC W1GEA and K1SRF for their yeoman work in East Conn. where they have built a fine AREC. WA1APY renewed his ORS and OPS and says he is s.s.b. on 20 mostly. WA1DNM is Navy RM3c at Norfolk, Va. W1QV's new 60-ft. fold-over tower has a TA4 on top. K1YON nailed two N.Y. stations on 220 Mc. and eyes 1220 Mc. with K1GLW/1. W1ECH reports a new YL harmonic and less radio after making it 262 worked on c.w. K1VDZ sports a new 32-ele-

NOW! A 3-BAND SSB TRANSCEIVER KIT FOR 189.95

NEW EICO 753 SSB/AM/CW 3-BAND TRANSCEIVER

WITH SILICON SOLID STATE VFO

Build the finest of SSB/AM/CW 3-band transceivers with 200 watts of SSB punch and every wanted operating facility, plus the extra reliability and maintenance ease inherent in kit design. Assembly is made faster and easier by VFO and IF circuit boards, plus preassembled crystal lattice filter. Rigid construction, compact size, and superb styling make this rig equally suited for mobile and fixed station use. The new EICO 753 is at your dealer now, in kit form and factory-wired. Compare, and you will find that ***only the 753 has all these important features:***

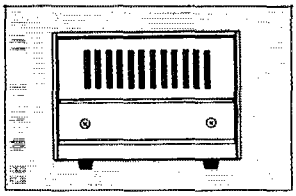
■ Full band coverage on 80, 40 and 20 meters. ■ Receiver offset tuning (up to ±10kc) without altering transmitter frequency. ■ SILICON SOLID-STATE VFO *for drift-free and voltage stable operation in both fixed and mobile* installations. ■ Built-in VOX. ■ Panel selected VOX, PTT & STANDBY. ■ High level dynamic ALC to prevent flat-topping or splatter and permit the use of a linear amplifier. ■ Automatic carrier level adjustment on CW and AM. ■ Dual ratio ball drive permits single knob 6:1 rapid tuning and 30:1 vernier bandspread (over 10 degrees of scale). ■ Position of hairline adjustable on panel. ■ Illuminated S-meter/PA Cathode Current Meter and tuning dial. ■ Fast attack, slow decay AGC. ■ Grid-block break-in CW keying. ■ Product detector for SSB and CW, triode detector for AM. ■ TR relay with auxiliary contacts for use with high power linear amplifier. ■ Includes mobile mounting bracket.

ADDITIONAL SPECIFICATIONS

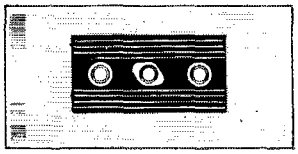
FREQUENCY COVERAGE: 3490-4010kc, 6990-7310kc, 13890-14410kc. SSB EMISSIONS: *LSB 80 and 40 meters, USB 20 meters.* RF POWER INPUT: *200 watts* SSB PEP and CW, 100 watts AM. RF POWER OUTPUT: 120 watts SSB PEP and CW, 30 watts AM. OUTPUT PI NETWORK MATCHING RANGE: 40-80 ohms. SSB GENERATION: 5.2 Mc crystal lattice filter; bandwidth 2.7kc at 6db. STABILITY: 400 cps after warm-up. SUPPRESSION: Carrier-50db; unwanted sideband-40db. RECEIVER: Sensitivity 1uv for 10db S/N ratio: selectivity 2.7kc at 6db; audio output over 2 watts (3.2 ohms). PANEL CONTROLS & CONNECTORS: Tuning, Band Selector, AF Gain, RF Gain, MIC Gain with calibrator switch at extreme CCW rotation, Hairline Set (capped), Mode (SSB, AM, CW, Tune), Function (Off, Standby, PTT, VOX), Carrier Balance, Exciter Tune, PA Tune, PA Load, Receiver Offset Tune, MIC input, phone jack. REAR CONTROLS & CONNECTORS: VOX Threshold, VOX delay, VOX sensitivity, Anti-VOX sensitivity, PA Bias adjust, S-Meter zero adjust, power socket, external relay, antenna connector, key jack, accessory calibrator socket. METERING: PA cathode on transmit, S-Meter on receive. SIZE (HWD): 5⅛" x 14¼" x 11¼". POWER REQUIREMENTS: 750 VDC at 300 ma, 250 VDC at 170 ma, -100 VDC at 5 ma, 12.6 VAC at 3.8 amps.

The Model 753 is an outstanding value factory-wired at $299.95.

Power Supplies Tailored for Optimum Performance of the 753.



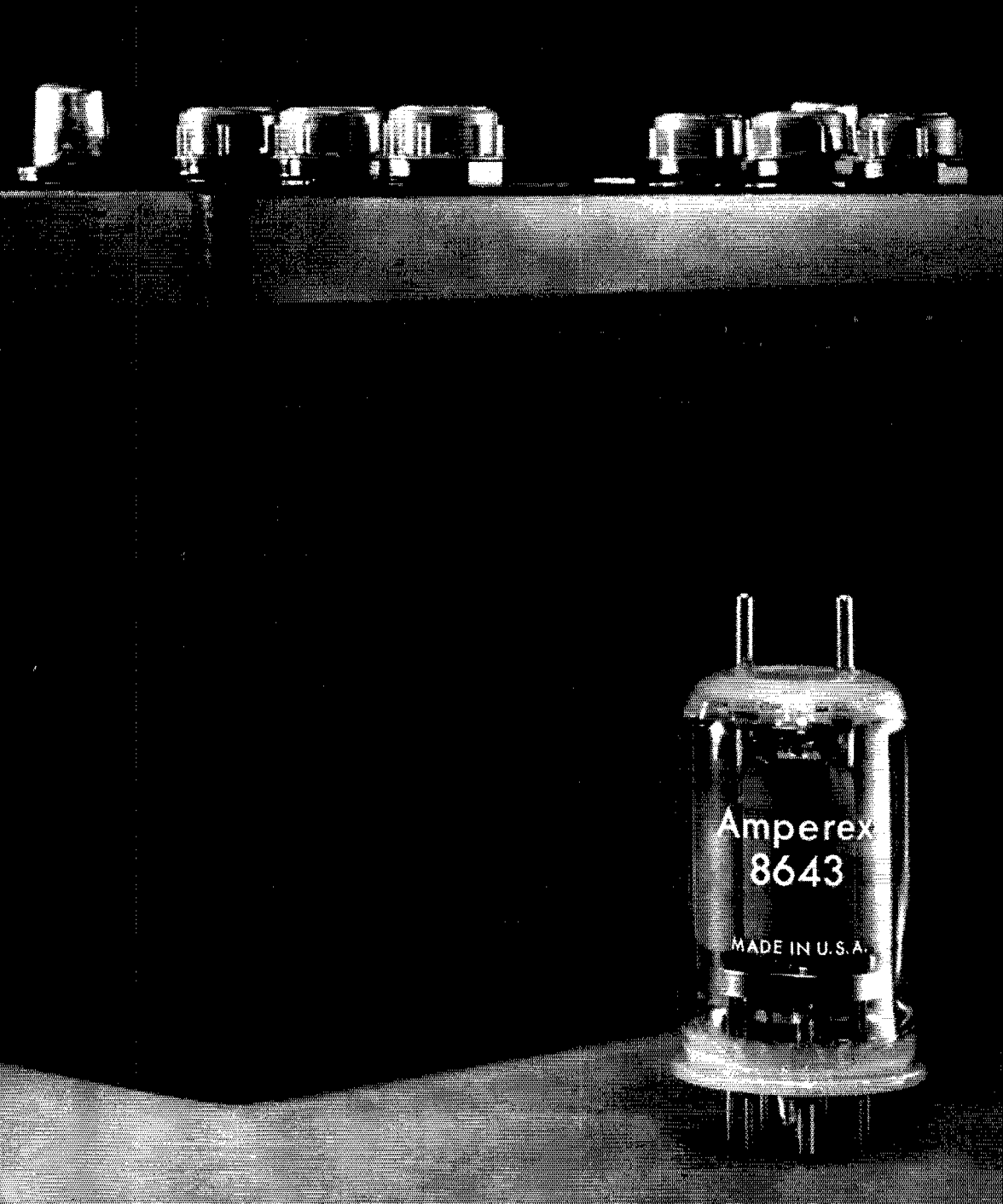
Model 751 Solid State AC Supply/Speaker Console.
Matching table-top companion unit. Built-in PM speaker.
Kit $79.95 Wired $109.95



Model 752 Solid State Mobile Supply.
For use with 12 volt positive or negative ground systems. Fully protected against polarity reversal or overload.
Kit $79.95 Wired $109.95

EICO For FREE Catalog and 753 Spec. Sheet write to EICO Dept. QST-7, 131-01 39th Ave., Flushing, N. Y. 11352

...and to take the curse out of fluctuating battery voltage in mobile communications, there's the new Amperex 8643..
with a new, wide-range cathode



There's a new Amperex cathode in a new Amperex tube, which was specifically designed to handle variations in power supply voltage.

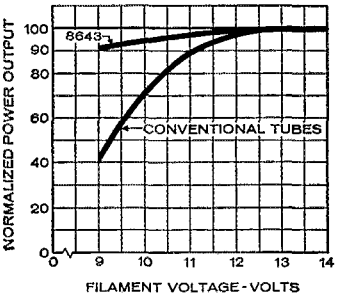
At its high end, this revolutionary, wide-range cathode is immune to high temperatures, and hence, to sublimation; at its low end, it insures adequate talk-power for any emergency!

Now, whether the battery delivers as little as ten volts or as much as sixteen—(all other parameters constant) the end result is the same—never less than 90% of full talk-power and no danger of damage to the tube!

The new cathode is being made available for the first time with the introduction of a new Amperex twin tetrode, the 8643, forerunner of a family of wide-range cathode tubes for mobile equipment.

The 8643 was designed for use as an RF power amplifier, oscillator and frequency multiplier up to 175Mc. It is rated for Push-To-Talk Service, capable of producing 135 watts from less than 4 watts drive as a 175Mc amplifier under PTTS conditions.

POWER PERFORMANCE vs. CATHODE VOLTAGE



PUSH-PULL FM AMPLIFIER (HEAT SINK OPERATION)

	ICAS (175Mc)	PTTS*(175Mc)
Plate Voltage (Volts)	750	750
DC Plate Current (ma)	240	264
Drive Power (Watts)	3.5	4.0
Useful Power Output (Watts)	123.0	135.0

*PUSH-TO-TALK SERVICE, MAX. DUTY CYCLE 1 MIN. ON, 4 MINS. OFF.

For data on the 8643 and other Amperex twin tetrodes for mobile communications, write: Amperex Electronic Corporation, Tube Division, Hicksville, L. I., New York 11802.

Amperex®

ment J beam on 2 and skeds W8WEN using 500 watts on s.s.b. If borrowed rigs hold out, WA1APY will continue as a regular on CN. W1ADW writes about old Navy operators and sends the *CARA Bulletin*. He skeds son K1CSB/DL5ED and plans a June retirement from FCI. K1PAI, at Windham College, Putney, Vt., skeds his dad, K1QPM. Bloomfield Kls SXF, TBA and QPM are active on 2 and credit HELCo for helping to eliminate a serious line noise. W1BEA, W1EBO, K1LAW, K1MRL and K1WXZ all participated in the FMT. New OESs: K1VDZ, K1YON. Renewals: W1APA, W1EFW, K1LMS, W1ZL as ORSs: W1APA, K1YGS as OPSs, W1PRT, W1EFW as OOs. K1SRF is the new EC for the ECAREC and WA1DWJ is the new Asst. EC for Simsbury. W1YBH issued a new CPN Bulletin. The new CCARC Bulletin from W1WHQ lists club activities and program suggestions. New officers of the Willimantic RC are W1BKC, pres.; K1VPF, vice-pres.; W1TVU, secy.; W1HNX, treas. W1EFW offers thanks to all for making the interim SCM job enjoyable, and welcomes W1GVT as your new SCM. Traffic: (Apr.) K1ZND 383, WA1APY 332, W1EFW 300, K1LMS 147, K1EYY 99, K1OQG 81, W1ZFM 66, WA1DEM 34, W1YBH 29, K1SRF 25, W1BDI 18, W1BHV 18, W1QV 13, W1CTI 12, W1BNB 9, W1PRT 9, K1TKS 6, K1YGS 6, W1CUH 4. (Mar.) W1APA 10.

EASTERN MASSACHUSETTS—SCM, Frank L. Baker, Jr., W1ALP—SEC: W1AOG. W1ALP and W1AOG held an SCM/SEC meeting at the National Convention with the following present: Ed Handy, George Hart, Big Green, SCMs W1EFW, K1AAV, K1MPN, W2CVW, W7PBV, W4PED, W4SHJ and SECs W1YNE and K1IJU. HVs, ZLs, VEs, Gs, VPs, KL7, every district and many states were represented at the convention. I met W8AQ, ex-W1AAC, who left here in the late '20s. EM2MN had 21 sessions, 187 QNIs, 81 traffic. W1ZQM is the new RO for Burlington. W1UOH is working out in Hawaii for a few months. W1HZV spoke on "Amateur Radio Astronomy" at the South Shore Club and one of our old friends, W1GM, was present. The 6-Meter Cross Band Net had 20 sessions, 339 QNIs, 16 traffic. W1THT has a Galaxy linear. W1AL has a TR-4. W1DAL is building and will be on soon. W1PGN is on s.s.b. W1BB is retiring after 40 years. WA1GAN is on 6. WA1FYI has an HW-29A Sixer. W1HKG's rig blew up. W1HOM has a new "Batman Hat." G3BVU/W1, in Acton, is on 6. W1MX has a new kw. W1UBC is on 6. W1FJJ says his mother has her General now. WA1FOJ is active with the WRONE and DXing on 15/20. W1PEX made the BPL. K1CLM is doing Intruder Watch duty. K1ETT has break-in c.w. WA1CBG had receiver trouble. W1JDP is busy plowing. W1BGW got the Commonwealth DX award from the RSGB. WN1FFY worked KZ5FX on 80 with 5 watts. WA1EQU has an HQ-180A receiver and a DX60-HG 10 transmitter. W1KBN had a traffic booth in University Commons. W3OY stayed at W1NF's. W1s PLJ, JYH, VAH, AYG, WAJ, TZ, HJP, ZLX, K1s WJD, QDR, WA1FMW and W9GTC/1 took part in the Feb. FMT. Hingham ARC elected WA1AUR, pres.; WA1EVI, vice-pres.; W1ZXG, secy.-treas.; W1MD, trustee. The club meets the 1st Thurs. of the month at C.D. Hq. WA1ENN is on 6 and 2. WA1CLU is on several bands. K1BTF has a new daughter. K1YFI is back on 2. WN1FFY passed the General Class exam at the convention and has a mobile rig on 2. W1AOG received reports from W1s LVK and STX, K1s PNB and WYW. W1DAL is a new ORS, WA1FRI a new OBS. W1WNP a new EC. Appointments endorsed: W1NZP and K1DZG as ECs, K1MEM as OBS, W1MX as ORS/OPS, W1UIR as OBS/OPS/PAM. W1DLY is moving to Sudbury. W1DEL is on 2 in Holbrook. The Wellesley Club had a talk by Mr. Sarles of Lincoln Lab. on "Communications Thru Earth Orbited Satellites." K1NAY spoke at the Middlesex Club about Air Force MARS. Sorry to hear that W1LJT is moving and selling out. Massasoit ARC had a talk by Mr. Lenoir on "Measuring Atmosphere Temp. from Balloons." WØPAN/KH6 is on 14.270 s.s.b. and works the gang back here. The W1WLZs have a new boy. W1AQV is a busy man keeping two clubs going. W1AEC has quite a setup with new club rigs and its own land and building. K1PNB reports that the EMNN is coming along fine. NCSs: WA1ECY on Mon., WA1EVD on Fri., 13 sessions, 94 QNIs, 44 traffic, new stations WN1FYK, WN1FUW, WN1FPF, WN1FFY. WA1DRO is back after a hospital visit. W1CQ says he gets on the 80-meter c.w. band and helps the Novices. The Yankee RC had a speaker from the phone co. and films. Heard on 75: W1AGX, W1KGH. Traffic: (Apr.) W1PEX 552, K1CLM 446, K1ESG 183, K1GKA 161, W1EMG 133, K1VOK 115, K1PNB 112, W1OFK 108, WA1EYY 90, W1OJM 89, K1GPH 72, K1WJD 56, W1MX 55, W1AOG 40, W1CTR 38, W1DOM 33, W1UIR 30, K1ETT 29, WA1DLT 25, W1ZSS 21, WA1CBG 9, W1JDP 9, K1LCQ 9, W1OFY 9, K1BGK 8, W1BGW 6, WA1EAT 5, WA1DED 4, WN1FFY 4, K1OKE 3, WA1DEC 2, WA1EQU 2, WN1FPF

EIMAC offers new 1 kW PEP tetrode for SSB with highest linearity—at least -40 db in typical operation

EIMAC's new 4CX1500B power tetrode is the most linear tube on the market; intermodulation distortion characteristics under typical operating conditions are at least −40db at all drive power levels from zero to maximum. The new tube is ideal for advanced single sideband transmitters demanding high linearity to avoid channel-to-channel interference. The 4CX1500B is the product of a four-year development study which included optimization of internal tube geometry by computer techniques. Rated maximum plate dissipation of this radial beam tetrode is 1500 watts, and control grid dissipation rating is 1 watt maximum. Because the 4CX1500B has very low grid interception (typically less than 1.5 mA grid current), it is possible to drive the grid positive without adverse effects upon the distortion level; the tube is therefore recommended for Class AB_2 linear amplifier service. For further information, write Product Manager, Power Grid Tubes, or contact your nearest EIMAC distributor.

TYPICAL OPERATION (Frequencies Below 30 MHz)

DC Plate Voltage	2500	2750	2900 volts
DC Screen Voltage	225	225	225 volts
DC Grid Voltage	−34	−34	−34 volts
Zero-Signal DC Plate Current	300	300	300 mA
Single-Tone DC Plate Current	720	755	710 mA
Two-Tone DC Plate Current	530	555	542 mA
Driving Power	1.5	1.5	1.5 watts
Useful Output Power	900	1100	1100 watts
Intermodulation Distortion Products			
3rd Order	−38	−40	−40 db
5th Order	−47	−48	−48 db

EIMAC
Division of Varian
San Carlos, California 94070

We have a new brochure entitled "Single Sideband." Write for your copy.

2. WA1DJC 1. (Mar.) W1KBN 134, K1WJD 48, K1YKT 9. (Feb.) K1WJD 31.

MAINE—SCM, Herbert A. Davis, K1DYG—SEC: K1QIG. RM: K1TZH. PAMs: K1WQI, K1ZVN. V.H.F. PAM: K1OYB. Traffic Nets: Sea Gull Net, 1700 to 1800 and 2000 to 2100 on 3940 kc. Mon. through Sat. Pine Tree Net C.W., daily at 1900 on 3596 kc. New EC changes: W1NND for Knox County and K1HHC for Washington County. Many thanks, fellows, and good luck. The City of Portland had a c.d. drill with good results and expects to do even better next time. Stations taking part: W1BTR, W1EFR, K1DCJ, K1RQE, K1MTJ and K1OYB. There will be a few get-togethers and meetings this summer, with the details to be passed on the nets. Traffic: K1VUU 187, K1ZVN 133, WA1BEB 119, WA1DOW 29, W1NND 22.

NEW HAMPSHIRE—SCM, Robert C. Mitchell, W1SWX/K1DSA—SEC: W1ALE/W1TNO. PAM: K1APQ. RM: W1DYE. The GSPN meets on 3842 kc. Mon. through Fri. at 2300Z and Sun. at 1330Z. The VTNH Net meets on 3685 kc. Mon. through Fri. at 2230Z. W1YHI has a new HW-12 and is mobile. K1GQH won a complete Galaxy station at the convention in Boston. GSPN certificates have been issued to K1IIK, WA1CPR and WA1DTY. W1DYE, of the Concord Brasspounders, is sorry to inform all that there will be no New Hampshire convention this year. W1YMJ did an excellent job in the Feb. EMT. W1UXR is mobile with an SB-34. K1APQ reports 737 check-ins and 93 traffic for Mar. Apr. report is 618 check-ins and 90 traffic. K1YSD is very active in the CD Parties with fine scores. K1UZG reports 94 check-ins and 34 traffic for the VTNH NET. W1DYE made DXCC. W1JNC's signal from the Capitol City is heard often checking into the nets. New N.H. hams: WA1DEW, WA1DNT, WA1FSV, WA1FSY, WA1FSZ and WA1FTX. W1MHX is active in the c.w. nets with traffic. The Manchester Radio Club is having code and theory classes and is fixing up the club station. W1HPM. Traffic: W1ALE 60, W1MHX 18, K1YSD 16, W1SWX 3.

RHODE ISLAND—SCM, John E. Johnson, K1AAV—SEC: W1YNE. PAM: W1TXL. RM: W1BTV. V.H.F. PAM: K1TPK. Section Net certificates were issued to W1YKQ and K1EYM. The Harvard Wireless Club has elected K1PAM, of East Providence, its pres. for 1966-67. Bob is a sophomore and also is president of the broadcasting station at Harvard, WLHR. Also elected by the Harvard Club, W1AF, was K1SGY, of Smithfield, as secy.-treas. Wyatt is a junior at Harvard. The NCRC Club of Newport held its Annual Spring Auction recently, with W1TXL acting as auctioneer. As in the past the auction was very successful. The W1AQ Club pres., K1LII, announces that the club operated from a new location during Field Day this year. Club members had a special tent to serve as a kitchen so that meals were prepared while other members were operating. If you are interested in a League appointment contact the SCM for information and application. Traffic: K1TPK 145, W1BTV 140, W1TXL 113, K1YEV 48, K1VYC 37, K1YVN 24, K1VPK 13, WA1CSO 10.

VERMONT—SCM, E. Reginald Murray, K1MPN—SEC: W1SVA. Apr. net reports:

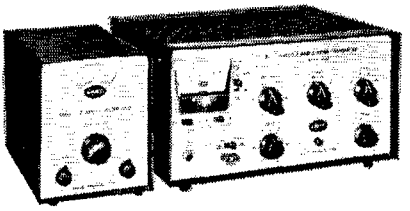
Net	*Freq.*	*Time*	*Days*	*QNI*	*QTC*	*NCS*
Gr. Mt.	3855	2130Z	DyxS	651	36	WZVMC
Vt. Fone	3855	1300Z	Sun.	0	0	W1UCL
VTNH	3685	2230Z	M-F	94	34	K1UZG
VTCD	3990½	1400Z	Sun.	91	9	W1AD
VTSB	3909	2230Z	M-S	541	26	W1CBW
		1230Z	Sun.			

K1IJJ has joined the ranks of the retired after 42 years in commercial radio; Bart has 11 countries on 75 meters. CVARC's new officers are K1HDB, pres.; W1JLF, vice-pres.; WA1EQI, secy.; K1OAJ, treas. International Field Day has been tentatively set for Aug. 14 in Burlington. K1OMO has a new SB-100 operational. Welcome to new hams WN1FYM, WN1FXM, WN1FXN, WN1FST and WN1FRF. Traffic: K1BQB 311, K1UZG 24, K1MPN 15, W1FRT 13, K1IJJ 8, W1KJG 4.

WESTERN MASSACHUSETTS—SCM, Percy C. Noble, W1BVR—SEC: K1IJU. C.W. RM: K1IJV. W1ZPB reports that the club station, W1IPN, at Mt. Hermon School is once more on the air after the fire. He also is bringing along some new hams. K1ESN and W1EZD, both of South Hadley, met for the first time while on jury duty in Springfield. K1IJU was the official delegate from the Hampden County Radio Association to the National Convention. He also represented your SCM there. Incidentally, he (not your SCM) has just received another promotion, this time to a vice-presidency of the Massachusetts Mutual Life Insurance Company. Nice going, Norm! The HCRA is

AMECO *Leader in Compact, Quality Ham Gear*

NEW VFO FOR TX-62 or any other VHF TRANSMITTER



NEW AMECO VFO FOR 6, 2 & 1¼ METERS

The new Ameco VFO-621 is a companion unit designed to operate with the Ameco TX-62. It can also be used with any other commercial 6, 2, or 1½ meter transmitter.

Because it uses a transistorized oscillator circuit, it is extremely stable. An amplifier stage provides high output at 24-26 MC. The VFO includes a built-in solid state Zener diode regulated AC power supply.

This new VFO is truly an exceptional performer at a very low price **Model VFO-621 $59.95 net.**

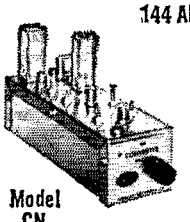
The NEW AMECO TX-62

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

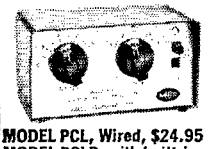
NUVISTOR CONVERTERS FOR 50, 144 AND 220 MC. HIGH GAIN, LOW NOISE



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**

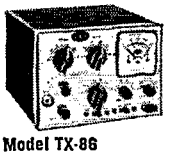
ALL BAND NUVISTOR PREAMP 6 THRU 160 METERS



MODEL PCL, Wired, $24.95
MODEL PCLP, with built-in power-supply, wired, $32.95

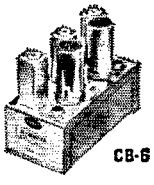
2 Nuvistors in cascode give noise figures of 1.5 to 3.4 db. depending on band. Weak signal performance, image and spurious rejection on all receivers are greatly improved. PCL's overall gain in excess of 20 db. Panel contains bandswitch, tuning capacitor and 3 position switch which puts unit into "OFF," "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 7″ — ideal mobile or fixed. Can take crystal or VFO. **Model TX-86 Kit $89.95 — Wired Model TX-86W, $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

Amateur Radio Theory Course **$3.95**
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EL 3 ..... **1.75** EL 4 ..... **1.25**
Amateur Log Book ..... **.50**
Radio Electronics Made Simple **1.95**

Write for details on code courses and other ham gear.

CODE PRACTICE MATERIAL

Ameco has the most complete line of code records, code practice oscillators and keys. Code courses range from start to 18 W.P.M. and are on 33, 45, or 78 r.p.m. records. Model CPS oscillator has a 4″ speaker and can be converted to a CW monitor.

Dept. QST-7

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Affiliated with American Electronics Co. and Ameco Publishing Corp.

competing with the Tri-city Radio Club on Field Day. New England Director W1QV was the March speaker at the HCRA and K1PMK, of the club, is one of his Assistant Directors. K1NGL's dad, seeing how much fun his son was having, is now K1PTG. W1NGE is signing up people in Dalton for c.d. work. In a recent FMT W1MUN checked 3514.488 to .3 parts per million and 7062.391 to .1 parts per million. The theory classes being conducted by the Valley Amateur Radio Club of Springfield still are going strong with twelve or thirteen reporting for it weekly. W1BVR has a new Eico 753 80-40-20-meter transceiver, so you just might hear him on s.s.b. once in a while. RM K1IJV reports that WMN handled 87 messages during April with K1IJV, K1WZY, W1ZPB, W1DVW and K1SSH being the most active. Traffic: K1IJV 115, K1SSH 90, W1BVR 52, K1WZY 35, W1ZPB 23, K1LBB 19, W1DVW 10.

NORTHWESTERN DIVISION

IDAHO—Acting SCM, Raymond V. Evans, K7HLR—PAM: W7GGV. First, we would like to again remind all members of the section that Idaho has no SCM and someone or some group should pick up a little initiative and get someone into this office. Yours truly is not a candidate, but will cooperate to the fullest with our next SCM. The Idaho RACES network meets at 1515Z Mon. through Fri. W7QEL, NCS, for an earlier session for those who are off to work by 1515Z. Frequency is 3990.5 kc. FARM NET: sessions 21, QNI 584, QTC 63. Traffic: K7HLR 122, W7GGV 37, K7OAB 4.

MONTANA—SCM, Joseph A. D'Arcy, W7TYN—SEC: W7RZY. V.H.F. PAM: K7IOA. Appointments: K7MRZ, Silver Bow County, as EC. W7QYA will be leaving soon for Mexico with Verda, K7UBC. W7RZY attended a meeting of the Bozeman Club and showed slides on the ARPSC along with a fine talk on the EC program in the State of Montana. W1IKE, ARRL Asst. Mgr., attended a meeting of the Yellowstone Radio Club in Billings June 13. The Havre Club has set the date of the North Central Hamfest for July 17. K7DCH is the 1966 mgr. of the Montana S.S.B. Net. OOS taking part in the Feb. FMT were W7FIS, W7LBK and W7NPV. Word of the v.h.f. world in the state comes from K7IOA, V.H.F. PAM, K7FPQ, at Helena, has a new TX-62 on the air. W7HDP has a kw. on 6-meter a.m., c.w., s.s.b. with 300 watts on 2 meters. W7BUT is now on 6 and putting out a fine signal. Missoula stations on 2 meters are W7CJB, W7IPB, W7FDI, W7NEG, W7BPQ, K7MGL, K7PGY, K7CVK, WA7ALJ, W7WWS, W7QZJ, W7COH and W7JIZ. If you are on v.h.f. in the State of Montana, write Bob in Great Falls and tell him of your activities. Traffic: W7CPY 6, W7TYN 5, K7UPH 3, W7CJN 2.

OREGON—SCM, Everett H. France, W7AJN—SEC: W7AJN. RM: W7ZFH. Appointments: K7IFG as ORS, K7QXF as OES. We are very sorry that no report for this column was sent to ARRL for March, as your SCM was under "doctor's orders." W7AZD, mgr. of the AREC Net, reports Mar. sessions 13, maximum counties 8, attendance 105, contacts 14; Apr. sessions 30, attendance 353, maximum counties 12, 36 contacts, 1 QST. The Saint Helen's Amateur Radio Klub (SHARK) now is licensed as WA7FFX. WN7CPI is now WA7CPI and worked PY2EQ, Brazil, on 15-meter phone with 90 watts using a 15-meter inverted "V." W7DEM now is using a Galaxy 5. Grants Pass news: W7AHP has a 15/20 bird cage quad up 60 feet, K7YNO has a new 15-meter beam, W7AHP received a gift of a 50-ft. tower and beam. WN7CKL now is WA7CKL, new hams are WN7FFJ, WN7FEM, WN7FHX and K7YNO, on with an SB-100. WN7DWK, 10 years old, still is doing good work on 15 meters with many JA contacts. He and his father now are studying for the General Class license. K7IFG, mgr. of QSN, reports Apr. sessions 21, attendance 88, traffic 27. Traffic: (Apr.) K7IFG 224, WA7CAQ 87, K7DVK 20, W7ZFH 18, W7DEM 16, (Mar.) K7IWD 141, WA7CAQ 83, K7BHJ 48, W7ZFH 27, W7GWT 16, K7DVK 14, W7KTG 5, W7LNG 1.

WASHINGTON—SCM, Everett E. Young, W7HMQ—SEC: W7UWT. RM: W7OEB. PAM: W7LEC. V.H.F. PAM: W7PGY. NTS Nets:

WSN	3535	Daily	0200Z	QNI	253	QTC	308 Sess. 30
WARTS	3970	X-Sun.	0130Z	QNI	909	QTC	144 Sess. 26
NTN	3970	Daily	2030Z	QNI	964	QTC	641 Sess. 30

EC K7MGA reminds all of the All-Nets Section Hamfest to be held July 9-10 at the Fairgrounds, Yakima. K7AMJ hits the jackpot in the editorial for W7DK's *Loggers Bark*, May issue. Ask the RC of Tacoma 1249 So. Wash., for a copy. K7JHA enjoys the HW12/M with DX to N.Y., also guides the Tech. Net past 50 sessions. EC/ORS W7GYF had an FB score in the April CD Party. OPS W7-

ANTENNA BREAKTHROUGH

IN PERFORMANCE, VALUE, QUALITY, PRICE, AVAILABILITY

ALL-BAND VERTICALS

QUALITY MATERIAL

Brand new mill stock aluminum alloy tubing with Aluminite finish for protection against corrosion. Loading coils made by Barker & Williamson.

ALL-BAND OPERATION

Loading coil not required on 6, 10, 15 and 20 meters. For 40, 80, and 160 meters, loading coil taps are changed manually except if a wide-range pi-network output or an antenna tuner is used; in this case band changing can be done from the shack.

EASY ASSEMBLY

Less than two minutes is all you need to put your vertical together. No special tools or electronic equipment required. Full instructions given.

SIMPLE INSTALLATION

Goes almost anywhere. On the ground, on the roof, or outside your window.

AMAZING PERFORMANCE

Hundreds of reports of exceptional DX operation on both low and high power. You will work wonders with a Gotham vertical.

NO GUY WIRES

Our design eliminates unsightly guy wires. You save time, trouble, space and money by avoiding guy wires.

"All band vertical?" asked one skeptic. "Twenty meters is murder these days. Let's see you make a contact on twenty meter phone with low power!" So K4KXR switched to twenty, using a V80 antenna and 35 watts AM. Here is a small portion of the stations he worked: VE3FAZ, TI2FGS, W5KYJ, W1WOZ, W2ODH, WA3DJT, WB2FCB, W2YHH, VE3FOB, WA8CZE, K1SYB, K2RDJ, K1MVV, K8HGY, K3UTL, W8QJC, WA2LVE, YS1MAM, WA8ATS, K2PGS, W2QJP, W4JWJ, K2PSK, WA8CGA, WB2KWY, W2IWJ, VE3KT. Moral: It's the antenna that counts!

V40 vertical for 40, 20, 15, 10, 6 meters.....$14.95

V80 vertical for 80, 75, 40, 20, 15, 10, 6 meters.....$16.95

V160 vertical for 160, 80, 75, 40, 20, 15, 10, 6 meters...$18.95

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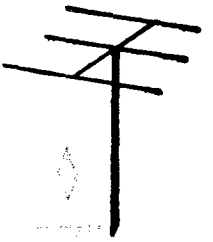
AIREX RADIO CORP., NEW YORK CITY
CANADA — ON REQUEST

BEAMS

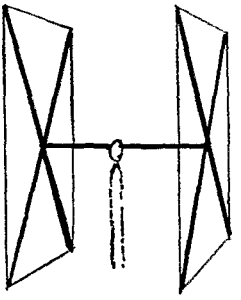


Compare the performance, value, and price of the following beams and you will see that this offer is unprecedented in radio history! Each beam is brand new; full size (36' of tubing for *each* 20 meter element, for instance); absolutely complete including a boom and all hardware; uses a single 52 or 72 ohm coaxial feedline; the SWR is 1:1; easily handles 5 KW; ⅞" and 1" aluminum alloy tubing is employed for maximum strength and low wind loading; all beams are adjustable to any frequency in the band.

2 El 20	$16	7 El 10	$32*
3 El 20	22*	8 El 10	36*
4 El 20	32*	4 El 6	15
2 El 15	12	5 El 6	20*
3 El 15	16	6 El 6	24*
4 El 15	25*	7 El 6	26*
5 El 15	28*	8 El 6	28*
4 El 10	18	9 El 6	30*
5 El 10	24*	10 El 6	32*
6 El 10	28*		

* 20' boom

QUADS



NEW! NEW! NEW! CUBICAL QUAD ANTENNAS — these two element beams have a full wavelength driven element and a reflector; the gain is equal to that of a three element beam and the directivity appears to us to be exceptional! ALL METAL (except the insulators) — absolutely no bamboo. Complete with boom, aluminum alloy spreaders; sturdy, universal-type beam mount; uses single 52 ohm coaxial feed; no stubs or matching devices needed; full instruction for the simple one-man assembly and installation are included; this is a fool-proof beam that always works with exceptional results. The cubical quad is the antenna used by the DX champs, and it will do a wonderful job for you! Now check these startling prices — note that they are *much lower* than even the bamboo-type:

TWENTY METER CUBICAL QUAD.$25.00
FIFTEEN METER CUBICAL QUAD. 24.00

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GOTHAM, 1805 Purdy Ave, Miami Beach, Fla. 33139

BTB reports the QCWA had a big attendance and FB dinner at its meeting in Centralia. RM/OO/ORS W7OEB says the Richland ARC has a nice novice class going with W7YFO, K7PVG/PVF, K7VNV and himself as tutors. A 2-meter repeater now is active on Rattlesnake Mtn. W7NNH is active with a 753 s.s.b. K7UDG is home from KL7-Land. EC K7MGA reports his 2-meter f.m. gear now is ready. EC W7MCW is smoke-testing the new SBE-34. OBS W7GVC sends a reminder of the 20th Annual Walla Walla Hamfest Sept. 25, 1966. ORS/OPS W7RXH is now MARS. ORS W7AIB is trustee of the new Clallam County ARC Club, WA7FHV. OPS W7EVW had some trouble with the receiver but was able to work WARTS and NTN. K7ZPM/W7DEQ is QRL school. W7UMJ addressed the RC of Tacoma on Satellites. Our sympathy goes to W7FUL and his XYL on the loss of a daughter, W7RGD on the loss of his father and W7RXS on the loss of his mother. W7BUN and his XYL are off to Japan. W7IKG is on 20 with new s.s.b. gear. WA7BZY has information for the eve bank. W7ZEV still is working out ground planes for the new beam. The Northwest Amateur Radio Communications System (NARCS) plans a full communications set-up for the Shelton Forest Festival. WA7BAY worked UWØIN. K7UKC now has home-brew s.s.b. WA7ASM lost an element of his beam so now is 75/M. W7VRO is QSL Mgr. for HK7UL/CR6AI/HM1AB/HM9AB/YV5BMN/ZS1XR/9M2FT. W7KZ is back on the job for WSN. K7RSB has full information on the first Washington Section QSO Party scheduled for Sept. 17-19. This is an all-band all-mode affair open to all and under the sponsorship of the Boeing Employee's Amateur Radio Society. W7PI wants more outlets in major communities for WSN. OBS K7CHH/7 lost his antenna in the wind but is ready to resume skeds on 7070 kc. at 0200Z. W7AXT states the QCWA meets Sun. 1900-3655 kc., 2400Z-3950 kc., 0100-3950 kc. New WSN members are WA7CXD and WA7DXI. W7SLB/M runs away with the Valley Bunny Hunt prizes, Tacoma and Puyallup have gained mobile communications. W7DNU comes out of U.W. with E.E. K7PIY/OX now QSO Aberdeen almost daily.

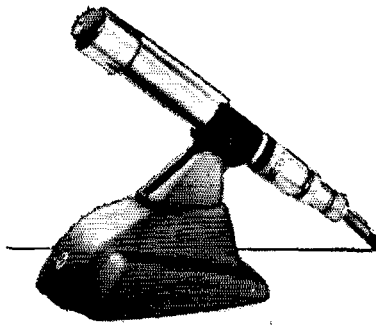
N.W.	Slo-speed Net	QNI	266	QTC	64	Sess. 27
N.W.	SSB	QNI	1285	QTC	127	Sess. 30

Traffic: (Apr.) W7BA 1209, K7TCY 1002, W7DZX 623, W7HMA 529, K7CTP 260, W7JEY 214, W7PI 212, WA7CFN 180, W7GYF 123, K7JHA 123, W7APS 102, W7BTB 63, W7OEB 61, K7MGA 49, W7MCW 47, W7AMC 45, W7HMQ 36, W7GVC 27, W7RXH 24, W7BJG 19, W7AIB 17, K7YDZ 17, W7EVW 5, W7GAT 5, K7ZPM 4. (Mar.) K7JHA 162.

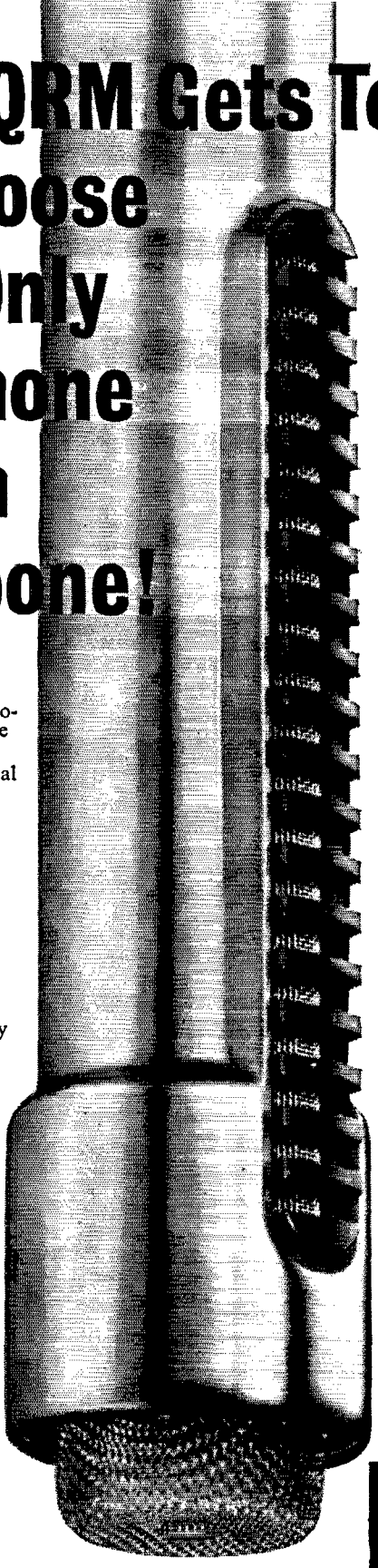
PACIFIC DIVISION

EAST BAY—SCM, Richard Wilson, K6LRN—WA6YAL was turned down by the El Cerrito City Council on his attempt to obtain a variance for installation of a 54-ft. crank-up tower and beam. The height limits in El Cerrito are 15 ft. above the ground or a total structure including a house of 30 ft. This is something that more and more of us may be up against and we should familiarize ourselves with the building codes as they apply to amateur radio. The East Bay Radio Club will hold a flea sale. The Oakland Radio Club is participating in the Oakland Hobby Show. The ORC took a trip through the facilities of KQED-TV in S.F. in April and in March toured the FAA facility in Fremont. WB6SAJ and WB6ILH have applied for appointments. Four of the fifteen students of the Hayward Radio Club's amateur radio course who took the Novice test passed and received the calls WN6SPD, WN6SPE, WN6SPH and WN6SPK. This school is run by K6HGO, chairman, with help from WA6KHN, WB6HXB, K6YBS, WA7BUW, K6CFY and K6LKX. K6VXJ has had his Swan visiting the factory for some doctoring. W6TYM is off the air with problems in the final. W6LNK and W6LGW represented MDARC, K6AMA and WA6UFW the Grizzly Peak Radio Club, WA6FFF and WA6QVS the Richmond Club, W6PQW the Northern Calif DX Club. W6IIF Hayward, W6UGO the SARO, WA6WNG, the section as RM and K6LRN the section as SCM at the Annual Director's meeting at the Edgewater Inn in April. W6CBF visited XE1EEH, XE1FN and XE1H on a recent trip to Mexico. XE1H was one of Clyde's students during WW-2. K6GZI took the Tech. Class test and reactivated his call. Lloyd plans to be active on 2 meters. WA6RRH QNIs the Bay Area Teletype Net and the Bay Area Net and asks for help in the form of check-ins and net controls. Neither requires a lot of effort unless one man is required to do everything every night. Contact WA6RRH at 48244 Cottonwood Dr., Fremont, for information on these 2-meter nets. Any help will be appreciated. WB6RKQ and WA6WNG are getting ready to attend college in September. WB6NUI is chasing DX on 20-meter s.s.b. and has snagged quite a few choice ones. Please remember to send your reports to me by the 5th of the month for the preceding month. Traffic: (Apr.) W6IDY 306, K6LRN 216, WA6WNG 179, WB6RKQ 144,

When QRM Gets Tough Choose The Only Microphone With Backbone!



ELECTRO-VOICE
MODEL 676
DYNAMIC CARDIOID



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

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

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

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

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

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

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WA6PTU 71, WA6RRH 52, WA6FBS 14, WA6QZA 8. (Mar.) WB6ETY 74, WA6RRH 31.

HAWAII—SCM, Lee R. Wical, KH6BZF—Asst. SCM/SEC: Ernie J. Kurlansky, KH6CCL. PAM: KH6ATS. RM: Vacant. Taking offers. V.H.F. PAM: Vacant, Too!

Net	*Freq. MHz*	*Time*	*Days*
Friendly	7.290	2030Z	M-F
50th State	3.895	0500Z	Tue.-Sat.
NO KA OI	7.290	2230Z	Sat.
Makuli	14.250	0700	Nightly (when no DX coming in)
KH6GG coordinates the following:			
RACES 40	7.225	1930Z	2&4 Sun.
RACES 10	28.700	1930Z	2&4 Sun.
RACES 6	50.252	1930Z	2&4 Sun.
RACES 2	147.000	1930Z	2&4 Sun.

KH6EXI's twin 8 yagi blew down. KH6s EEM, DEM, EFL and FLZ are holding down the low end of 144 MHz. KH6DEM reports that the 432-MHz converter is being reworked for better performance. The Wahiawa gang have "jumped the pond" to the island of Kauai on vertical polarization. KH6ARL former Acting SCM, has resigned his post as editor of the *Garden Island* newspaper. Ex-KH6EOF is now operating KA5MC at Iwakuni MCS, Japan. KH6EEM continues to lead the OOs in our area. Your SCM would like to get in contact with all island amateurs that are capable of and working 160 meters. Traffic: (Mar.) KG6AIG 128.

NEVADA—SCM, Leonard M. Norman, W7PBV—SEC: WA7BEU, K7ADD reports good DX from his new QTH in Reno. Good luck to Al and Shirley, W7OYQ, in their new Reno QTH. The Reno gang is thinking of putting out a Worked All Nevada Counties award. WA7BEU and W7PBV attended the Director's meeting in Oakland. W7PBV attended the National Convention in Boston and visited the FCC and MARS officials in Washington en route. K7ICW reports working W6PUZ/6 in California on 432 Mc. W6TQZ/7 is active on 6-meter s.s.b. WA7ESM, ex-WA2PWR, is active on 6-meter a.m. WB6ITI is building a new HB rig for 6 meters. WN7FBF is active on 2-meter a.m. The 2-meter f.m. gang reports 23 active stations and is trying to form an association for a 2-meter f.m. repeater station. K7NYU and K7RKH are active on v.h.f. WA7CFS reports activity on the Nevada Emergency Net on 3825 kc. at 1900 Thurs. K7ZAU and K7YVN are active in the West Coast Amateur Radio Service Net, 7225 kc. Traffic: K7RBM/7 125, K7ZAU 21, WA7BEU 14, K7-OHX 10, K7RKH 4, W7PBV 2, K7YVN 2.

SACRAMENTO VALLEY—SCM, John F. Minke, III, WA6JDT—SEC: WB6RWB. ECs: WB6MXD, K6-RHW, W6SMU, WA6TQJ. RM: W6CMA. PAM: WA6-YYK. ORSs: WB6HAW, W6LNZ. OPSs: WB6EAG, K6-IKV, WB6MAE, WB6RCR, WA6TQJ. OBSs: W6AF, WB6PHQ, WA6SLU, WA6TQJ, WA6YYK. ECs: W6ECE, W6GDO, W6WLI, W6ZJW. OESs: WA6CXB, WA6FWU, W6GDO. The results of the Feb. FMT for W6GDO show that Jay was on the nose for 7 out of 8 readings. The eighth reading was an error of only one cycle. BRAT certificates went to K6YBV and WB6MAE for April participation in the NCTN, the Northern California Traffic Net. WB6MAE has moved to Fair Oaks. WB6DQP broke his leg skiing at Mommouth Mountain. WA6FWU is attempting to work over the Sierras into Reno with K7ILB and K7HRW from Soda Springs. The Glenn Co. RACES group was on duty at the Black Butte Sailing Regatta near Orland Apr. 23 and 24. WN6PLD, WB6OYI, WB6-QZO and WN6SAT are new members of the Yolo County CD ARC. W6BLW, W6CIS, W6LNZ, WA6HYU, WA6-JDT and WB6BWB represented Sacramento Valley at the Pacific Division Directors meeting in Oakland. Traffic: (Apr.) WB6HAW 255, W6LNZ 37, K6YBV 35, WB6MAE 32, WA6QZL 30, WA6JDT 29, K6IKV 19, WB2OVB/6 5, WA6TQJ 5, WA6CXB 2. (Mar.) WB6RCR 4.

SAN FRANCISCO—SCM, Hugh Cassidy, WA6-AUD—SEC: W6KZF. The section was well represented at the Pacific Division meeting with the San Francisco Radio Club, the Marin Club, the HAMS from San Francisco and the Humboldt Radio Club participating. W6SPB had an average error of .2 parts per million in the Feb. FMT, closely followed by W6GQA with an average of 2.4 p.p.m. W6EAJ does well on 160 meters using the 400-ft. vertical of a broadcast station after sign-off time at night. WB6-GLD may move to Arizona in the near future. W6BIP, W6WLV, W6HSA, K6NCG and W6GQA were in the Apr. C.W. CD Party. WB6GVI will be moving to Stockton soon. W6FAX has been active on the NCN and the PCN systems. The San Francisco Radio Club enjoyed its May meeting at the Burgermeister Brewery. W6BIP was in OX-Land in April for a short stay. WA6IVM is preparing to put up a beam with provision for changing the azimuth as well as the usual rotation. K6RKG has installed 2-meter mobile gear in his car. All this came from a 2 meter

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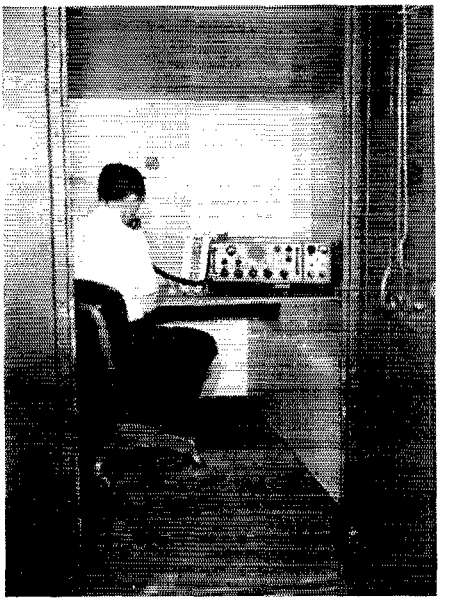
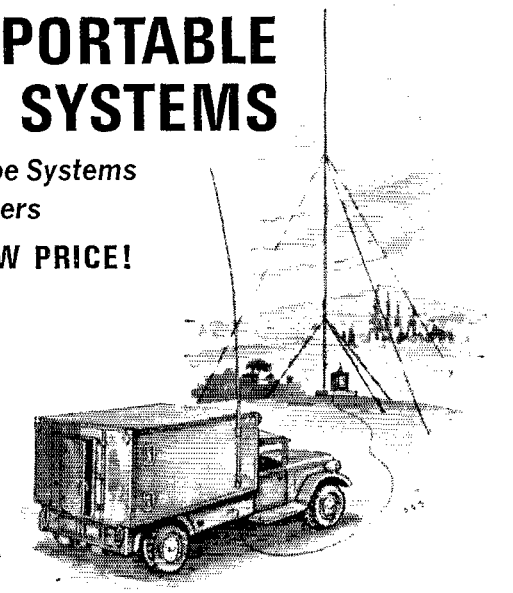


INTERIOR OF RF-2020 SHELTER



DEPENDABLE COMMUNICATIONS • Designed around the highly reliable R F Communications RF-301 Single Sideband Transceiver (military nomenclature AN/URC-58), the system provides 100 watts PEP and average power. The RF-301 is a self-contained synthesized exciter which permits the selection of any frequency in the 2.0 to 15.0 megacycle frequency range. One kilocycle incremental as well as continuous tuning is provided.

COMPATIBILITY • Compatible with other operational radio systems in the field, the RF-2020 Shelter series provides transmission and reception on Upper Sideband, Lower Sideband, Compatible AM and CW on any frequency within its range.

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POWER FLEXIBILITY • Extremely versatile, the RF-2020 Shelter series is designed for worldwide 115 volt, 50-60 cps, AC power. Available options include a portable AC generator for fixed operation, a built-in AC generator for mobile operation, and a DC adapter kit for emergency operation from the vehicle's battery.

QUICK DELIVERY • Systems are now available from off-shelf to 120 day delivery, depending on the options and the quantity required.

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BRIEF SPECIFICATIONS

		UNIT LIST PRICE
RF-2020	Complete Simplex Voice/CW System	$17,390
RF-2021	Complete Duplex Voice/CW System	26,200
RF-2025	Complete Simplex Voice, CW and Teletype System	23,055
RF-2026	Complete Duplex Voice, CW and Teletype System	34,710
RF-2027	Complete Duplex Voice, CW and Frequency Diversity Teletype System	41,585

Simplex systems include one RF-301 Transceiver and one RF-302 Antenna Coupler. Duplex Systems include two RF-301 Transceivers, one RF-302 Antenna Coupler and one RF-302R Remote Antenna Coupler. All RF-2020 Shelter Series Systems are complete with microphone, key, antenna, chair, clock, tabletop, storage drawers, ancillaries, etc., installed in a S-318 type shelter and ready for operation.

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demonstration by W6EJY at the Marin Club meeting in Apr. K6SAA is back on the Northern Calif. Net after a trip to Southern California and to the East Coast. The San Francisco Net continues to meet Mon. and Fri. at 1830 local time on 3900 kc. The section moved up in traffic standings in 1965, to 47th spot from 54th in 1964. Commendation was given to the section for emergency work in the ARRL Annual Report. W6ZZK is building a combination double/triple conversion receiver for 6 and 2 meters. The San Francisco Section *Courier* is being mailed to club officers and station appointees. If you have not received a copy, drop a line to the SCM, preferably on a Form 1. WA6MGG is handling publicity for the Humboldt Radio Club. WA6NFH, a polio victim, had a five-minute spot on the Eureka TV station. W6AEY was elected president of the Humboldt Club. WB6AVS and W6HSA are new ORSs. W6BYS keeps active. WB6DGH has a new HA-6 transverter. WB6KHS has added a linear to his 6-meter rig. K6OJO, W6CXU, W6CYO and WA6AUD are on the 1966 Greater Bay Area Hamfest Committees. W6DZQ showed color movies of Antarctica at the May Marin Club meeting. W6FVK has returned to Marin. W6LUM has loved to West Point after retiring from civilian service with the 6th Army. WA6LST worked into LU-Land and immediately became a DX hunter. Traffic: W6WLV 136, WB6GLD 110, W6KVQ 86, WB6OGF 31, K6SAA 19, WA6AUD 18, K6TWJ 18, WB6IMO 16, W6BIP 12, W6BWV 7, WB6DMP 7, WB6NOL 6, K6TZN 6, W6CYO 5, W6FAX 2, WB6JOX 2.

SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6JPU—WA6FBL is teaching code and expects several Novices. K6AXV is building a homebrew v.t.v.m. K6CPQ, WB6PDY and WB6IGD are experimenting with 2-meter antennas, horizontally polarized. W6OHT has a Galaxy V and is back on the air. WA6LML is running a Swan 240 mobile on 75 and 40 meters. The Delta Amateur Radio Club, in Stockton, boasts 49 members, indicating an upswing. WB6ZGP is running a Heath Apache SB-10 and a Mohawk receiver. WB6KUO is running a Galaxy V on 75-meter s.s.b. WA6PTG is the new TVI chairman. WA6TZN is in boot camp. WB6PCL is running double sideband a.m. on 75. K6ROU participated in the CD Party and says, "Never again with a transceiver." WB6NCJ is attending school, and this is cutting down his traffic count. The San Joaquin Valley Net operates at 1830 on 3915 kc. and all are invited. The San Joaquin Valley Net had 819 check-ins, 104 contacts, traffic of 16, 7 phone calls and 19 QST. W6QON is thinking again of running a kw. WA6SCE, for the sixth year, is the coach of the Little League in Bakersfield. W6KOK is playing with RTTY. I feel that I have done a good job as your SCM for the San Joaquin Valley and would appreciate your support in this election. Please note. Traffic: (Apr.) W6ADB 295, WB6HVA 216, WA6SCE 44, WB6NCJ 4. (Mar.) WA6SCE 29. (Feb.) WA6SCE 23.

SANTA CLARA VALLEY—SCM, Jean A. Gmelin, W6ZRJ—Asst. SCM: Ed Turner, W6NVO. SEC: WA6HVN. RM: W6QMO. The Red Cross of San Jose and Palo Alto, in cooperation with cities in the north Santa Clara and south San Mateo counties, took part in a successful drill aimed at fire protection, Operation Black Stop. The SCCARA communications trailor, W6UU/6, was in operation at the main site in Palo Alto. SEC WA6HVN did a fine job of organization and leading of the operations. WA6VJQ reports operations on the Mission Trail Net. K6DRX is busy in RACES and Navy MARS. K6HGV is active as an OES and is in favor of seeing more c.w. operations on v.h.f. WB6IZF reports that the entire ham population in the King City area is now signed up in AREC. W6SAW is active as OO and OBS and has a Clegg 22er. Herb is now a member of the Intruder Watch. WA6AVS has a new vertical on 40 meters. W6MMG works PCN. W6QBY works the SKETO and QCWA Nets. W6RFF is QRL with school work. W6ACW is active on NCN and has finished construction of a single-band rig for 20 meters. W6BVB reports 240 contacts in 57 sections in the Apr. CD Party. W6OH worked the Apr. CD Party and made contact with W1AW. WN6SSF is a new call on 80 meters from Santa Clara. WB6NXJ is a new ORS in Sunnyvale. W6AUC is active as OO. W6QMO reports that WB6HVA is doing a fine job as manager of NCN. Jeri also reports that the NCARTS visited the Stanford Linear Accelerator for its Apr. meeting with about 50 attending. W6ZRJ, along with SEC WA6HVN and RM W6QMO, attended the Pacific Division Directors meeting in Oakland in April, both for the SCM/SEC meeting and the general meeting. There were over 50 club representatives along with SCMs, SECs and Asst. Directors in attendance. W6VZE is our very active EC for Burlingame. Charlie reports that he is holding regular drills with about 12 mobile units. K6GK is very active with San Jose Red Cross station W6UW/UU and on NCN. W6DEF is originating traffic to *QST* authors. W6YBV retired his old transmitter and is using a TBW along with an ART-13. K6DYX is now on 432 Mc., along with W6SHK. WA6CVU is an active ORS in Cupertino. W6RSY

works RN6. WB6DMX reports that St. Joseph's College Amateur Radio Club now has the call WB6SHQ and is operating on all bands. The club is active on WCARS. W6UMI is active as an OO. Traffic: (Apr.) W6RSY 557, WA6CVU 257, K6DYX 226, W6YBV 134, W6DEF 129, K6GK 35, W6VZE 31, W6QMO 21, W6AUC 20, WB6NXJ 20, W6ZRJ 16, W6OIL 11, W6BVB 9, W6ACW 8, K6YKG 8, K6HGV 4, W6RFF 4, W6QBY 2, W6MMG 1. (Mar.) WA6YJQ 4.

ROANOKE DIVISION

NORTH CAROLINA—SCM, Barnett S. Dodd, W4BNU—Asst. SCM: Robert B. Corns, W4FDV. SEC: W4MFK. RMs: K4CWZ and WA4ANH. PAMs: W4AJT and WA4LWE. V.H.F. PAM: W4HJZ. K4EOF says that W1WJD requested and received permission to play a recorded tape of the EAN session featuring K4EOF at the National Convention in Boston. W4LEV reports excessive P.P. traffic handled from KG4AM, Gitmo, Cuba, because of the *Viking Princess* disaster and also Red Cross traffic because of the tornado in Florida. WA4UFQ is mobile with a new TR-3. WA4KWC has a new inverted "V" on 20 and has worked all states except Alaska. WA4-KGR is now DX-hunting with a new 4-1000, compliments of WA5IXC. K4ZVK has been appointed Asst. EC in the Raleigh area by K4FMW. From W4AJT: We have moved our RACES communications center to the War Memorial Auditorium cellar, with the 6- and 2-meter antennas about 100 feet high.

Net	*Freq.*	*Time*	*Days*	*QTC*	*Mgr.*
NCN(E)	3573 kc.	0030Z	Daily	341	K4CWZ
NCN(L)	3573 kc.	0300Z	Daily	150	WA4ANH
NCSSBN	3938 kc.	0030Z	Daily	98	WA4LWE
THEN	3865 kc.	0030Z	Daily	76	K4ODX

Traffic: (Apr.) W4LEV 1913, W4LWZ 354, W4EVN 338, K4OXM 145, W4OTE 125, WØGXQ/4 118, WB4BGL 107, K4EOF 99, W4UWS 99, K4CWZ 81, WA4UFQ 74, K4IEX 67, K4GNX 46, K4TTN 46, WA4ANH 36, WA4NUO 36, WA4FJM 35, WA4UVH 34, W4BNU 32, K4EO 31, WA4-LWE 28, WA4VTV 28, WA4CFN 23, WA4KWC 15, WA4-KGR 12, WA4ICU 8, K4ZVK 8, W4AJT 6, K4ZKQ 4. (Mar.) K4EOF 198.

SOUTH CAROLINA—SCM, Charles N. Wright, W4PED—SEC: WA4ECJ. Asst. SECs: W4WQM, WA4-EFP. RM: K4LND. PAM: K4WQA.

SCN	3795 kc.	Daily	0000Z/0300Z	Apr. Tfc: 81
SCSSBN	3915 kc.	M-F	0100Z, S-S 0000Z	Apr. Tfc: 277
SCSN	3795 kc.	Daily	2330Z	Apr. Tfc: 14

The Spartanburg Club was again active relaying scores for the Betsy Rawls Golf Tournament. New officers of the SPARC are W4NTO, Ledford Sumner and K4LEI. WB4AEM won a blue ribbon for his ham exhibit at the local Science Fair. WA4IKU, off on a European trip, hopes to operate from 4U1ITU and other DX spots. W4VCH reports a 1½-hour 6-meter QSO with old cronies in Chattanooga—about 300 airline miles. W4JA is working on a new homebrew rig and t.r. switch. Results of Feb. FMT (parts per million error): W4NTO, 1.0; W4FFH 2.1; W4PED, 15.3; W4JA, 21.5; K4AVU 27.7; K4YYL 58.1; W4AWY, 141.4. Look for the N. Augusta club operating portable in Edgefield/McCormick Counties in the August S.C. QSO Party. Traffic: K4LND 169, W4WQM 100, K4LNJ 67, W4JA 43, W4NTO 36, WA4QKQ 19, W4-PED 17, WA4HFA 10, WB4AEM 5, WA4IKU 5.

VIRGINIA—SCM, H. J. Hopkins, W4SHJ—SEC: W5VZO/4. PAM: K4SCL. RMs: W4SHJ, WA4EUL, K4-LJK. All members desiring to submit activity reports on Form 1 cards are requested to order them from the Communications Department, ARRL Hq. The SCM keeps a small supply on hand but they sure go down fast. Thanks to all for the many activity reports; it puts a lot of extra work on the SCM but that's what we are here for. K4-ASU has relocated in Springfield. The Virginia section surely will feel the loss of W5VZO and K4SCL when they leave the state later this year. K4KNP has rearranged the shack and now has the best operating layout in dozens of years of hamming. W4SHJ and WA4NJG plan to have mobile rigs in the near future. OES K4SUM reports plenty of activity on 2 meters and 432 Mc. There still are many areas of the section with no EC and many with no provision for local nets on 2, 6 or 10 meters. Traffic: (Apr.) WA4UMX 213, WA4YSE 208, W4DVT 182, W4RHA 168, W4NLC 144, WA4EUL 142, K4SCL 118, K4LJK 98, K4-FSS 88, W4OWE 86, W4SZT 70, WA4URN 70, K4ITV 68, W4BWF 66, WA4QOC 61, W4OKN 51, WA4DAI 49, WA4-OHZ 48, W4ZM 34, K4YCH 27, W4ZAU 27, K4KNP 26, WA4PUI 26, K6HPR/4 23, W4GPD 21, W4BZE 14, WA4-FEY 14, K4VCY 14, WA4JJW 13, K4LMB 13, WA4TUF 12, WA4NJG 11, K4SDS 10, W4WG 10, W4MK 8, W4KX 6, K4MLC 5, K4PIK 5, W4TE 4, W4ZMT 4, W4PTR 3, K4YEE 1. (Mar.) W5VZO/4 73, K4SDS 6.

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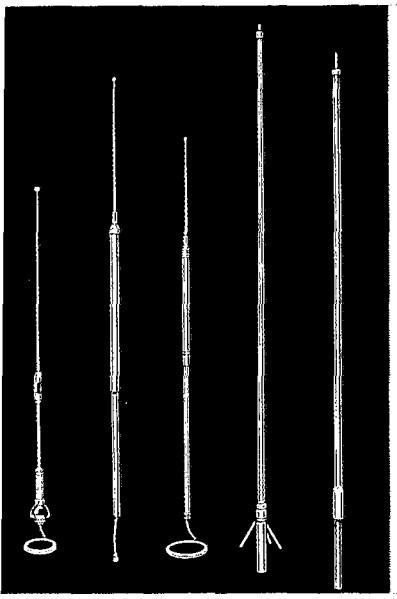

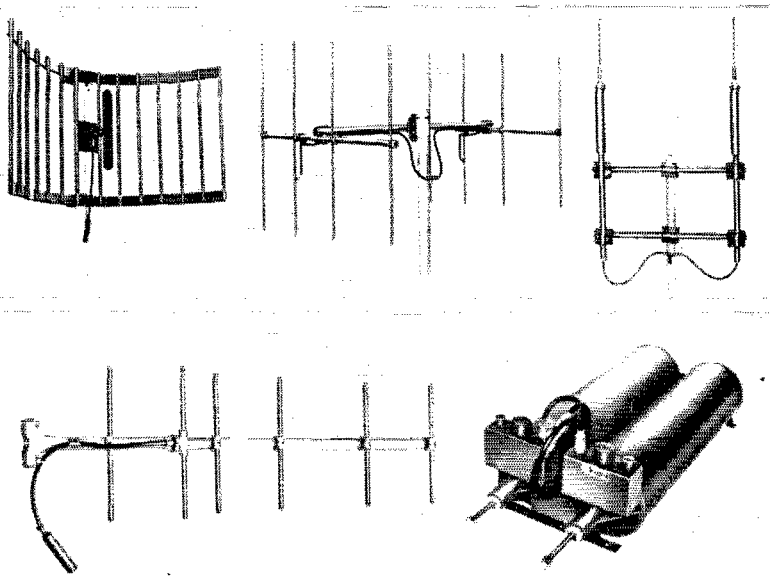

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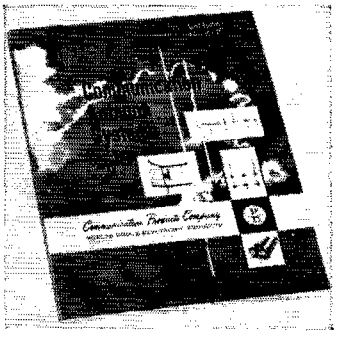

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WEST VIRGINIA—SCM, Donald B. Morris, W8JM—SEC: W8SSA. RMs: K8TPF, W8LMF. PAMs: K8CHW, W8IYD. C.W. Net Mgr.: WA8GRE. Nets meet on 3570, 3890, 3903 and 3905 kc. Officers of the new QCWA Chapter, Fairmont, are W8PZT, pres.; W8AKQ, vice-pres.; W8QR, secy.; W8BOK, publicity. Others attending the first meeting were W8REH, W8CCN, W8ESQ, W8EHA, W8CLX and W8JM. W8GUL, active in ARPSC work, has a new Drake T-4X. The Morgantown Radio Klub has changed its name to the Monongalia Wireless Assn. and WA8HMU is club historian. W8DYJ and W8FRV have new TR-4. K8CHW reports WVN Phone, 21 sessions, 459 stations, 128 messages. For WVN C.W., WA8GRE reports 27 sessions, 134 stations and 135 messages. WA8PXF is attending Natl. Science School, Ohio U. WA8KQX is working at R. L. Drake. WA8MAT has reached 80 countries with low power. WA8JYR is a new OES/OBS. W8PQQ attended the National Convention. The Black Diamond ARC Annual Hamfest again will be held at Bluefield. Contact K8ZDY for information. Hq. commends West Va. in overall traffic, jumping from 40th in '64 to 34th in '65 with 9415 messages. Regional nets on 10, 6 and 2 continue to grow. See you at Jackson's Mill, July 2 and 3. Traffic: WA8QND 163, WA8POS 141, WA8PXF 95, W8HZA 61, K8BIT 51, WA8GRE 43, W8CKX 38, K8WWW 22, WA8KAN 20, WA8IMY 13, W8GUL 11, WA8MAT 10, WA8MRK 7, K8MQB 5, K8TPF 5, WA8CKN 4, K8QEW 4, K8SOR 4, WA8BSE 3, K8CHW 3, WA8BUM 2, W8GXD 2, K8KRW 2, WA8OVC 2, K8ZDY 2, WA8GGI 1, WA8KMZ 1, WA8PDJ 1, WA8RQB 1, K8ZPR 1.

ROCKY MOUNTAIN DIVISION

COLORADO—SCM, Donald Ray Crumpton, KØTTB—Asst. SCM: A. E. Hankinson, WAØNQL. SEC: WØSIN. PAM: KØFDH. WAØNQL is subbing again for KØTTB. By the time this is in print, Field Day 1966 will be in the past. It will be interesting to know how many groups go out. Some comments around Denver are in favor of a local or statewide trophy to stimulate competition. Maybe next year. Daytime traffic-handlers are reminded that the High Noon Net meets Mon. through Sat. at 12 noon local time on 3895, s.s.b./c.w./a.m./RTTY. During April check-ins numbered 591, QTC 182. Liaisons were with the 12th Region, Wyoming and Nebraska Nets. The YLRL in Colorado, in cooperation with the Denver USO, provides message blanks for servicemen. KØZSQ is a primary outlet. Section members are reminded that this column depends on your reports. Also remember that this column was written in the first week of May, lead time, etc., because of printing requirements. Traffic: KØZSQ 226, KØDCW 96, WAØJEV 65, KØCER 4.

NEW MEXICO—SCM, Bill Farley, WA5FLG—SEC: K5HTT. K5VXJ checked into the nets despite the fact that he was portable in Enid, Okla. W5ALL, in Cloudcroft, reports that he has to watch for bears playing around with his coax. Well, the Mesilla Valley Bean Feed was a very enjoyable outing. Everyone reported that they had a most enjoyable time. WA5MCX has joined the big guns on 2 meters. He has even worked Alamogordo. The Road Runner Traffic Net will remain on 3.838 at 1800 MST for the summer. Seems like everyone has been stopping at W5ROH's. He reports visits from WA5MCX and WA5FLG among others. WA5LDV, in Gallup, reports some good activity by the fellows up there. They want to stir up some traffic-handling for that area and hold a local emergency net. Hope you have some luck. W1ICP, Novice Editor for *QST*, gave a talk at Alamogordo June 18. Traffic: WA5FJK 67, WA5FFL 31, W5UBW 30, K5VXJ 21, WA5MCX 15, W5WZK 14.

UTAH—SCM, Marvin C. Zitting, W7MWR/W7OAD—Asst. SCM: Richard E. Carman, W7APY. SEC: W7WKF. Section nets: BUN meets daily on 7272 kc. at 1930Z. UARN each Sat. and Sun. on 3987.5 kc. at 1500Z. The Utah Hamfest will be held at Liberty Park in Ogden Sat., July 16. Registration will begin at 9:30 A.M. and festivities will begin at 10 A.M. K7RAJ won first place in the South Central Utah Science Fair and second place in the Greater Utah Science Fair with his homebrew oscilloscope project. W7EHX still is busy with her job in Geneva, N.Y. but expects to come back within the next few months. W7POU still is collecting DXCC confirmations. W7BAJ has been very busy with club work, closing out his business and making out-of-town trips. W7VEX and W7CYH are working rare DX with new triband beams. W7CCP is busy at Stanford University working on an advanced degree but can be heard from the school's club station, W6YX, each Sat. morning on 40 meters. Traffic: W7OCX 102, WA7BME 92, K7ERR 8, W7MWR 6.

WYOMING—SCM, Wayne M. Moore, W7CQL—SEC: W7YWE. RM: W7BHH. PAMs: W7TZK, K7SLM. OBSs: W7TZK, K7SLM and K7ZHT. Nets: Pony Express, Sun. at 0800 on 3920; YO, Mon., Wed., Fri. at 1830 on 3610; Jackalope Mon. through Sat. at 1215 on 3920.

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With directional coupler and indicator....$94.95
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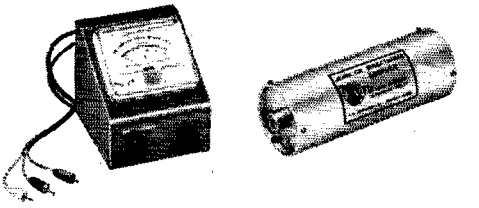

DIRECTIONAL COUPLER AND INDICATOR—Provides continuous reading of SWR and relative power in transmission line. May be permanently installed in 52 ohm transmission line. Handles full legal power.
Cat. No. 250-37
Directional Coupler, wired and tested.....$11.75
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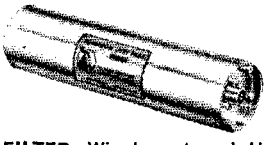

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52 ohms, wired and pre-tuned.....$14.95
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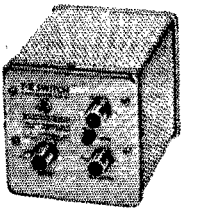

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T-R Switch wired and tested with tube....$29.95

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250-43-1	26 to 30 MHz
250-43-2	28 to 30 MHz
250-43-3	14 to 18 MHz
250-43-4	30.5 to 34.5 MHz

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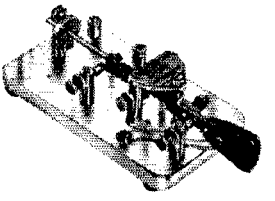
Cat. No.	Range
250-43-12	26 to 30 MHz
250-43-22	28 to 30 MHz
250-43-32	14 to 18 MHz
250-43-42	30.5 to 34.5 MHz



DELUXE SEMI-AUTOMATIC KEY—Adjustable from lowest to highest speed... smooth easy action... 5 adjustments... separate height adjustment for paddles. All parts heavily chrome plated.
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⅛" contacts,
black wrinkle base.....$20.30
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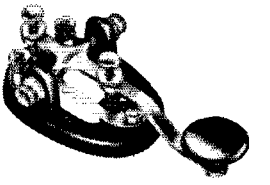

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Black Wrinkle
no switch.....$3.50
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Cat. No. 114-311
Chrome plated,
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Cat. No. 114-311-3
Chrome plated
with switch.....$6.50

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Some new mobiles in the state: W7HEB, K7MGM and K7SLM. Don't forget the State Hamfest at Deer Haven July 23-24. The Casper Club has scheduled a series of technical talks and movies throughout the year for the first Tue. of each month. WA7BFV will be working in Jackson part of the summer. The Road Runner Net has been organized. It meets at 0630 on 3920 and is composed mostly of the younger age group of hams. Some of the old-timers might take a lesson from these energetic young hams as regards enthusiasm, etc. Traffic: WA7CLF 81, WA7DNZ 70, W7BHH 16, K7AHO 10, W7NKR 8, K7SLM 8, W7GSQ 4, K7JED 4, K7OWT 2, K7OWX 2, W7TZK 1, W7VJI 1.

SOUTHEASTERN DIVISION

ALABAMA—SCM, William S. Crafts, K4KJD—Asst. SCM/SEC: W4NML. RM: WA4EXA. PAM: K4WHW. Enjoyed seeing everyone at the Birminghamfest. Remember the N. Ala. Hamfest Aug. 21 at Decatur. AEND is back in business at 0000 GMT daily on 3725 with WØHXB/4 as net mgr. Apr. net reports (times GMT):

Net	*Freq.*	*Time*	*Days*	*Sess.*	*Ave. Tfc.*	*Ave. QNI*
AENB	3575	0100	Daily	31	3.3	5
AENH	50.7	0200	Sun./Tue.	9	.66	18.8
AENM	3965	0030	Daily	30	4.3	41.9
AENO	50.55	0115	T/T/Sat.	12	.52	13
AENP	3955	1230	Mon.-Sat.	26	1.4	13.4
AENR	50.55	0115	Wed./Fri.	8	.5	21.5
AENT	3970	2230	Daily	35	.8	5.8

New equipment: K4VPP-NCX-5, K4UUC-TR-4, WA4YTJ-SB-100. W4ELX was given the citizenship award at the Birminghamfest. K4IQU, K4ZQM, K4ZQP and K7PAG/4 are on 146.94 f.m. WA4VQI is the new net mgr. of AENR. Thanks to WA4EBS for an FB job while NM. WB4AYL and WB4BMO are new Generals, both active on the c.w. nets. Traffic: (Apr.) W4ZJY 136, K4AOZ 89, WA4UXC 78, WA4EXA 53, W4NML 41, WB4BMO 38, K4NUW 35, K4WHW 34, K4KJD 28, K4BSK 23, WA4EEC 19, WA4OCL 15, K4GHX 14, K4FZQ 12, W4HON 11, K4HJX 10, K4NSU 10, W4DGH 7, K4WOP 7, W4ZNI 6, K4UUC 5, WA4WLD 5, WA4EBS 4, WA4GNK 2, W4WGI 2, WA4FWP 1. (Mar.) K4AOZ 105.

CANAL ZONE—SCM, Mrs. Lillian C. Smith, KZ5TT—SEC: KZ5MV. The Crossroads Amateur Radio Club held a farewell party for KZ5TG on Apr. 19 with 44 hams and XYLs attending, including 10 who made the "transcontinental" trip from the Pacific Side to wish Tom a happy retirement. KZ5FX reports a fine time at the ARRL Convention in Boston. Clem also figures in the news for having received the first 4th Regional Net certificate ever issued to a KZ5 and for his total of 2400 in the DX Competition. KZ5OB and KZ5OA are maritime mobile as K5YGF and WB4BEN as of May 15 and will mobile in the U.S. while on vacation. KZ5MV is off the lower bands—his house is being reroofed and the antennas are down. The CZARA and USAFSO MARS were both active in Field Day activities. Traffic: KZ5LT 132, KZ5TT 102, KZ5JC 63, KZ5FX 20.

EASTERN FLORIDA—SCM, Albert L. Hamel, K4SJH—SEC: W4IYT. RM C.W.: W4LUV. RM RTTY: W4RWM. PAM S.S.B.: W4OGX. PAMs: W4SDR, W4TUB. V.H.F. PAM: WA4BMC. *Flash*: On his third try K4YOQ passed the Amateur Extra Class exam. While Jim is no old-timer he is no youth either. He stuck with it and made it. Those who have not tried the "top band" 160 meters this past winter now have all summer to get prepared for next winter. In case you wonder "what good is 160 meters," this station was heard in England at 25 watts input. By now the Orlando Hamfest is over. Advance congrats to the gang on an excellent job. Say, fellers, try to keep your traffic and net reports separate from your other correspondence. It could be missed in the rush. If my "new ham" and Novice activity grows any bigger I'll need a longer day. Sure is a nice feeling, though. Why don't *you* try it? Our new RATT RTTY traffic net is growing, slowly but surely. Once again, you c.w. and phone traffickers are urged to route traffic via this net. Give a boost. See your RM or PAM for details or contact W4ZAG, Tampa. Traffic: (Apr.) W3CUL/4 2665, W4FP 1189, WA4SCK 1008, WA4NEV 657, WA4NBT 656, W4TUB 570, K4BNE 249, W3VR/4 189, K4KDN 166, WA4OHO 160, WA4DEL 156, K4SJH 129, W4AKB 118, WA4WEB 103, W4OGX 96, W4SDR 81, WA4PDM 79, W4EHW 69, WA4KDL 69, W4ILE 62, K4ILB 60, WB4AJV 54, W4TJM 54, WA4HDH 53, WA4NBE 49, W4VPQ 49, WA4FHG 48, K4BY 42, W4IYT 39, W4NUH 38, WA4CIQ 34, W4VDC 33, W4SMK 32, K4EBE 23, K4DAX 21, W4MOL 21, WA4BGW 18, W4MSH 8, W4LMT 7, W4IE 6. (Mar.) WA4HDH 96, WA4WZD 46.

GEORGIA—SCM, Howard L. Schonher, W4RZL—Asst. SCM: James W. Parker, Sr., W4KGP. SEC: W4DDY. RM: W4CZN. PAMs: K4PKK, WA4JSU, WA4-

Home Station Performance

with a mobile rig?

LOOK INTO THE SWAN 350

The performance of the Swan 350 in your car may not quite equal your home station, but you will be amazed at how often the difference is very small. Many Swan mobile operators have established enviable DX records. QSL cards on file here at the factory verify solid contacts from all continents including stations in Antarctica.

Old timers who have fought QRM with old style AM equipment have discovered a new world of mobile communication thanks to the power and punch of the Swan 350 and 400 transceivers. The efficiency of the SSB mode coupled with the convenience of transceive operation and a powel level unmatched in the field, represent a combination well worth looking into. So, if you haven't heard a ZL, DU or JA say, "stand by, the mobile station," then, why not put a Swan in your car this summer!

SWAN SPEAKS YOUR LANGUAGE
ASK THE HAM WHO OWNS ONE

The 350 installs conveniently under the dash of most cars, and the power supply goes under the hood. The best location for a mobile rig is naturally up front under the dash, but if you have a car with a center console and a consequent space problem, you will be happy to learn that either the 350 or 400 can be installed in the trunk. The 406B external VFO was designed to permit trunk mounting of either transceiver, and thanks to its miniature size, the 406B can be mounted conveniently in any car, either under the dash or on top at eye level. Add an efficient 5 band mobile antenna such as the model 55 or 45 Swantenna, and you can enjoy mobile operation to the fullest. Home station performance? Well not quite, but nothing comes closer than a Swan Transceiver.

73, Dave Howard, WA6OQY

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Model 45 Swantenna	$ 65.00
Model 55 Remote Switching Antenna	$ 95.00

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GAY. Glad to welcome WA4CHN back to Georgia. K4UUM spent two weeks in Virginia. W4LLR is active on 2-meter f.m. WA4GAY gave 15 a whirl with good results. WA4POM is acting as alternate for the alternates on the GSSB Net. W4HYW participated in the Florida and Iowa CD Parties. WA4UYT is working over some surplus 2-meter gear. K4BAI is EC for Muscogee and Chathoochie Counties. WA4JES continues to gather the Form 1 reports from GSN. Regional liaison stations for GSN: W4GXU, WA4RAV, W4PIM, W4CZN, WA4UPE, WB4BDG, W4DDY, WA4UYT, K4NFP, WB4BGL, WA4GAY, W4TFL.

Net	*Freq.*	*Time (GMT)*	*Sess.*	*QNI*	*QTC*
GSN	3595	0000 & 0300 Dy	60		240
GSSN	3975	0100 Dy.	30	971	158
GTN	3718	2200 Dy.	30	220	85
G Teen. Net	3855	1600 Sat. 2130 Wed.	9	85	26
Cobb Co. AREC Net 145.8					
N.E.G.E.N.	52.250	1730 Sun.			

All operators are urged to reregister for the AREC to bring the file up to date. Mail a card with information or send a message to your EC or W4DDY. Traffic: W4FOE 256, K4FLR 222, W4PIM 155, W4CZN 141, WA4WQU 75, W4TFL 66, WA4JSU 62, W4DDY 59, W4RZL 40, WA4JES 37, K4BAI 26, WA4GAY 26, WA4UYT 24, WA4POM 20, WA4LLI 18, K4UUM 18, WA4WDE 15, WA4FUN 13, W2-TPV/4 9, W4HYW 8, WA4WKZ 7.

WEST INDIES—SCM, Albert R. Crumley, Jr., KP4DV—The New Board of Directors of the PRARC is starting off with a bang, with KP4s CK, BBN, AQQ and CL at the helm. KP4WT is active in the Antilles Weather Net, Red Cross Net, MARS and CAP nets. KP4RA and his XYL, in Arecibo, are very active with Collins gear. KP4AV again is active after many years of inactivity. KP4AVB works 40-80. KP4AMN, out of the Air Force, has a new baby. KP4BL is very active on 20-meter s.s.b. He advises that the FAA Communications gang is organized on 14,305 kc. Sat. at 1300 GMT. W4MCL/KP4, now KP4CRD, is active on 10-20-40-75-meter s.s.b. KP4ID, Red Cross Hq., San Juan, conducts drills on 3820 kc. s.s.b. at 0001 GMT Fri. and 50.2 Mc. 0200 GMT, Sun. drill is on 7240 kc. at 1400 GMT (A.M.) and 50.2 Mc. at 1400 GMT. KP4JM is in charge and KP4s BFE, BKP and AMJ assist in Red Cross operations. KP4BBI is active on 40-80-meter phone/c.w. KP4MS is manager of the El Portal Hotel in the Santurce-Condado section. KP4DV is QRL with CAP. Traffic: KP4WT 274.

WESTERN FLORIDA—SCM, Frank M. Butler, Jr., W4RKH—SEC: W4MLE. PAM: K4NMZ. RM: W4BVE. Section net reports:

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*
WFPN	3950 kc.	2300Z	Daily	30	565	197
QFN	3651 kc.	2330/0300Z	Daily	60	733	754

WFPN and QFN operated for several hours in emergency session on Apr. 5, handling tornado inquiry traffic. Pensacola: OM and XYL WA4UAJ and WA4UAI are active on 6 and 2 meters. Fort Walton: W4BVE attended the disaster communications meeting in New Orleans, and described the operation of WARN. W2ZRX/4 has a new SR-42 for 2 meters. WA3APO/4 is up to 100 countries worked. Crestview: K4KHV has a BC-610 fired up. The Crestview gang is stirring up activity on 28.6 Mc. nightly. Seagrove Beach: K4QVL is recovering from an operation. Panama City: K4MZA is now EC; WA4NRP continues as RACES RO. Defuniak Springs: W4HQN was seriously injured in an auto accident. Chipley: WN4ZIM has a Twoer and six-element beam on 145.2 Mc. Quincy: The h.f. s.s.b. rig purchased by the c.d. has been installed in the EOC. K4QDN is chief operator. Tallahassee: K4YPI is now working for Dayco Electronics. K4VRT got another good score in the recent FMT. Traffic: K4BSS/4 298, WA4IMC 203, K4VND 194, W4BVE 139, K4NMZ 112, WA4EOQ 85, WA4JIM 31, W4IKB 20, WA4NRP 6.

SOUTHWESTERN DIVISION

ARIZONA—SCM, Floyd C. Colyar, W7FKK—SEC: K7NIY. PAM: W7CAF. RMs: K7NHL, K7TNW. Fine OO reports were received from K7OIX and K7RUR. W7BYF/K7YSE has 45 states confirmed on 6 meters. It is with deep regret that we report that W7HSF, of Phoenix, has become a Silent Key. W7AYY reports that W7AWH has a new 6-meter rig and also that ex-W7AAY is now W4FKF and is looking for the Arizona gang on 6 meters. K7NII reports that he has completed the following projects: I.f. noise blanker, thermos bottle oscillator frequency control for his 432/1296 Mc. exciter and an audio filter. W7FQW is the proud owner of a Drake T-4X transmitter and an R-4A receiver. WA7BOA and WA7BOB, our young DXers, now have their beam on a newly-erected 40-ft. tower and expect much better reports. K7-MTZ was high traffic man for April. Your SCM is the proud father of a new son, his sixth jr. operator. Traffic:

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	301-E1	144-145	.6-1.6
	301-E2	145-146	.6-1.6
	301-F	144-146	28-30
	301-Q	144-148	14-18
	301-R	144-148	7-11
	301-S	143.5-148.5	30-35
6M	301-B1	50-51	.6-1.6
	301-B2	51-52	.6-1.6
	301-C1	50-54	7-11
	301-C2	50-54	14-18
	301-J	50-52	28-30
20M	301-G	13.6-14.6	.6-1.6
CB	301-A1	26.5-27.5	.6-1.6
	301-A2	26.8-27.3	3.5-4.0
40M	301-K	7-8	.6-1.6
CHU WWV	301-L	3.35	1.0
	301-H	5.0	1.0
Int'l. Marine	301-I1	9-10	.6-1.6
	301-I2	15-16	.6-1.6
	301-M	2-3	.6-1.6
Aircraft	301-N1	118-119	.6-1.6
	301-N2	119-120	.6-1.6
	301-N3	120-121	.6-1.6
	301-N4	121-122	.6-1.6
	301-N5	122-123	.6-1.6
	301-N6	123-124	.6-1.6
Fire Police VHF Marine etc.	301-P1	154-155	.6-1.6
	301-P2	155-156	.6-1.6
	301-P3	154-158	7-11
	301-P4	154-158	104-108
	301-P5	156.3-157.3	.6-1.6
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	301-W2	162.55	10.7
	301-W3	162.55	107.0
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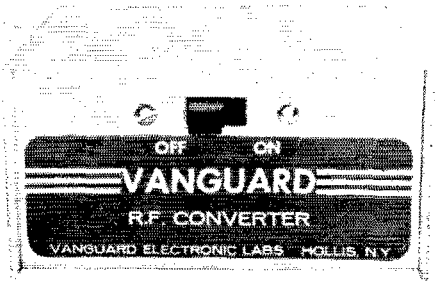

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K7MTZ 430, K7NHL 383, K7RWI/7 57, K7RUR 24, W7-FKK 22, K7UXB 16.

LOS ANGELES—SCM, H. G. Garman, W6BHG—Asst. SCM/SEC, Wallace R. Calkins, WIKUX/6. RMs: W6BHG, WB6BBO, W6QAE. PAMs: K6MDD, W6MLZ, W6ORS. BPLers this month are K6WAH, K6EPT, K6-YVN, WB6QXY, WB6BBO and K6IOV. W6GYH will be absent from the airways approximately three months—East Coast bound. K6IOV is busy with the GSN Slo-Speed C.W. Net on 3590 kc. New officers of the Salvation Army D.C. Net: K6MDD, pres.; WA6DBB, secy.; WA6-WVI, 1st vice-pres.; K6VVT, 2nd vice-pres. WB6KNK has a new Swan 350 and Twoer. WN6RQB is a new-comer to 2 meters. WN6ROM is experimenting with 2-meter antennas. WB6OJR has a 14AVQ. WB6MPH is trying for 6 meters. WB6KVA is working on an ARC-3 and a BC-639A for 2-meters. WA6WKF was reelected operations manager of the SoCal 6 Net. W6WPF attended the 1966 ARRL National Convention in Boston, Mass. K6ASK is building a Heath HO-10 monitor scope. WB6KGK finally received his MTHC No. 204. WB6BBH hopes to have the Mod. 19 going soon. W6BMZ/6 reports full break-in and new 80- and 40-meter dipoles. WB6AEL's old rig working 30 watts is getting better reports than with his 75-watter. W6AM reports 346 countries worked. K9ELT/6 now has W6DQX and has moved to a new QTH. W6IBD has the large solid state P.S. for the final working fine. WB6MQF is off with rig trouble. W6ORS is mobile 40 meters with an Eico 753 s.s.b. W6PUZ reports his 1st Nevada/California QSO on 432 Mc. WA6YKP departed for San Juan, P.R. After 2 years WA6YMY has worked all California counties. WB6KGK reports that a young lady, who has been blind for 8 years and almost deaf for 22 years has received her license with the call WN6SSZ. WB6KGK is arranging a station for her. It is suggested that if you are operating portable or mobile, or planning such operation, you review U.S. amateur regulations Article 97.87, transmission of call signs, particularly telephone procedure. W3QYH, operating portable in Abilene, Tex., received two citations from different FCC monitoring stations for improper identification while operating his station on voice. He was using the c.w. procedure and on voice the word "portable" and geographical location must be given. Support your section level nets: The Eight Ball Net (EBN) Mon. through Fri. at 1615Z and Tue. through Sat. at 0230Z on 50.5 Mc.; the Southern California Net (SCN) daily at 0300Z on 3600 kc. Traffic: (Apr.) K6WAH 1941, K6EPT 1762, K6YVN 799, WB6QXY 724, WB6BBO 625, W6GYH 379, W6MLF 312, K6IOV 305, K6MDD 305, W6-QAE 208, WB6KVA 154, W6FD 117, WA6WKF 111, K6-LDM 110, W6WPF 87, K6ASK 83, WB6GGL 74, WB6-KGK 71, W6BVK 68, W6YRA 56, WB6BBH 52, W6BHG 41, W6TXJ 35, W6BMZ/6 32, W6MLZ 30, W6-USY 18, W6NKR 14, WB6AEL 9, WB6GXI 9, W6PCP 9, W11KUX/6 8, W6QJW 8, W6HUJ 7, K6HV 7, WA6KZI 5, W6JNX 3, W6LDA 3, W6OI 3, W6AM 2, W6DGH 2, K9ELT/6 2, W6LVQ 2. (Mar.) W6QAE 285, K6UMV 8, W6YRA 5.

ORANGE—SCM, Roy R. Maxson, W6DEY—W6-BNX and W6PJU both broke bones in their feet. WA6-IDN and W5MVL co-founded the new DeMolay AR Net. WB6LIO and WB6NGE had a Swan 350 working at the Valencia HS Science Fair. W6FB's QTH still is Palm Springs. I goofed, sorry. WB6PHO had a "twoer" mobile for FD use at the W6ZE site. The Tri-County ARA, Inc., meets the 2nd Mon. of the month at the Pomona First Federal Savings and Loan building, Garey and Center Sts., Pomona, info via *QRM*, the club paper by editor WB6JAO. WA6TAG, Desert Area EC, reports 2 new AREC members and WA6UVW, Palm Springs, Asst. EC. K6IME has a new Drake T-4 and R4A. W6WRJ, W6BZR and W6YMV preregistered about 1000 in the Southwestern Division Convention. WB6RME is a new AREC member. WB6OPA is leaving K6MCA. WA6QWI and K3LBX are the new operators. C-Bar-C now holds meetings at the Regional Facility of the Calif. Disaster Office. If interested in the newly-reorganized Yorba Linda ARS, please contact either WB6LCO or WB6ASQ. Traffic: K6MCA 3707, W6ZJB 1498, WB6JFO 301, WA6ROF 274, WA6OQM 129, K6IME 79, W6WRJ 33, KØYVN/6 25, WA6VUI 20, WA6IDN 17, K6GMA 9, WA6TAG 9, WB6NGE 8, WB6-ASQ 7, K6ZPE 7, WB6LCO 5.

SAN DIEGO—SCM, Don Stansifer, W6LRU—W6-VNQ, ORS in Solano Beach, has a new home-built final using 572Bs in grounded grid. W6LKC and W6YZV, in Fallbrook, have been conducting code classes for beginners at their home Mon. evenings. K6RYI retired, sold his ranch in Fallbrook and is moving to San Diego this summer. W6NWG, the Palomar Club call, was active in May for a week end at the Annual Fiesta in San Marcos. WA6-UEL and WB6PAG did yeoman work on the project. Anyone with a knowledge of t.m. repeater systems please send the call, location, input and output frequencies to

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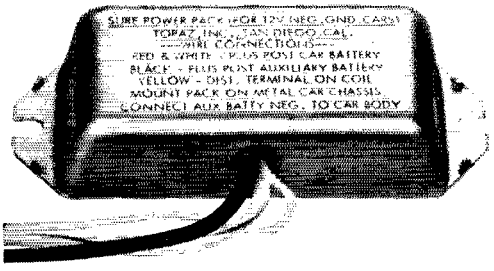

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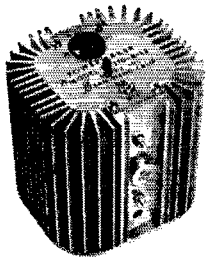

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OES WA6OSB, in San Diego, who is compiling a directory of same. The June meeting of the San Diego DX Club was held at the home of Pres. WB6LZI, with a visiting ZL as honored guest. Many San Diego area hams enjoyed the Convention at Disneyland. Section amateurs are reminded that mail for the SCM between July 1 and Sept. 1 should go to Route 3, Box 47, Bishop, Calif. 93514. New OO WA6YME, La Jolla, puts out Official Bulletins on 6 meter. Traffic: K6BPI 6194, W6IAB 5828, W6YDK 5235, WB6JUH 816, W6VNQ 568, WB6GMM 646, W6EOT 453, W6BGF 235, W6LRU 10.

SANTA BARBARA—SCM, Cecil D. Hinson, WA6-OKN/WØCUG—SEC: WB6NDP. RM: W7WST/6. The Santa Barbara area has an active RACES group and regular meetings are held at the City Hall the 3rd Mon. of each month. Contact WB6NDP for further details. K6AAK, after a long holdout, has joined the ranks of Collins owners with the 75S, 32S, and 30S linear. WA6IJZ with us again after some Viet Nam duty and is back at his DX tricks. Officers of the Simi Valley ARC are K6-GOS, pres.; WB6QGE, vice-pres.; WB6LNF, secy.-treas. Major club activities in Simi are v.h.f. transmitter hunts and construction of a 6-meter repeater. W6ORW/6 has a new SB-300 and SB-400 to go with his new antenna. W6-AGO did well in the ARRL FMT. K6LBV's 60-ft. tower came down in the 12-kc. line during the last high wind. K6KCH has suffered a heart attack and will be off the air. K6GV is taking it easy after an auto mishap and can be found on 3895 kc. Traffic: W6ORW 6.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. L. Harbin, W5BNG—Asst. SCM: E. C. Pool, W5NFO. SEC: W5PYI. PAM: W5BOO. RM: W5LR. I was disappointed in not being able to attend the 6th Golden Spread Hamfest at Amarillo Apr. 30 and May 1. Believe it or not, the weather was the cause; all the airline flights were either cancelled or delayed too late for me to make it. Because of weather conditions and local interference I have been unable to get any kind of report as to the attendance at the hamfest. As usual I am sure that it was a successful meeting. For an explanation, I spent the entire day at the airport trying to get an alternate flight and finally gave up at 5 P.M. The Arlington ARC is working hard on the West Gulf Division Convention. Looks like the gang is preparing for the DX season on 6 meters as there is much activity with the erection of 6-meter beams going on. WA5-KYO had an antenna-raising with the assistance of K5-WWZ, K5LNM, WN5MUL and WA5HTQ. Several XYLs assisted with coffee and donuts and much arm-waving. The Arlington Club had an unexpected set-back with the passing of WN5OLP, Novice Convention chairman. WA5-NEX is confined with an undetermined illness. I hope it is not too serious and that he will recover soon. Traffic: K5DBJ 77, K2GKK/5 68, K2EIU/5 26, W5LR 5.

OKLAHOMA—SCM, Daniel B. Prater, K5CAY—Asst. SCM: Sam Whitley, W5WAX SEC: K5DLP. RM: W5-QMJ. PAM 75: WA5BTQ.

Net	*Freq.*	*Times*	*Days*	*RM-PAM*	*QNI*	*QTC*
OPEN	3850	0800 CST	Sun.	W5PML	198	12
STFCN	3850	1745 CST	M-Sat.	WA5BTQ	579	175
OLZ	3682.5	1900 CST	M-Fri.	W5QMJ	86	84
SSZ	3682.5	2145 CST	M-Fri.	W5QMJ	78	70

The Wheat Straw Club reports five new calls, WA5OZF, WA5OVQ, WA5OYC, WA5PBC and WA5PCS, as a result of its code and theory classes. WA5OZF has his new home-brew 6-meter beam working. During the East Pageant in the Wichita Mountains near Lawton, the Lawton-Fort Sill radio group originated over 700 messages using 2 meters and RTTY on 75 meters for a link to Lawton for dispersing traffic. K5LMG is a new OBS on 3682.5 at 2300Z Mon., Wed. and Fri. W5EMB reports excellent results with all-transistor 75-meter phone transmitter with 10 watts output. The Electron Benders Radio club of Tulsa had antennas and units in place for the International Petroleum Exposition May 12-21. The Oklahoma Central V.H.F. Amateur Radio Club has been invited to handle the information booth at the Oklahoma State Fair in Oklahoma City Sept. 24 through Oct. 2. The Weather Bureau 2-meter station is operational again for the season. W5PPE made several contacts in checking out equipment. Traffic: K5CAY 2219, W5PML 259, W5NBI 1168, K5MBK 111, W5QMJ 99, W5NML 66, W5MFX 35, W5KFI 34, K5DLP 19, WA5FVJ 12, K5OCX 10, K5YAQ 8.

SOUTHERN TEXAS—SCM, G. D. Jerry Sears, W5-AIR—SEC: K5QQG. PAM: W5ZPD. RM: K5ANS. K5-FTN is the new EC for Uvalde County. WA5AUA is a new OES in Portland and writes the Short Short Wave section for the Corpus Christi W5MS *Bulletin*. Enjoyed a visit with the College Station group at its Steak Fry Apr. 23, with about 18 of the W5AC attending with Doc Best, W5QKF. WA5MOE now has his General. WA5AUZ

enjoys the CD Parties very much, operating c.w. K5ZSC is now in his new shack. Pres. of the Del Valle High School ARC (WA6PEW) is WN5OEL, who is building his v.f.o. getting ready for his General to arrive. Let's hear from more of the high school clubs. WA5BTO, in addition to his regular OBS skeds, includes information on local ARC meetings and events of interest. WA5CZR is getting ready to take the Extra Class exam. Good luck. W5EMW is conducting much-needed training sessions on net procedures. Section Net certificates have been awarded to the following stations for their consistent and reliable participation in the 7290 and TEX Traffic nets: W5ZPD, WA5AUZ, K5GDH, W5ABQ, W5KLV, W5HWY, WA5EQQ, W5EMW and K5HZR. Nice going. More stations are needed on the TEX Traffic Net, 3770 kc. at 1900S and 2200S daily. K5HZR and K5FPJ operated mobile from Runge and Kenedy after those areas were hit by a tornado until regular communications were restored. K5RHN, Martha, operated furnishing communication when flood waters washed out the land lines into Paris. Father Van, WA5GIG, serves as chaplain at the Houston VA Hospital and goes fishing on his off day. Congratulations to the Corpus Christi AREC on a job well done covering Buccaneer Days festivities under the direction of EC W5AQK. Twenty-one stations participated. Traffic: WA5AUZ 252, W5BGE 199, K5HZR 196, W5KLV 170, W5ZPD 117, WA5CZR 89, W5ABQ 41, W5HWY 20, K5ANS 15, K5TOL 3.

CANADIAN DIVISION

ALBERTA—SCM, Harry Harrold, VE6TG—SEC: VE6FK. PAM (APN): VE6ADS. PAM (SSBN): VE6ALQ. ECs: VE6SA, VE6SS, VE6AFJ, VE6HB, VE6ALL, VE6XO, VE6XC. ORS: VE6BR. OPSs: VE6HM, VE6SS, VE6BA, VE6ADS. OOs: VE6HM, VE6NX, VE6TY, VE6AKV. OBSs: VE6HM, VE6AKV. OESs: VE6DB, VE6AKV. It is with regret we report the passing of VE6AQI, better known as the operator at the Southern Alberta Institute of Technology. VE6IT, Calgary AREC will be looking after the communications of the canoe races July 2 and 3 between Calgary and Banff. VE6XC is very busy checking all the EMO groups in the province. If you are looking for VE6AFJ you will find him at the golf course? VE6UK is very busy these days with no time to wear out his new 350. VE6OW is doing a lot of mobiling and fishing these days. VE6AAI still is pounding brass. No phone ticket yet, Emma? VE6ALL is doing a very fine job with the Sunday Morning Net, but still no reports. All OOs are doing very fine jobs these days. Don't forget the International Glacier-Waterton Hamfest July 23 and 24 at Apgar, Mont. Traffic: VE6HM 128, VE6FK 93, VE6BR 42, VE6XC 40, VE6AKV 10, VE6ALQ 9, VE6SS 9, VE6TG 8, VE6PZ 5, VE6SB 2.

BRITISH COLUMBIA—SCM, H. E. Savage, VE7FB —Three hundred amateur license vehicle plates were ordered by us and sixty have not been claimed. The Motor Vehicle Branch is not pleased with these left-over plates each year. The new holders of VE7AKY, VE7OM, VE7AKD, VE7AKS and VE7BEE may apply now to the M.V.B. and obtain the above license plates if they desire for this year. VE7AMW is in the hospital suffering from a heart attack and will be out of action for many months. VE7AAF is in the hospital after a car crash. Kamloops ARC's three new amateurs are VE7AWN, VE7BHW, VE7BPF and Powell River ARC reports VE7AWJ as a result of code classes. The afternoon shift workers would like to have a noon net on 3755 kc. but it seems that there are no Vancouver shift-workers to take Vancouver traffic. VE7BGJ who handles swap and shop on the BCARPSC Net Tue. and other nights is handicapped by being blind. VE7BHH was in Ottawa for the month of April. Orchard City ARC's officers are VE7BPO, pres.; VE7BMB, vice-pres.; VE7FG, secy. VE7BDR, our new EC for Nanaimo, reports things are really good. Please support your ECs and file a Form 7. VE7BLO is another one of our handicapped, but with a traffic report of 42 or more monthly from both phone and c.w. nets. Chilliwack ARC reports that VE7BOK and VE7BBV have passed the Advanced Class exam. Traffic: (Apr.) VE7BRE 80, VE7BLS 64, VE7BLO 42, VE7AC 40, VE7BBB 19, VE7WS 15. (Mar.) VE7ASY 150, VE7BRE 107, VE7BQB 43, VE7WS 22.

MANITOBA—SCM, John Thomas Stacey, VE4JT—The Amateur Radio League of Manitoba is actively considering participation in the Intruder Watch. VE4NE has his phone ticket. VE4EP is on 20-meter s.s.b. with a homebrew solid state rig. VE4LG spends most of his time on traffic and in contests but is completing a big rig to do even better. New calls: VE4AQ, VE4RU and VE4VB, Winnipeg; VE4GD, The Pas; VE4TK, Headingly; VE4VH, McCreary. Executives of the ARLM are VE4OL, pres.; VE4LU, vice-pres.; VE4RS, secy.; VE4ZB, treas.; VE4MP, technical;

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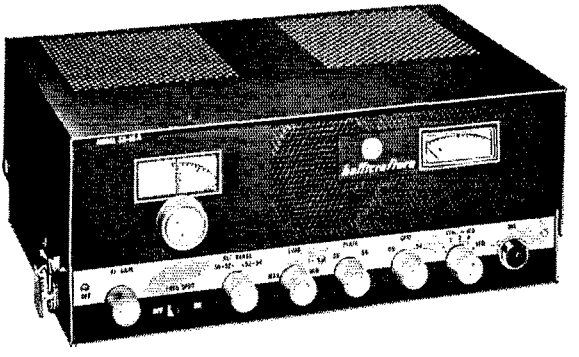

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VE4SN, membership; VE4TP, program. Net reports for the month: Noon Phone, 10 sessions, 97 QNI traffic nil. Evening Phone, sessions 30, QNI 610, traffic 13. C.W., sessions 30, QNI 183, traffic 162. The 6-Meter Net invites all to check in. It meets Wed. at 1900 CDST and Sun. at 1000 CDST on 50.280 kc. VE4QX, our RM, is looking for more stations for the c.w. net and invites QNI on 3635 kc. at 1900 CDST. Traffic: (Apr.) VE4JT 128, VE4LG 118, VE4QX 83, VE4NE 67, VE4EI 59, VE4TM 13, VE4EF 9, VE4LT 5, VE4QJ 5, VE4EP 4, VE4QD 4, VE4GN 3, VE4OL 3, VE4JA 2, VE4JC 2. VE4LQ 2, VE4EG 1.

MARITIME—SCM, D. E. Weeks, VE1WR—Asst. SCMs: A. E. W. Street, VE1EK and R. P. Thorne, VO1-EI. SEC: VE1HJ. The Saint Croix Valley Club will hold a picnic and get-together for all the family at St. Stephen July 10. All are invited. VE1HE has been transferred to the VE7 district. Bob has been NCS of the AP (Atlantic Provinces) Net. VE1MX has now taken on the task. Ex-VO1AE is now VE1AFB with QTH in Halifax. Ex-VE1QV (ex-VO1BT) is now VE3GGM with XYL VE3GGN and son John VE3GGO. VE1RX, of the RCMP Marine Section, recently was presented with a 20-year service medal. VE1OC and his XYL have returned from a trip to Bermuda. Newly-elected officers of SONRA are VO1HI, pres.; VO1HC, vice-pres.; VO1AW, secy.; VO1IE, treas. VO1ET is back on the air with s.s.b. Also active on s.s.b. are VO1AB and VO1AQ. Congratulations to VO1HY and his XYL on their recent wedding. VO1s AS, EC and FV are active on 2 meters, VO2AB, VO2-AI and KØRUR/VO2 are active from Wabush. There has been a change in the WAVO (Worked All VO) Rules. Those interested should contact SONRA, P.O. Box 1226, St. John's, Nfld. VO2DK is active again with SB-300 and SB-400. Traffic: VE1HE 108, VE1-ABS 11, VE1AAX 8, VE1OM 5, VE1ES 2.

ONTARIO—SCM, Richard W. Roberts, VE3NG—The Niagara ARC is in top running form and the Ontario Division Convention in Niagara Falls Sept. 16 and 17 is expected to be one of the best. VE3CLT, of Fonthill, is now VE3SI. Someone asked the other day, "Don't hams build gear anymore?" Well, look at the goodies on any swap club or read the "For Sale" ads in any club paper and you tell me. Times do change. The Toronto 2-Meter f.m. repeater station, VE3RPT, is in operation with an input of 146.460 Mc. and the output of 146.940 Mc. VE3CSO is mgr. The Nortown ARC voted VE3AAW, pres.; VE3DEO, vice-pres.; VE3CVJ, secy.; VE3FTI, treas. for 1966-67. VE3AAW won the Alberts Yates award as the most outstanding club member. VE3BWM put up new sky-hooks, only to lose them in a bad storm. I still believe that we should hold on to our own call-up frequencies to minimize QRM from our cousins to the south. VE3HW reports that the Horshoe Two-Meter Net is progressing very well now that Hamilton is on the ball. This worthwhile endeavor will go-go soon. Dickie Lester is PAM for 2. VE3DJK, in Cornwall, edits a very top rate club bulletin named *Ham Bull* and will exchange. Once again, if you hold an ARRL appointment of any kind you are obliged to reconfirm each year depending on the date of appointment. Please check yours *now* and send it (or them) to your SEC or SCM, as the case may be, as soon as possible to avoid cancellation. Traffic: VE3CYR 234, VE3DPO 113, VE3BII 112, VE3NG 110, VE3AWE 100, VE3EBC 88, VE3BZB 84, VE3TT 82, VE3GI 63, VE3DBG 60, VE3DVE 51, VE3DU 29, VE3FHV 29, VE3BLZ 22, VE3RUR 20, VE3GCE 20, VE3HW 19, VE3AUU 18, VE3VD 15, VE3DMU 8, VE3DH 7.

QUEBEC—SCM, C. W. Skarstedt, VE2DR—A few VE2s took in the National Convention at Boston and enjoyed it very much. W4BPD, of DX renown, through the efforts of QSL Mgr. VE2NV was guest speaker at the MARC. The 2-meter gang met at Ste. Anne de Bellevue. We hear that ex-VE2YA (recently VE1RB) is returning as VE2AJ. His well-meaning DX buddies are trying to locate him far away from the Lakeshore. Reason? Obvious. Sorry to lose our c.w. expert, VE2AGM, who is departing for Columbus, S.C., in Aug. VE2SD keeps regular skeds with VE7-APU/VE2 at Churchill. VE2BWL and VE2AT are new ECs. Our SEC, VE2ABV, is doing an excellent job and reports regularly to ARRL. His assistant, VE2AZF, also deserves plaudits for diligent work in keeping all ECs posted. Ex-VE2BOC now signs VE3BUC. The new 2-meter net (Sun. at 12 noon) shows good activity with some 20 stations reporting regularly. VE2AGI has installed a 145-Mc. repeater at 3 Rivers for the benefit of f.m. stations. VE2DAX joined the 3 Rivers' XYL group. VE2HZH, who files excellent OES reports, dug out a kw. linear to boost his signal. The repeater, previously tried on Mt. Gabriel, has now been moved

QRV...QRV...QRV...

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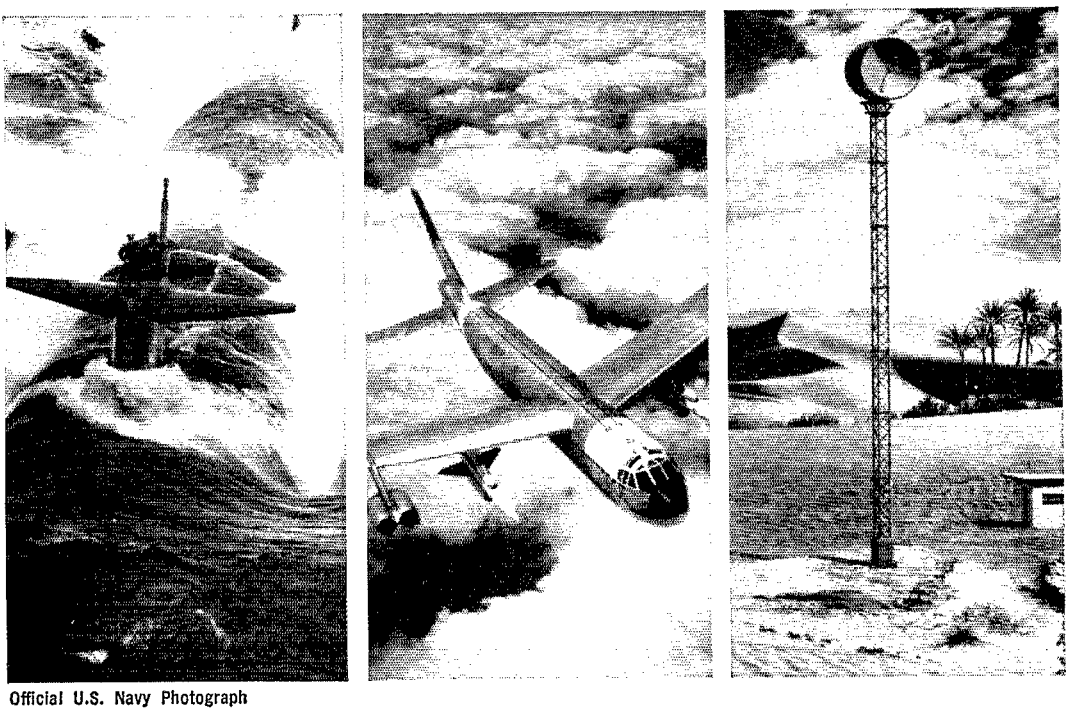

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and installed on Mt. Orford. VE2NT, NCS of the Sun. AREC Net, is doing a fine job keeping VE2XT humming. Traffic: VE2DR 137, VE2OJ 94, VE2BGJ 61, VE2AZF 60, VE2BRD 51, VE2BLL 33, VE2EC 27, VE2CP 18, VE2BZH 15, VE2AGM 13, VE2BWL 12, VE2NT 11, VE2BRT 10, VE2WM 10, VE2ALE 8, VE2-AZQ 2, VE2QA 2.

SASKATCHEWAN—SCM, Mel W. Mills, VE5QC—The season for vacation travelling is here with the mobile and portable methods of operation coming to the fore. Also with it is the anticipation of meeting eyeball for the first time many hams in many locations. These contacts are much easier if you, before you leave on your trip, look up your QSL files for addresses and phone numbers of past QSOed hams in the various locations you plan to visit. Also, inquire around as to the various bands most frequented in the particular location. Bring as many band capabilities as possible with you on your trip. Don't forget the Glacier Hamfest near the end of July. This is a type of family get-together hamfest in a most spectacular surrounding. Also don't forget the south-central picnic-hamfest the weekend before. I wish to announce that *QSO* is now being published by SARL headquarters in Regina. Please support Gordon and the boys. Traffic: VE5HP 119, VE5OB 35, VE5BO 27, VE5LM 22, VE5VD 21, VE5IR 14, VE5HQ 3, VE5KZ 3, VE5GX 2, VE5PZ 2, VE5TM 1. QST

DX OPERATING NOTES

(Continued from page 81)

(**Bold face** indicates changes since the most recent *QST* listing.)

United States Reciprocal Operating Agreements currently exist *only* with: Australia, Belguim, Bolivia, Canada, Colombia, Costa Rica, Dominican Republic, Ecuador, **France,** Luxembourg, Paraguay, Peru, Portugal, Sierra Leone and United Kingdom. Several other foreign countries grant FCC licensees amateur radio operating privileges on a courtesy basis; write headquarters for details concerning a particular place.

Third-Party Restrictions

Messages and other communications — and then only if not important enough to justify use of the regular international communications facilities — may be handled by U. S. radio amateurs on behalf of third parties *only* with amateurs in the following countries: Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador,

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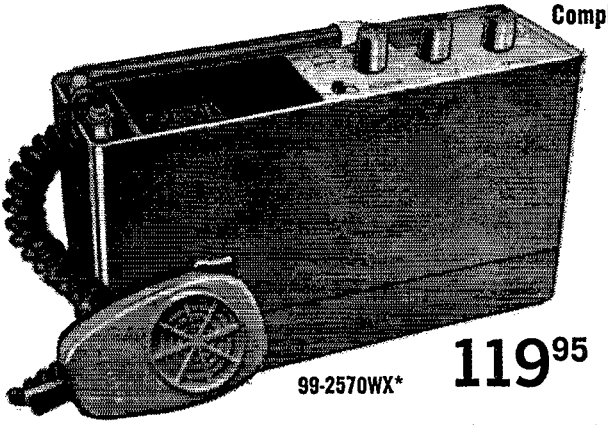

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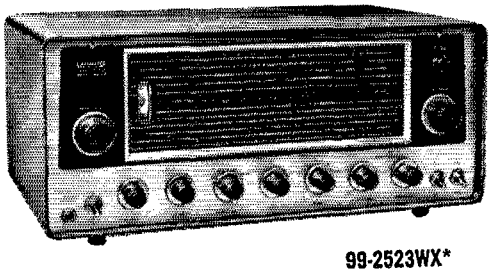

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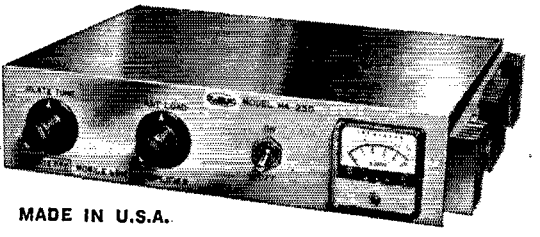

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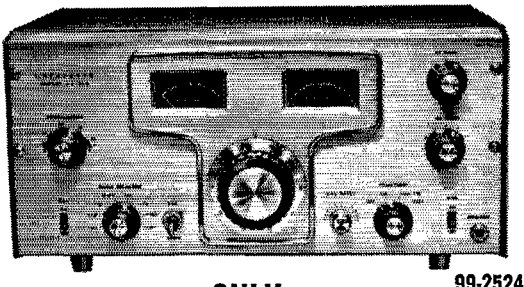

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DX Restrictions

United States amateur licensees are warned that international communications are limited by the following notifications of foreign countries made to the International Telecommunication Union under the provisions in Article 41 of the Geneva (1959) conference.

Cambodia, Indonesia (including West New Guinea), Thailand and Viet Nam[1] forbid radio communication between their amateur stations and amateur stations in other countries. U. S. amateurs should not work HS XU 3W8 or 8F. CANADIAN amateurs may not communicate with Cambodia, Indonesia, Laos, Thailand, Viet Nam and Jordan. Prefixes to be avoided are HS JY XU XW8 3W8 and 8F.

[1]KIYPE/XV5 has permission for international communications from U.S. and Vietnamese administrations and is authorized to handle third-party messages with U.S. amateurs. QST

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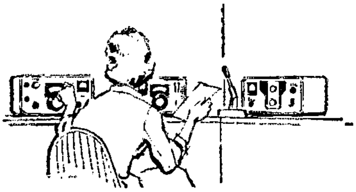

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SWAN 350	339
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THOR 6&AC	239
EICO 722 VFO	37
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HE45A	67
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AMECO TX62	107
S40B	49
S86	49
S120	44
SX71	117
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SX117	259
SX140	87
SR42	147
SR46	147
CRX2A 152-174mc.	59
SR160	219
FPM200	695
HT37	219
HT40	57
HT41	179
HT44	269
PS150-120 AC	79

B&W LPA-1 LINEAR	$139
VIKING VFO	27
TR SWITCH	19
6N2 CONV 26mc if	44
CHALLENGER	67
RANGER	107
VALIANT	147
KNIGHT VFO	32
T50	27
T150A	87
R100A & S METER	79
SWR BRIDGE &mtr.	17
HQ100C	107
HQ100AC	127
HQ145C	149
HQ170	199
HQ170AC & N.B.	269
HC10	69
HK1B KEYER	27
GONSET GR211	57

GONSET G50	$239
IV 6 METER	159
G76 TRANSCEIVER	139
G76 DC SUPPLY	47
SUPER 12 CONV	47
GONSET MONITONE	19
NCX5	439
NC155	119
NC300	147
NC300 XTAL CALL	17
6 METER CONV	27
HRO50T1R &4coils	147
HRO COILS-E,F,G, H,J each	27
HRO XTAL CAL	24
HEATH HR10	69
GR54	37
SB300	239
SENECA	177
TX1	139

DX20	$ 24
DX35	32
DX40	37
DX60	67
QF1 Q MULT	9
HG10 VFO	34
VF1 VFO	17
UT1 SUPPLY	22
HP20 SUPPLY	24
GLOBE V10 VFO	39
SCOUT DELUXE	57
P&H DDI SCOPE W/ tone osc	67
HICKOK 539A	47
HICKOK 820vtvm tube,trans cker	37
TRIPLETT 3414	47
KNIGHT VTVM	19
HEATH A111 STERO	29
FISHER FM90X	87

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YL News and Views

(Continued from page 90)

it a 'real' magazine as well as a financial asset to YLRL which would hopefully result in lower dues for members; and encouraged all to make YLRL known to everyone.

The YL luncheon, wig demonstration, and talk on spires were all well attended, as was the SWOOP party. As many suffering wives were initiated and received SWOOP certificates, prizes galore were won by all the YLs as they sang along with Ruth McNamara, K1RZO; Ruth Barber, K1IIF and Pres. of WRONE, also Co-Chairman for YL Activities at the Convention; and K1IJV; while Rhea King, K1ERT, provided some fine piano playing.

YL Harmonic's New Look

As the comparatively new Editor of YL Harmonics (YLH), Peg Harnois, K1GSF, of Westbrook, Maine has every right to beam (see photo). For, YLH, YLRL's bimonthly publication, took on an entirely new look in 1966 beginning with the Jan.-Feb. issue.

Drastic changes are not always easily accomplished, and Kayla, WØHJL, Pres. of YLRL, and Peggy, as well as many other members, have made an all out attempt to provide additional reading pleasure through YLH for all. If you haven't already seen it, extra copies are available from WØHJL for $.50; or, subscriptions are available for $3.00 per year (YLs receive YLRL membership).

YL Net News

The new officers for 1966 announced by the Loaded Clothes Line YL Net are as follows: Pres., W7GGV; V. Pres., KØEPE; Secy., K7WVT; Treas., KØWZN; Pub. Chr., KØGAS. Their net meets every Monday at 1700 GMT on 7235 kcs. NCS is W7GGV. QST

Hamfest Calendar

(Continued from page 96)

Washington — The 4th Annual VHF-FM family campout and picnic of the Northwest AR Communication System will be held July 16 and 17 at Indian Creek Campground on Hy. 14, eight miles east of White Pass Summit. Potluck dinner Saturday evening, breakfast Sunday morning furnished to all. Boating, fishing, hiking and games available. Ragchews, gear inspection, and idea swapping. Write W7GJL, 1909 S. Franklin St., Olympia, Washington 98501.

Washington — The Okanogan Valley International Hamfest will be held this year in Conconully State Park, Conconully, Washington, on July 23 and 24. Registration for hams is $1.00 and a piece of "junk," XYLs 50c. There will be activities for hams, XYLs, and children. Potluck dinner Sunday noon. More information from K7RZH, Rt. 1, Box 280-A, Omak, Washington 98841.

West Virginia — The Black Diamond ARC annual Hamfest will be held again at Bluefield. Contact K8ZDY for information.

West Virginia — The W. Va. State Radio Convention will be at Jackson's Mill, July 2 and 3.

Wisconsin — The Point Radio Amateurs Ltd. will host the annual Wisconsin Nets Asso. "WNA" picnic July 10 at Iverson Park in Stevens Point, Wisc. There will be the annual a.m. *vs.* c.w./s.s.b. softball game and a 75-meter mobile field strength contest. Iverson Park is on the east side of Stevens Point on Hy. 10, and is well equipped with playground, swimming, picnic benches, etc. Registration begins at 10:00 A.M. Refreshments will be served. Bring your picnic lunches. For further information contact K9GSC, 822 Wauona Trail, Portage, Wisconsin 53901.

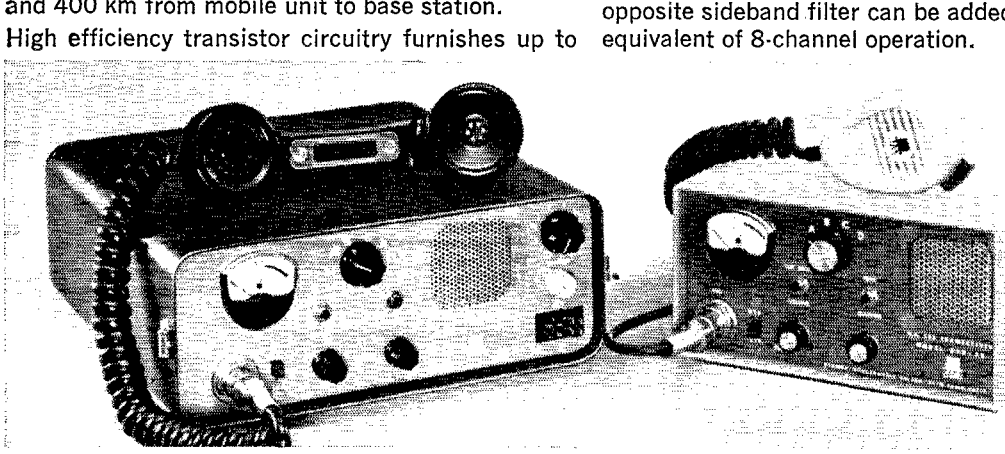
Wyoming — Don't forget the annual Wyoming Hamfest to be held this year on July 23 and 24 at Deer Haven in the Big Horn Mountains. Write W7VB for details. QST

Low cost — *completely transistorized* — SSB manpack covers 200 kilometer range while being carried

Completely transistorized — **all silicon** — SSB-20M *single sideband transceiver with its companion whip* antenna provides dependable, high quality communications up to 200 kilometers while being carried. When used with appropriate antenna systems, the units cover 800 km from base station to base station and 400 km from mobile unit to base station.

High efficiency transistor circuitry furnishes up to 20 watts P.E.P. output without the use of a powe *converter. All transistors operate at 12 volts.* Curren drain is less than 50 ma during reception; average drain is less than 2 amps during transmission.

From 1 to 4 crystal controlled channels can be fur nished for operation between 2.5 and 10 MHZ. An opposite sideband filter can be added to provide the equivalent of 8-channel operation.



The SSB-20M is housed in a rugged aluminum case with all connections available from the front. The unit weighs 9.5 lbs. (4.32 kilograms), and measures 10.5"W x 4"H x 12"D.

SSB-20 single sideband transceivers for base station and mobile use ca be installed in positive or negative ground 12-volt automotive systems in emergencies, can operate up to 10 days on 8 flashlight batteries.

Write for specifications, prices and the name of the Stoner representative in your area.

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World Above 50 Mc.

(Continued from page 87)

danger of over modulation while allowing almost an infinite amount of audio to be used. I am already using a compressor and will add the peak clipper as an afterthought. It is not an ordinary clipper. It just removes negative peaks. Previous attempts introduced too much bass into the signal and were unsuccessful. That problem has been eliminated." Another Flushing, New York station, WB2TRD agrees that activity on 50 Mc. is poor. Sandy comments that during the week activity is almost dead during the day but does pick up a little during the evening. In spite of this he sez he has heard and spoken to a number of new operators during the past month. (Guess it must have been on weekends.) K3VAX wants to know: "Where are all the six-meter operators? Band seems pretty dead!" Don't worry, Bob, they'll be around when the band opens up and then you'll wish they weren't! Bob has been working with mobile antennas lately and sez his new mobile antenna system for six was heard Q5 twenty miles away by WA3EJH using a halo and Utica G50.

Our one "skip" report for 50 Mc. was received from K4OCK in Miami. "On March 31 six meters opened into South America. Worked CE4CP in Chile at 1720 EST. Four other stations were observed but could not read their a.m. on the KWM-2 due to instability. Band was open for over two hours. Someone had a beacon on down there at 50.0025 which was first in and last out. Band has not opened to the south since. Next year should be better. Had first es on April 25 to 4s, 8s, etc."

50 Mc. News from Old Mexico via Rusty, XE1PY

XE2GGL, XE2EEL, XE1CT, XE1IIG, XE-1GE and XE1PY hold an on the air get-to-gether every Sunday on 50.4 Mc. at 1500. Beams are mostly headed stateside and frequent standbys are made. Future plans include a full-time monitored f.m. net on 50.500 with all the above participating.

QST

Happenings of the Month

(Continued from page 77)

TRW Radio Club and Project Oscar, Inc., the Board's heartiest congratulations for its Oscar IV achievement, and assures the continued interest and support of the ARRL in the amateur space effort. Mr. Shepherd, as representative of the League on the Project Oscar Board of Directors, spoke briefly in appreciation of the commendation and ARRL financial support, and indicated enthusiasm by Project Oscar and associated groups in continuing space communications activities.

100) On motion of Mr. Spencer, after discussion, unanimously VOTED that the General Manager make a study and report to the Executive Committee concerning the feasibility of the creation of an office of Public Relations Manager as part of the field organization program in the respective divisions.

A STAR-SPANGLED ANNIVERSARY ALBUM

25 year history of U.S. Savings Bonds

1941: FDR buys first E Bond.

1944: June 6—D Day.

1945: The war ends. Bond sales continue.

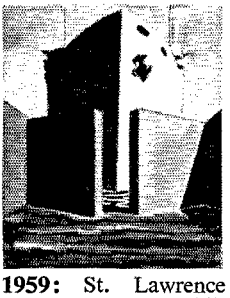
1948: Berlin Airlift.

1950: President Truman orders military aid to Korea.

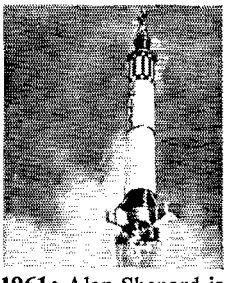
1951: Kefauver hearings. E Bonds get 10-year extension.

1953: Dr. Salk develops polio vaccine.

1956: Don Larsen hurls first perfect Series game.

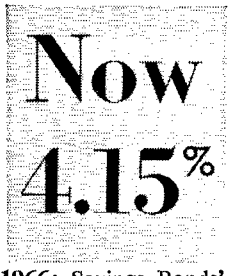


1959: St. Lawrence Seaway opens. $17 billion in E Bonds over 10 years old.



1961: Alan Shepard is first U. S. Astronaut in space.

1963: John F. Kennedy assassinated; Lyndon Johnson sworn in.



1966: Savings Bonds' 25th Anniversary. New 4.15% interest rate announced.

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101) On motion of Mr. Spencer, unanimously VOTED that the General Manager make a study and report to the Executive Committee on the feasibility of retaining public relations counsel to attend all Board and Executive Committee meetings to advise ARRL in this field.

102) On motion of Mr. Spencer, unanimously VOTED that the League continue to advertise its publications in other scientific, education, hobby and sports magazines, with the end in view of getting more persons interested in becoming radio amateurs.

103) On motion of Mr. Denniston, unanimously VOTED that the Headquarters staff handling the Intruder Watch program, particularly Assistant General Manager Richard L. Baldwin, W1IKE, as its administrator, and all Intruder Watchers, be heartily commended for their success in assisting the long-term protection of amateur frequency assignments by keeping unauthorized non-amateur stations out of our bands, and the Board hopes many more members will join this worthwhile effort.

104) On motion of Mr. Chapman, unanimously VOTED to take from the table his motion concerning a membership identification number. After discussion, on motion of Mr. Denniston, unanimously VOTED to amend the motion to refer this matter to the headquarters staff for study. Whereupon, the question then being on the motion as amended, the same was unanimously ADOPTED.

105) Moved, by Mr. Chapman, that a paid-up life membership in The American Radio Relay League be made available to any full member for a fee of $100 and that this paid-up life membership enjoy all rights, benefits and privileges subject to all assessments and decrees, this paid-up membership to be nontransferable. After discussion, on motion, of Mr. Bolvin, unanimously VOTED to amend the motion to provide that a study be made by the Membership & Publications Committee and Headquarters staff. Whereupon, the question then being on the motion as amended, the same was unanimously ADOPTED.

106) On motion of Mr. Thurston, unanimously VOTED that the Board extends its sincere thanks and appreciation to the many League members and clubs who have contributed so generously to the Building Fund, and that the Board requests the continued support of the project until the goal has been reached.

107) Moved, by Mr. Bolvin, to take from the table his motion concerning reimbursement of vice directors expenses for attendance at Board meetings. After discussion, the motion to take from the table was rejected, 5 votes in favor to 10 opposed.

108) On motion of Mr. Shepherd, unanimously VOTED that the Amateur Radio Public Service Corps shall consist of the National Traffic System, the Amateur Radio Emergency Corps, and the Radio Amateur Civil Emergency Service.

109) On motion of Mr. Best, unanimously VOTED that the Board expresses its sincere thanks and appreciation for the untiring work and devotion to the League and to amateur radio by the vice

directors, assistant directors, SCMs, SECs, QSL Managers and all of the members of the League, and it is the sense of the Board that their contribution to amateur radio has done much to enhance amateur radio in the field of public service, convenience and necessity.

110) On motion of Mr. Eaton, unanimously VOTED that the President and Secretary in attending, in their comparable IARU capacities, the Region 1 Conference in Yugoslavia, convey to the assembled delegates the greetings of the ARRL and our best wishes for another successful meeting in the furtherance of international amateur radio.

111) On motion of Mr. Denniston, unanimously VOTED that the staff conduct a study of the feasibility and cost of providing small attachments for League membership pins which would indicate, in perhaps five-year increments, the number of years the wearer has been a member of the League.

112) At this point, announcement was made of committee appointments by the incoming president as follows:

Finance Committee: Mr. Eaton, Chairman, Mr. Shepherd, Mr. Chapman, (Mr. Anderson, Alternate).

Planning Committee: Mr. Dannals, Chairman, Mr. Thurston, Mr. Engwicht.

Membership & Publications Committee: Mr. Best, Chairman, Mr. Crossley, Mr. Spencer.

Public Relations Committee: Mr. Compton, Chairman, Mr. Haller, Mr. Cartwright.

Merit & Awards Committee: Mr. Groves, Chairman, Mr. Smith, Mr. Bolvin.

113) On motion of Mr. Haller, unanimously VOTED that the General Manager is hereby authorized to pay expenses for the operation of ARRL committees during the year 1966, but not to exceed amounts as follows:

Finance Committee	$2000
Planning Committee	1500
Membership & Publications Committee	1000
Public Relations Committee	500
Merit & Awards Committee	400

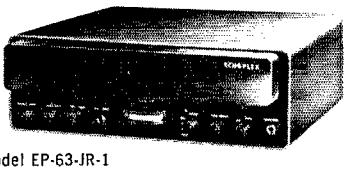
114) On motion of Mr. Compton, the following resolution was ADOPTED by standing ovation: Be it known that the Board of Directors of The American Radio Relay League, in meeting assembled on the 7th day of May, 1966, does recognize HERBERT HOOVER, JR., W6ZH, for progressive leadership, wise counsel and guidance, and wholehearted devotion to voluntary tasks as President of the ARRL and IARU, despite a heavy impact on personal and business life — all resulting in four years of outstanding advancement of the League and international amateur radio. Mr. Hoover spoke in appreciation of the cooperation of the officers, directors and staff during his term.

115) Whereupon, on motion of Mr. Shepherd, the Board adjourned, *sine die*, at 10:10 P.M.

116) (Time in session 17 hours, 37 minutes; total direct authorizations, $64,593.00.)

JOHN HUNTOON
Secretary

ECHOPLEX...



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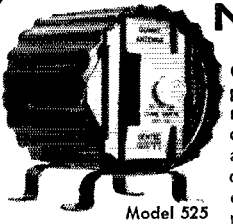

Model 525

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Term'ls	UHF	UHF	N	BNC	UHF	N	BNC
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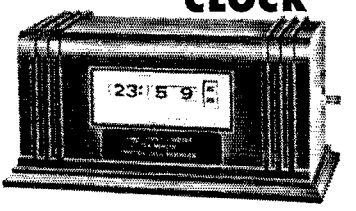

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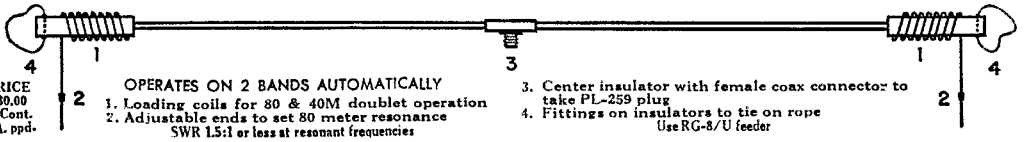

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W1, K1, WA1 — Providence Radio Ass'n., W1OP, Box 2903, Providence, Rhode Island 02908.
W2, K2, WA2, WB2 — North Jersey DX Assn., P.O. Box 505, Ridgewood, New Jersey 07451
W3, K3, WA3 — Jesse Bieberman, W3KT, P.O. Box 204, Chalfont, Pennsylvania 18914.
W4, K4, WA4, WB4 — F.A.R.C. — W4AM, P.O. Box 13, Chattanooga, Tennessee, 37401.
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, California 92106.
W7, K7, WA7 — Willamette Valley DX Club, Inc., P.O. Box 555, Portland, Oregon 97207.
W8, K8, WA8 — Paul R. Hubbard, WA8CXY, 921 Market St., Zanesville, Ohio 43701.
W9, K9, WA9 — Ray P. Birren, W9MSG, Box 510, Elmhurst, Illinois 60126.
WØ, KØ, WAØ — Alva A. Smith, WØDMA, 238 East Main St., Caledonia, Minnesota 55921.
VE1 — L. J. Fader, VE1FQ, P.O. Box 663, Halifax, N. S.
VE2 — John Ravenscroft, VE2NV, 135 Thornerest Ave., Dorval, Quebec.
VE3 — R. H. Buckley, VE3UW, 20 Almont Road, Downsview, Ontario
VE4 — D. E. McVittie, VE4OX, 647 Academy Road, Winnipeg 9, Manitoba.
VE5 — Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Saskatchewan
VE6 — Karel Tettelaar, VE6AAV, Sub. P.O. 55, N. Edmonton, Alberta.
VE7 — H. R. Hough, VE7HR, 1291 Simon Road, Victoria, British Columbia
VE8 — George T. Kondo, VE8RX, c/o Dept. of Transport, P.O. Box 339, Fort Smith, N.W.T.
VO1 — Ernest Ash, VO1AA, P.O. Box 6, St. John's, Newf.
VO2 — Goose Bay Amateur Radio Club, P.O. Box 232, Goose Bay, Labrador.
KH6 — John H. Oka, KH6DQ, P.O. Box 101, Aiea, Oahu, Hawaii 96701
KL7 — Alaska QSL Bureau, **Star Route C, Wasilla, Alaska**
KP4 — Joseph Gonzalez, KP4YT, Box 1061, San Juan, Puerto Rico 00902
KV4 — Graciano Belardo, KV4CF, P.O. Box 572, Christiansted, St. Croix, Virgin Islands 00820
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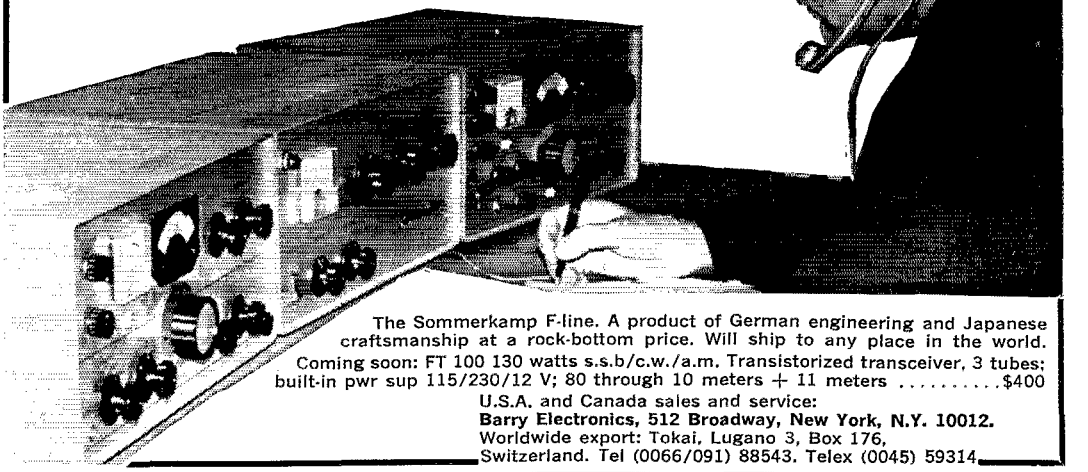
FL-200B 130 watts s.s.b./c.w./a.m. Same bands and size as FR-100B. v.f.o.; one mech filter 2.1 kc; carrier and sideband suppression 50 db; built-in ant relay; vox, anti-trip; built-in pwr sup 115/230 vac, 60 cps; upper & lower sideband; transceive plug; 13 tubes, 7 diodes. Supplied with plugs. $350.00

FL-1000 1 k.w. grounded grid ampl. Same bands and size as other equipments. 115/230 vac. 60 cps. $200.00



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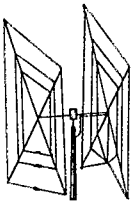

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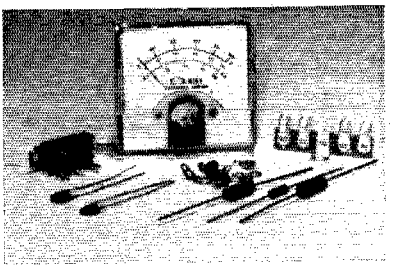

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A versatile multi-range panel meter kit specifically designed for amateur radio transmitters. The MX-10 includes a 1000 Ω/V meter, two-position range switch, TVI suppression capacitors, shunt resistors for plate voltage (0-1000V) and plate current (0-200 Ma. and 0-500 Ma.) ranges, complete instructions and all necessary hardware.

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Silent Keys

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

WN1EAN, Leon C. Hopkins, Guilford, Conn.
W1EEY, Robert A. Croswell, Farmington Falls, Me.
K1SRG, Horace DeCelles, West Yarmouth, Mass.
WB2CSH, Martin F. Mader, Lindenhurst, L. I., N. Y.
W2CVG, Jack W. Prior, Maplewood, N. J.
K2GC/OD5EM, John V. Fill, Red Bank, N. J.
W2GKP, Myron Skraly, Bronx, N. Y.
WA2HRZ, Charles W. Berner, Brooklyn, N. Y.
W2MED, Walter W. Turchin, East Meadow, N. Y.
W2MK, John F. DeJonge, Clifton, N. J.
W2MLR, William F. Smith, Wantagh, L. I., N. Y.
WB2TBV, William C. Carnegie, Whitestone, N. Y.
W3OIW, Charles A. Emmerich, Adamsburg, Penn.
W3PQ, Langford T. Bourland, Washington, D. C.
W3WIC, Lusk C. Funk, Glyndon, Md.
W3WU, M. Wilson Downs, Silver Spring, Md.
W3WVO, George A. Fairfield, Rising Sun, Md.
W4FGG, Marvin S. Storler, Memphis, Tenn.
W4FIE, Grady L. Carter, Clanton, Ala.
W4LTF, Howard O. Lanford, Woodruff, S. C.
W4RNO, Alexander L. Manuel, Jr., Norfolk, Va.
W4TCF, Truman C. Haseltine, St. Petersburg, Fla.
WA4VSC, Charles P. Wray, Jr., Bowling Green, Va.
W4VXR, David H. McIntyre, Tampa, Fla.
W5AFA, Jerome Cohen, Meridian, Miss.
W5CTF, Wayne M. Smith, Jacksonville, Texas
K5GHE, J. B. Hammack, Freer, Texas
K5KOK, Frances L. Lenn, El Paso, Texas
W5NYY, Derry H. Gardner, Houston, Texas
K6FH, T. Meredith B. Lowe, Huntington Beach, Calif.
K6KU, Ira H. Wright, Palo Alto, Calif.
K6LI, Alfred S. DeWald, Vallejo, Calif.
W6QWT, Perry O. Trisler, Fullerton, Calif.
W6VHC, Edward Balogh, Sherman Oaks, Calif.
W7AQO, Victor W. Watts, Eugene, Ore.
W7FMX, Cecil L. McNeil, Salem, Ore.
W7HSF, James H. Pitzer, Phoenix, Ariz.
W7NUR, Harry M. Squire, Salem, Ore.
K7QMH, Tom A. Blessing, Seattle, Wash.
W7WY, Robert H. Votaw, Vancouver, Wash.
W8AGG, Earl H. Brockway, Davison, Mich.
WA8CDW, Kerry D. Nye, Dayton, Ohio
K8KJZ, Frederick F. Weidner, Roseville, Mich.
W8MRO, Donald W. Bender, Wyoming, Mich.
W9BUH, Gerald R. Ulman, Rock Island, Ill.
W9DQN, Charles Michalek, Brookfield, Ill.
W9PCR, John H. Holloway, Green Bay, Wis.
WA9PVN, Finis E. Gream, Bluford, Ill.
W9ZTO, C. Everett Smith, Wausau, Wisc.
KØLNE, Francis H. Plante, So. St. Paul, Minn.
WØOAR, Warren C. Stickler, Louisville, Colo.
KØTGB, Howard P. Woertendyke, Garden City, Kans.
WØUEV, E. Hansen, Omaha, Nebr.
KØVEJ, Samuel L. Henry, Sioux City, Iowa
G2AWF, W. A. Maddocks, Cheshire, Eng.
G3IZT, K. R. Coates, Cheshire, Eng.
VE3BYL, W. B. Reaburn, Weston, Ont.
VE6AQI, John W. Howard, Calgary, Alb.

Because of the need for accuracy in our "Silent Keys" listing, please send all notices to the ARRL and include both name and call of the deceased.

YES!

I would like to become a member of ARRL and help support its many services to amateurs and amateur radio. Here's my $5.00 ($5.25 from Canada, $6.00 elsewhere). Sign me up for a year's membership and twelve big issues of *QST!*

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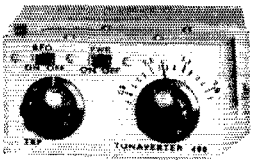

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Large Calibrated Dial! 6-1 Reduction Tuning! Superior Sensitivity, Selectivity, S/N Ratio! 9 V Btry Pwrd! Mute Terminals! Just Plug In! 2 WEEK MONEY BACK GUARANTEE! In Stock & PPD.

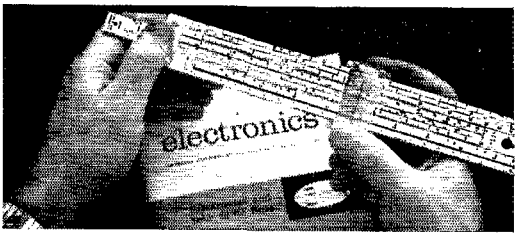
AM-FM $19.95
Marine 2-3 mc.
SWL 9.3-10 mc.
SW 14-18 mc.
160, 75 M

CB-10 **$29.95**
6 Meter **$34.95**

SSB-CW-AM $24.95
160 M 1.8-2.0 mc.
80 M 3.4-4.2 mc.
75 M 3.8-4.0 mc.
40 M 6.9-7.33 mc.
20 M 14-14.35 mc.
15 M 21-22 mc.

Police 30-38, 37-50, or 150-164 mc. **$34.95**
Aircraft 118-128 mc. **$34.95.** Outputs in BC band.

H. SALCH & CO., Dept Q, Woodsboro, Texas 78393



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HAM-ADS

(1) Advertising shall pertain to products and services which are related to amateur radio.
(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others. No Box Reply Service can be maintained in these columns nor may commercial type copy be signed solely with amateur call letters. Ham-ads signed only with a box number without identifying signature cannot be accepted.
(3) The Ham-Ad rate is 35¢ per word, except as noted in paragraph (6) below.
(4) Remittance in full must accompany copy, since Ham-Ads are not carried on our books. No cash or contract discount or agency commission will be allowed.
(5) Closing date for Ham-Ads is the 20th of the second month preceding publication date.
(6) **A special rate of 10¢ per word will apply to advertising which, in our judgment, is obviously non-commercial in nature.** Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, takes the 10¢ rate. Address and signatures are charged for. **An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising so classified takes the 35¢ rate.** Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply.
(7) **Because error is more easily avoided, it is requested copy, signature and address be printed plainly on one side of paper only. Typewritten copy preferred but handwritten signature must accompany all authorized insertions. No checking-copies can be supplied.**
(8) **No advertiser may use more than 100 words in any one advertisement, nor more than one ad in one issue.**

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.

LOUISVILLE Ham Kenvention, Oct. 15, 1966. Technical forums, exhibits, banquet Giant indoor Trade-O-Rama (bring your goodies). Ladies Program (Advance Registration only). Details P.O. Box 20094, Louisville, Ky. 40220.

LONG ISLAND Hamfest & picnic sponsored by the Federation of Long Island Radio Clubs will be held Sunday July 17th, at 9 A.M. Come one down with the entire family for a pleasant day. Picnic Pavilions, swimming, playgrounds, charcoal grills, technical talks, manufacturers' displays, mobile judging contest, auction, and more. Al Smith, Public Relations Chairman, WA2TAQ.

HAMFESTERS Radio Club, Chicago, Illinois, proudly announces its 32nd Annual Midwestern Hamfest, Sunday, August 14th at Santa Fe Park, 91st Wolf Road near Chicago. The Hamfest features manufacturer and distributor exhibits, swappers row, contests, awards and a variety of activities for all. Clowns and games for the children, activities for the XYL while you enjoy amateur radio with friends and acquaintances. The Hamfest climaxes "Illinois Amateur Radio Week August 8-14th" by proclamation of Governor Otto Kerner. For complete details and a map of the location, write: Gregory Purteck, WA9MRE, 2916 West Marquette Road, Chicago, Illinois 60629.

W6SD 10th Annual Hamfest picnic—Sunday July 24—contests, fabulous program for family. Dollar donation. Write W6SD Hamfest, 2814 Empire, Burbank, Calif. 91504.

THE Wood County Amateur Radio Club will hold its annual Ham-A-Rama Sunday July 10 at the fairgrounds Bowling Green, Ohio. Contact W8PSK, 324 South Grove St., Bowling Green, Ohio for additional information.

MOTOROLA used FM communication equipment bought and sold. W5BCQ, Ralph Hicks, Box 6097, Tulsa, Okla.

WANT Callbooks, catalogs, magazine, pre-1920 for historical library. W4AA Wayne Nelson, Concord, N.C. 28025.

WANTED: all types of aircraft on ground radios. 17L 618F or S388, 390, GRC, PRC, 51 JRVX, Collins linear amplifier, Type 294; 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.Y.

SELL, swap and buy ancient radio set and parts magazines. Laverty, 118 N. Wycomb, Landsdowne, Penna.

WANTED: Military ad commercial laboratory text equipment. Electronicraft, Box 13, Binghamton, N.Y. 13902.

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.

WANTED: 2 to 12 304TL tubes. Callanan, W9AU, 118 S. Canton, Chicago 6, Ill.

304TL tubes wanted. Also other xmtg and special purpose tubes. We will buy military or commercial transmitters and receivers with designations ARG, GCR, URR, 51 and MN. Air Ground Electronics Co., 64 Grand Pl., Kearney, N.J.

WANTED For personal collection; WE 1A mike mounting case with or without 387 carbon mike. Also WE 618-A dynamic. Gardner, WØJJD, 223 Welch, Ames, Iowa 55010.

TUBES Wanted. All types, highest prices paid. Write or phone Ceco Communications, 120 west 18th St., N.Y. 11, N.Y. Tel: 242-7359.

WANTED: For personal collection: QST, May 1916, W1CUT, 18 Mohawk Dr., Unionville, Conn.

QSLS SWLS? World's finest QSL cards! Personalized made-to-order! (Any special design desired?). Largest variety samples, 25¢. Deluxe, 35¢. Religious, 25¢ refunded). Sakkers, W8-DED, Box 218, Holland, Mich. 49423.

QSLS, samples 20¢. QSL Press Box 281, Oak Park, Illinois 60303.

QSLS "Brownie" W3CJI, 3111 Lehigh, Allentown, Penna. Samples 10¢. Catalog 25¢.

C. FRITZ For better QSLS! Bringing hams greater returns for over a quarter-century. Samples 25¢ deductible. Box 1684, Scottsdale, Arizona 85252 (formerly Joliet, Ill.)

QSLS: Quality with service. Samples free. R. A. Larson Press, Box 45, Fairport, N.Y.

QSLS-SMS. Samples 10¢. Malgo Press, Box 373 M.O., Toledo 1, Ohio 43601.

DELUXE QSLS Petty, W2HAZ, P.O. Box 5237, Trenton, N.J. 08638. Samples, 10¢.

QSLS. See our new "Eye-Binder" cards. Extra high visibility. Samples, 5¢. Dick, W8VXK, 1994 N. M-18, Gladwin, Mich.

10¢ Brings free samples. Sims Advertising Service, 32227 Missouri Ave. St. Louis, Mo. 63118.

DON'T Buy QSL cards until you see my free samples. Bolles, W5OWC, Box 9363, Austin, Texas.

QSL Specialists. Distinctive Samples, 15¢. DRJ Studios, 2114 N. Lavergne Ave., Chicago, Illinois, 60639.

SUPERIOR QSLS, samples 10¢. Ham Specialties Co., 108 East Palace, Hobbs, New Mexico.

QSLS, SWLs, XYL-OMS (sample assortment approximately 9¢) covering designing, planning, printing, arranging, mailing, eye-catching, comic, sedate, fabulous, DX-attracting, prototypal, snazy, unparagoned cards (Wow!) Rogers KØAAB, 961 Arcade St., St. Paul 6, Minn.

3-D QSL cards add prestige with spectacularly different glittering colors and raised designs. Samples 25¢ (refundable). 3-D QSL Co., Monson 2, Mass.

QSL, SWLS. WPE. Samples 10¢ in adv. Nicholas & Son Printery, P.O. Box 11184, Phoenix 17, Ariz.

QSLS 300 for $4.35. Samples 10¢. W9SKR. George Vesely, Rte. #1, 100 Wilson Road, Ingleside, Ill. 60041.

QSL 3-color glossy, 100, $4.50. Rutgers Vari-Typing Service. Free samples. Thomas St., Riegel Ridge, Milford, N.J.

PICTURE QSL Cards of your shack, etc. Made from your photograph. 1000 $14.50. Also unusual non-picture designs. Samples 20¢. Raum's, 4154 Fifth St., Philadelphia, Penna. 19140.

QSLS Kromekote 2 & 3 colors attractive, distinctive, different. Free ball point pen with order. Samples 15¢. Agent for Call-D-Call decals K2VOB Press, 31 Argyle Terrace, Irvington, N.J.

QSLS-100 3-color glossy $3.00; silver globe on front, report form on back. Free samples. Rusprint, Box 7575, Kansas City, Mo. 64116.

DAZZLING QSLS. Samples 10¢ (ex-W2QCC) Ted Besesparis, WA4WVK, Box 1275, Lake Worth, Fla.

QSLS, Finest YLRs, OM's, samples 10¢. W2DJH Press, Warrensburg, N.Y. 12885.

QUALITY Rubber stamps; Complete QSL 3"x5" $5.00. Call, name, address $1.50 "Wes's, W1FP, RFD No. 1, Amesbury, Mass. 01913.

QSLS Stamp and call brings samples. Eddie Scott, W3CSX, Fairplay, Md.

DX-QSL. The original plastic display for ur cards. Holds 20 cards. 3 for $1; ten for $3. Satisfaction guaranteed. Dealers inquiries invited. DX-QSL, Box 19033, Houston, Texas 77024.

QSLS $2.50 per 100. Free samples and catalog. Garth, Box 51Q, Jutland, N.J.

FINE EMBOSSED QSL cards. 21 samples, 25¢ (deductible). Ace Printing Service, 3298 Fulton Road, Cleveland, Ohio 44109.

HUNDRED QSLs—$1.00. Samples, dime. Holland, R3, Box 649, Duluth, Minn. 55803.

RUBBER Stamps $1.00. Call and address. Clint's Radio W2UDO. 32 Cumberland Ave., Verona, N.J.

QSLS: 100 4-color, $3.99. Free Samples. Ed's Press, 3232 Le Moyne, Chicago, Ill. 60651.

QSLS—Free samples. Attractive designs. Quick Service, W7IIZ Press, Box 183, Springfield, Ore.

ORIGINAL EZ-IN double holders display 20 cards each in plastic. 3 for $1.00 or 10 for $3.00 prepaid and guaranteed. Free sample to dealers or clubs. Tepabco, John K4MNT, Box 198T, Gallatin, Tenn. 37066.

SMART Ham operators buy their QSL cards from the Ham Wholesale Card Club. See ½ p. ad (p. 161) in this magazine.

QSL Cards. Quality printing. Samples 15¢. Sargent Press, 19 Glenn Ave., Lynn, Mass.

QSLS. 18 samples, 10¢. Filmcrafters, Box 304, Martins Ferry, Ohio.

QSLS. Vacation. Radio Press, Box 17112, San Diego, California.

QSLS, SWLS, 3 and 4 colors. 100, $2.00. Samples dime. Bob Garra, Leighton, Penna.

CANADIANS: For sale, Halicrafters SR-150 and PS-120 p/s, Astatic D-104 microphone. New condition. Ronald Schindler, 219 Hewat St., Preston, Ont. P., Canada.

CANADIANS: Collins 75A2 receiver complete with xtal calibrator, speaker, and spinner dial. Excellent condition. $275.00. VE3YX, Box 183, Deep River, Ont. P., Canada.

CANADIANS: SX-101, MK III with p.d. $275.00. VE3DKN, Stan Turner, 1358 Langdale Cres., Oakville, Ont., Canada.

CANADIANS: Collins 75S-1 with 500 cycle filter, $450.00. Original owner VE3EDR, 803 Concession, Apt. 604, Hamilton, Ont., Canada.

CLEGG Zeus, low price, excellent condition. WB2CUD, Tel: 201-756-8340.

MOBILOCK! Incomparable theft protection exclusively for KWM-2 owners. Stop worrying! Write Transistics Co., 4452 N. 20th Rd., Arlington, Va.

OLD Old Timers Club now over 600 members with verified 2-way contacts before 1925. Life membership, $15 Bi-monthly "Spark-Gap Times" $2.50 annually; also available to non-members. $3.00. Write Secretary W1MPP, Lovell, Maine 04051.

SELL: Eimac 4X250B tubes. Guaranteed gud condx. $6.50 each, $10.00 pair prepaid in U.S.A. Send check or m.o. Everett Stidham, Jr., W5JLQ, 722 So. 30th, Muskogee, Okla.

MANUALS for surplus electronics. List, 10¢. S. Consalvo, 4905 Roanne Drive, Washington, D.C. 20021.

WANTED: Teletype equipment, R-388, R-390A. Cash or trade for ew amateur equipment. Alltronics-Howard Co., Box 19, Boston, Mass. 02101. Tel: (617-742-0048).

MICHIGAN Hams! Amateur supplies, standard brands. Store hours 0830 to 1730 Monday through Saturday. Roy J. Purchase, W8RP. Purchase Radio Supply, 37 E. Hoover St., Ann Arbor, Michigan. Tel. NOrmandy 8-8262.

TOOOOBES: 6146B, $4.00; 6CW4, $1.40; 417A, $3.95; 6360, $3.45; 6146, $2.55; 5894, $15.50. All new, boxed guaranteed. No pulls, seconds or JAN. Catalog of many other types, free. Vanbar Distr., Box 444Z, Stirling, N.J. 07980.

RTTY Gear for sale. List issued monthly. 88 or 33 mhy toroids, five for $1.75 postpaid. Elliott Buchanan, W6VPC, 1067 Mancana Blvd., Oakland, Calif. 94610.

TELETYPES, parts. Fast service, Schmidt, W4NYF.

HAM Paradise for sale on beautiful Maine lake. Fully equipped station with Telrex Xmas Tree, 300 ft. lake frontage. 10 acres, boating, fishing, swimming. W1AUR, H. G. Riley, Fayette, Maine.

FM Equipment Schematic Digest: A comprehensive collection of Motorola schematic diagrams covering low-band, high band and 450 Mc equipment, manufactured between 1949 and 1954. Crystal formulas, alignment instructions and a wealth of technical data included in 92 pages. Price, $3.95 ppd. Two-Way Engineers, Inc., 1100 Tremont St., Roxbury 20, Mass.

WANTED: Collins Parts. BC-610, GRC-27, Antodyne, Bethpage, L.I., N.Y.

WE Buy all types of tubes for cash, especially Eimac, subject to our test. Maritime International Co., Box 516, Hempstead, N.Y.

ACT Now!! Barry pays cash for tubes (unused) and equipment. Barry Electronics, 512 Broadway, NYC 12. Call 212-Walker-5-7000.

WANTED: Tubes, all types, write or phone W2ONV, Bill Salemo, 243 Harrison Avenue, Garfield, N.J., Tel GArfield Area code 201-471-2020.

NOVICE Crystals 80-40M, $1.05 each. Also other freqs. Free list Nat Stinnette, W4AYU, Umatilla, Fla. 32784.

CERTIFICATE Hunters: Work five members, get free award. Tu-Boro Hadio Club, Inc. W2BMW, 104-19 127 St., Richmond Hill, N.Y. 11419.

WANTED: 160-meter band kit for modifying Central Electronics 200-V transmitter to operate in the 1.7-2.5 Mc band. Highest price paid. WAØIOE, Francis Budavary, 285 Summit Avenue, Saint Paul, Minnesota 55102.

HAM Discount House. Latest amateur equipment. Factory sealed cartons. Send self-addressed stamped envelope for lowest quotation on your needs. H D H Sales Co., 170 Lockwood Ave., Stamford, Conn. 06902.

AMATEUR Paradise Vacation: Livingstone Lodge, Mascoma Lake, Enfield, N.H. Cosy cabin for two weekly, $50.00. Swimming, Fishing, Boats, Sports, Ham Radio, Dartmouth Golf, Tennis. Hot Showers, Fireplaces, light housekeeping, children half. Lake Shore Camp Cites, literature. Al. Q. Livingstone, W2QPN (Quarters, Pennies, Nickles).

RTTY Channel Filters, octal mounted. 2125/2975 cps. $5.95 pair. 88 mhy toroids, uncased, 5 for $2.50. Herman Zachry, WA6IGI, 3232 Selby Ave., Los Angeles, Calif. 90034.

SELL: Hallicrafters SX-28A receiver w/manual, good, $60.00. Telrex beams: excellent. 10 mtr. 3-41. $40; 15 mtr. 3-el. $50. 20 mtr. Super-Mini, 2-el., $40. Motor/generator PE-103, exclnt, $15. F.o.b. Jackson, N.H. Mack Beal, W1PNR.

75A4 Wanted: State serial No., what accessories, and price. Charles W. Rogers, Manasquan, N.J.

BRAND New: SR-160 with DC PW supply. Hustler ant. with 20-40-75 sections. Turner hand mike. $329.00. List for over $500. Used DX-100B, perf. condx, $120.00. HQ-110C with spkr, $125.00 and both for $210.00. John Harlin, 944 E. Normal, Springfield, Ohio.

DON'T Struggle with the code! The Codemaster system is a planned program of code learning on magnetic tape which brings you from scratch to 15 WPM. Thousands have learned by this method. Two-hour tape, $5.95 postpaid. Brochure free. Codemaster, Box 29, Portsmouth, R.I. 02871.

HQ-170 Receiver, excellent condition, asking $220.00. D. G. Steffens, K8YWS, 656 Cascade Rd., Cincinnati, Ohio 45240. Phone 825-8333.

MAGAZINES: QST, CQ 100 copies 1947-1958, $20.00; 126 assorted copies 1959-1966, Pop. Elec., RDO Elec. PF Reporter, Electronics, Broadcast EEng., etc. $20.00. K1ZDI, 174 Andover Rd., Billerica, Mass.

432 Mc ATV xmtrs. APQ2 converted. $15.00; ART-28 $45.00; New tubes, 4-250A RCA, $15.00; Eimac 4-65As, $18.00 pr. Eimac 4CX50R with socket and chimney, $20.00. RCA 829B, $8.00. H. Wright, 3857 No. 86th St., Milwaukee, Wis. W9AFT.

WANTED: Military, Commercial, Surplus, Airborne, Ground. Transmitters, Receivers, Testsets, Accessories, Especially Collins. We pay cash and freight. Ritco, F.O.B. 156, Annandale, Virginia Tel: (703) 560-5480.

FOR Sale: SB-100, SB-200, SB-300. Wanted: any kit to wire and repair, preferably Heathkit. Most Heathkits in stock. Business ref. on request. Lan Richter, 131 Florence Dr., Harrisburg, Penna. 17112

BLUEBOOK Prices save money. Take 10% off these prices without trade-ins. KWM-1, $299.00; HW-12, $119.00; NCX-3, $219.00; Galaxy 300, $179.00; Communicator 3/6M—$149.00; NCL2000, $479.00; Thunderbolt, $349.00; 75A4, $479.00; SX-99, $99.00; SX-117, $259.00; HQ-110, $134.00; DX-100, $99.00; AF-67, $59.00. Hundreds more. Free list. WRL, Leo, WØGFO. Box 919, Council Bluffs, Iowa.

GUARANTEED Reconditioned equipment on approval. Terms. Collins KWM-1, $229.00; 75S-1, $299.00; 30L-1, $349.00; 75A-4, $395.00; Drake TR-3, $385.00; TR-4, $485.00. Hallicrafters SX-140, $49.00; SX-101A, $219.00; HT-37, $269.00; Hammarlund HQ-110, $119.00; HQ-170, $179.00; HQ-180, $249.00; Johnson Ranger, $99.00; Valiant, $159.00; National NCL-2000, $395.00. Other equipment. Write for lists. Henry Radio, Butler, Mo.

VIKING II, $85.00; RME 4350A, $105.00; SW-54, $20.00; VF1-VFO, $15.00; EV-727 mike, $5.00; R46B speaker, $5; complete station, $215.00. Everything in excellent condition, on the air now. Erwin Sapiro, K1JMH, Caputo Road, North Branford, Conn.

APACHE and Mohawk Heathkit receiver and transmitter in very good condition. Factory checked. $325.00 or your best offer. R. Milasich, K9ECK, 405 Price, Calumet City, Illinois.

SIDEBAND: Heath HX-20 and p/s. Drake 2B and cal. Asking $325.00. Eric Drucker, WB2DTB, 2324 Boston Rd., Bronx, N.Y.

SELL: HQ-110. Globe V-10, VFO deluxe. Excellent. Deutsch, 545 Neptune Ave., Brooklyn, N.Y.

GONSET G-76, w/A.C. power supply, $200.00. Heath VFO HG-10 w/ext. power supply, $20.00. WB2FCB, Richard Reiter, 1370 Anchor, Wantagh, N.Y. 11793.

75A4 like new, with speaker, $400.00. Viking II, $90.00. Both together, $475.00. K4AOZ, 572 Park Ave., Birmingham, Ala. 35226.

CHRISTIAN Ham Fellowship now being organized as non-denominational organization. Donations are needed for work among hams. Christian Ham Callbook for $1.00 donation. For details write Christian Ham Fellowship, 5857 Lakeshore Drive, Holland, Michigan 49423.

TRANSCEIVER. All band, Hallicrafters SR-150, AC power supply, extra 10-meter xtals, special heat shields on tubes, 600E mike, mint condition, cost $800. Sell for $349.00. WA4SBD, 2804 Broadview, Huntsville, Ala. 35810. Tel: 852-0880.

DX-40 with xtals and VF1 v.g., many extras. $50.00. Hammarlund HQ-145C with clock, calibrator, like new condx, $125.00. A. DeSalvo, 2890 E. 197th St., N.Y.C. 10461. Tel: TA9-3070.

HOMEBREWER's Dream: custom-built 3-1000Z linear, full power, complete, 90% assembled, simply no time to finish. Over $1200.00 in parts alone, no surplus, custom engraved panels, all in 3 ft. cabinet, designed and built to be the ultimate. Sacrifice price or trade for suitable commercial linear. D. Angel, K1RYT, Overlook Dr., Ridgefield, Connecticut 06877.

FOR Sale: Mint condition: HT-32A serial #3321009 instruction book carton, $345.00; HT-33A Mark I linear serial #269344, brand new PL8295/172, instruction book, carton: $350.00: Anyone buying HT-32A and HT-33A gets 3 Dow-Key relays, cables, interconnecting wires, ready for the hookup, for $695.00: SX-101A serial #101102 with 2 and 6 meter converter scale, instruction book, carton, $250.00: Ameco CN-50W converter, $35.00; CN-144W converter, $35.00; PS-1W power supply, $8.00; CSB converter selector box, $5.00; anyone buying SX-101A and 4 Ameco pieces can have for $310.00 certified check or money-order. Sil Thompson, W2BIF, 134 Plainfield Ave., Edison, N.J. Tel: (201) 985-1755 after 6 P.M.

APARTMENT Bound. Swap excellent 41 ft. E-Z Way crank-up tower, Hornet Tribander, preferably for kilowatt Matchbox. Removal deal only. Blosser, W8DBK, Chagrin Falls, Ohio.

SELL: Viking II, VFO $140. Harvey-Wells R9A rcvr, $40. Walt Steen, Tel: 882-8532, 2425 Hering Ave., Bronx 69, N.Y.

FOR Sale: DX-60, $50.00; NC-155, $90, both in xclnt condition. Dick Schellens, WA1BDA, Westbrook Rd., Essex, Conn.

HOUSE: Ranch-style QTH in quiet professional neighborhood near Bell Labs and Fort Monmouth. Trees and open area on ⅝ acre. Seven rooms, 1¾ baths, attached garage. Hamshack study and tower with beams. R. Silberstein, WA2UZO, 38 Knollwood Drive, New Shrewsbury, New Jersey 07724.

FOR Sale: NCX-5 Mark II transceiver, CXU-27 xtal calibrator, NCX-A power supply/speaker console, all 6 months old, original cartons $530.00, 40 ft. Rohn tower, 3-element Hy-Gain Tribander TH3MK2, TR-44 rotor and desk-control, $135.00. Less than one year old. Moving. No shipping on antenna installation, you take down and away. Certified check or m.o. Alan Kogerup, 25 W. Soffel, Northlake, Illinois. Tel: (312)-562-1575.

HALLICRAFTERS SX-101 MK III receiver, $150.00 or best offer, Jim Weaver, WB4BLP, 1044 Myrtle Lane, Cocoa, Fla. 32922. Tel: PH 6368403.

MUST Sacrifice, mint HT-37, original owner, purchased new. First certified check for $275.00 takes it. Ship express collect. W8EWP, Schaffer, 7229 Saratoga, Reynoldsburg, Ohio 43068.

FOR Sale: Lafayette HE-45-B 6 meter transceiver in excellent condition with 3 crystals and PTT mike. Has built-in AC and DC power supplies, $85.00. Saturn 6 halo with matching transformer and cables, $14.00. Call or write Tom Adler, 2 Garden Road, Scarsdale, N.Y. Tel: (914)-723-3041.

SSB Cheap with a Viking II and SB-10 operating on MARS and hamband frequencies with VFO, $150.00. Bill Donovan, K3RRT, 4606 Griffin Drive, Wilmington, Delaware 19808.

HEATHKIT Mohawk SSB transmitter and Hammarlund HQ-129X. Will sacrifice for $250.00 for both. The Mohawk is actually factory assembled and has never been used. It is still in sealed Heathkit carton. Receiver 1953 model but works fine. Contact Robert S. Cannon (RCA) PAA/Antigua, Patrick Air Force Base, Florida.

LABORATORY Equipment: Measurements G.D.O. Model 59, $90.00; Lampkin 105B, $165.00; Panoramic Panalyzor Model SB12A Type T100 used for SSB AM or FM measurements, Tekronix scope 513D- DC to 18 Mc, $375.00; Simpson 479 TV signal and sweep generator, $185.00; Precise oscilloscope 300B, $150.00; Bcx BC221-AH, $65.00; Dumont scope Model 241, $65.00; Dumont square wave generator and electronic switch for dual trace on oscilloscope Model 185, $45.00; Hewlett-Packard 400H VTVM, $185.00. All in A-1 condition with instruction manuals. Sidney Gogel, 1096 Laux Place, No. bellmore, N.Y.

TA-33 3-element beam, like new, 1.2 SWR or lower. W2TDQ, Lindenman, W2TWD. 138-54 228 St., Laurelton, N.Y. Tel: LA 5-7859.

WANTED: BC779 Rcvr or equal w/ps. State condx, all mod., and price. Also want Knight sweep gen. w/xtals and man. Brandquist, 1545 Evers Ave., Westchester, Ill. 60153

COLLEGE Expenses: Drake 2B, $175.00; HT-44 and PS-150, $375; 275 watt Matchbox, $30.00. Shipped collect. Gari Berliot, 2634 Fairfield Pl., Madison, Wis.

HQ-145C, $135.00; HT-41, $150.00; GSB-100 $155, All excellent condition. Entman, 150 Chace Avenue, Providence, R.I. 02906.

EICO AC VTVM #250, $35.00; Eico power supply #1020, $15.00; Simpson Therm-O-Meter #388, $25.00; Teletest capacitor tester, #CT355, $15.00, B & K Tubetester, #500, $25.00. Witmer, 217 S. East, Oak Park, Ill.

FOR Sale: KWM-2, mint condx, #11443, 62S1, #11311, never used, 312B5 mint condx, #10051, 30S-1 mint, #10356, 516F-2, #15158, SM-2, #2002, 136B-2 (installed in KWM-2); 351D2, new, PM2, #12143, mint, CC2, new, 516E1, #008, not used, $2000 for lot. Will not sell separately. Never used mobile. WA9EHE, 915 N. President St., Wheaton, Ill. 60187.

SELL: B&W 5100-B and 51SB-B, $300. Multi-Elmac AF-68, PMR-8, M-1070, $250.00. ART-13: converted, w/p.s., $150; part converted, $50.00. new, $75.00; teletype: printer, reperf., TD, converter, scope, $200.00. Oscilloscope, BC-1060-A, $50.00; BC-639A rec., 100-158 mc, $125.00. AN APR-4Y rec., 38-4000 Mc., $200.00. All offers considered. John Peyton, 209 E. 56th St., Savannah, Ga.

URGENTLY Required: McCoy filter, either type, 2, 7360s. Michael Whelan, 44, Synge Street, South Circular Road, Dublin 8, Eire.

NCX-3 and AC supply. 4 months old, perfect condition, $320.00. Want CW/AM gear. Will consider trade. WB2DMU, Box 37, Burt, N.Y.

TRADE Southern Style: RME-6900, $210.00; Heath SB-300 and SB-400, $520.00; SB1-LA linear, $220.00; SX-117 and HT-44 and P/S, $850.00; HX-50 new, $320.00; KWM-2, $795.00. Free reconditioned equipment listings. Call or write Mitch, K4OQY at Electronic Wholesalers, Inc., 2310 Bob Wallace Ave., Huntsville, Alabama. Tel: 205-539-5723.

DESPERATE! Must sell because of college: Collins 32V-2, $95.00; TA33-Jr, AR-22, 32 ft. Spaulding tower, $75.00, or both for $150.00. Will also trade for small transceiver or small sailboat. WA4CPO, 500 Gondoliere Ave., Coral Gables, Florida. Tel: MO 7-3286.

AMECO TX-62, like new, $100.00; Johnson Valiant, vy gud, $120.00; Hallicrafters SX-100, gud condx, $125.00; Hammarlund HQ160, gud condx, $125.00, Philip Schwebler, W9GCG, 4536 N 50th St., Milwaukee, Wis. 53218.

CLEANING Out! A-54, PMR-6, AC supplies, $69.00; AF-68, PMR-8, M1070 supply, $180.00; Drake TR-3, TR-4 DC supply, still in box, $100.00; Heath Twoer, halo, DC supp., mount, $52.00. W5SYB, 5000 Hall, Amarillo, Texas 79109.

ALL In like new condition: Ameco TX-62 VHF, xmter and Dow-Key DK60 G2C relay, $100; matching Ameco VFO-621, $35.00; CDR TR-44 rotor and 200 ft. of cable, $30.00; Shure 520SL mic, $15.00 Johnson 6N2 conv. 28-30 IF, $40.00; $200 takes all, plus many extras not listed here. Joe Hettler, 2200 Morris Ave., Bronx, N.Y. Tel: 295-1694.

COLLINS KW-1 transmitter, all bands, 1000 watts phone and c.w. (500 watts 160 meters), $1200. 75A-4 receiver, $400.00; 32V-3 transmitter, $200.00. All are in excellent condition. Prices are F.o.b. Harold J. Mabes, W2CKY, 445 Delmar Place, Syracuse, N.Y.

COLLEGE Studies and expenses require sale of complete SSB station! Gonset GSB-100 xmtr, $215.00; Heath Mohawk rcvr, $175.00; EV-927 crystal mike, $8.00; Speed-X bug, $10.00; Hy-Gain 10-15-20 trap vertical, $15.00. Extras, $400 takes all. Original owner. No scratches and everything works perfectly, no bugs. W7HYK/2, Bob McConnell, 595 Taylor Rd., Piscataway Township, N.J. 08854. In NYC area, call (201)-249 8439.

IT'S Here now! The biggest price break-thru in the linear business! The ever-famous power packed Hunter Bandit 2000B is available now for $249.95 (less tubes) in easy-to-build kit form. Send your order to assure early shipment to: Hunter Sales, Inc., P.O. Box 1128, Des Moines, Iowa 50311.

SX-101-A, excint condx, $165.00; KW amp, 250As, power supplies, $110.00; TA-33 beam, $35.00. K1IGO Clinton, Conn.

GETTING Out of the service in August and going transceive. Have SX-11 with matching speaker, $175.00, T-150A, $75.00. Will take $225.00 for both items. Both are in excellent condition. Pat McMahon, WA4ADP, 4536 Old Stage Rd., Kingsport, Tenn.

L.A. California. Swap new Hy-Gain all-band trap fan doublet and cash for Ham-M rotor. Ralph, WB6PCZ, Tel: HO-74412. 7335 St. Monica Blvd.

MINT SB-33, modified with Variactor diode to tune plus or minus 50 kcs of xmtr freq. receiver freq. controlled via 10-turn heliopot, tuning rate 10 kcs. per turn. Exceptional clean modification. I invite your inspection. Transceiver plus SB1LA linear, $395.00. W1DFN, 59 Tahattawan Rd., Littleton, Mass. Tel: (617)-486-3485.

ROHN Tower 71 ft., heavy-duty motorized, crank-up tilt-over, with four element fiberglass cubical quad 20 meter antenna. Located in Long Island. Call 212-ES-5-2264.

HQ-180C, serial 1800, perfect condx, with speaker, $250.00 or trade for 19 in. color portable TV. Robert Gray, 657 Elmira Rd., Ithaca, N.Y.

SELL: Galaxy V with AC supply, $345.00; Galaxy deluxe console, $50.00; guaranteed to be like new. Factory cartons and instruction manuals. Less than one year old. Jack Yeoman, W8VHY, R #4, Washington Court House, Ohio.

I Have the following for sale and will accept the best offer, complete: 1—Elmac Model AF-67 transmitter with PSA, 500 power supply; 1—20A SSB exciter, 2—450 VFO's; 1—200 watt P.E.P. linear amplifier (home built); 1 Hallicrafters SX-71 receiver with C-E model A, sideband slicer. Mrs. I. L. Tovrea, 303 W. Saunders, Mt. Pleasant, Iowa.

SBE-33 with d/c supply and SBE matched mike, excellent: $195.00; also in excint condx Gonset 6-meter Communicator, 4 xtals, mike and Hilltop ant., all for $90.00. Cash only, no trades! K4UBD, Al Lawrence, 3301 N.E. 5th Ave., Miami, Fla.

SELLING: Heathkit SB-300 receiver, SSB filter, in excellent condx, $230.00. K1RPB.

FOR Sale: 90651 Millen grid-dip meter with coils range 1.7 to 300 Mc., $35.00; TG-34A code keyer with box of 14 reels code-practice tapes, $35.00; pair 304-TL Elmac tubes with sockets, $35.00; 2-3E29 tubes, 2-829B tunes, 2-832A tubes, one 4-125A Elmac. Make offer on any or all tubes. Helen Thompson, WB2VJL, 134 Plainfield Ave., Edison, N.J. 08817. Tel: (201)-985-1755 after 5 P.M.

WANTED: Tilt-over tower, 30 to 40 feet for heavy beam. WA6DPX, 1127 Mesquite, Palm Springs, Calif. Tel: (714)-327-4297.

NCX-3, NCX-A, perfect, $295.00; Warrior Linear, runs 1000 watts P.E.P. from 100 watt exciter, $145.00. K3WNS, Box 4, Forest Hill, Maryland.

HT-37 SSB transmitter, like new, $240.00. K3PSW, 640 Trephanny Lane, Wayne, Penna. Tel: (215)-687-3194.

TRANSMITTERS For sale: Heath DX-60, $50.00; DX-20, $20.00; HG-10, $30.00; Knight T-60, $30.00; Vibroplex Champion bug, $13.00; need 6 and 1¼ meter converters. K8GNZ, Box 683, Fairmont, West Virginia 26554.

SELL: Swan 350 w/a.c. power supply and VOX. Equipment is in mint condx. Best offer over $325.00. Ken Bentz, K4MNB, 767 N. W. 7th Dr., Boca Raton, Fla.

SALE: Eico 720, $55.00; Lafayette HA-230, $65.00. Don Stewart, WN3EPH, 4314 Devereaux St., Philadelphia, Penna. 19135. Tel: DE-3-7449.

QUICK Sale: All in gud condx, HT-37, $220.00; Warrior linear, $160.00; Drake 2B, $185.00; 2BQ, $20.00; Hallicrafters HA-4 keyer, also key, $50.00; TA-33, $55.00; Tri-Ex H series, 40 ft. crank-up, $90.00. WA6ZJZ, tel: 982-6759. DuVall, 1068 Hampden Ct., Upland, Calif. 91786.

QSTS: 1957 thru 1965, in QST binders. Unable to ship. Pick-up deal only, sry. Make offer. K2YFM, 50 Brookside, Allendale, N.J. 07401.

CLEGG Thor VI transceiver and 12v. supply/modulator. Units never used on air. Must sell because of college expenses: $200.00. Fred Salzman, WB2EHS, 72 Johnson Road, Somerset, N.J. Tel: (201)-846-4719.

MUST Sell: DX-100, SB-10, SX-111, TA-33SR, AR-22 rotor linear amplifier. Best offer. K1PFD, New Britain, Conn. Tel: (203)-225-1033.

SALE: KWS-1, s/n 1055, with relay, 2 sets spare final and complete set spare tubes, $650.00. Tetrex TM-30, $150.00; 75A-4 filters 1.5 and 6.0, $25 each. K5YVR, 356 Roosevelt Blvd., Cherry Point, N.C. 28533.

COLLINS S/Line: 32S-1, 75S-1, 516F-2. Immaculate: $675.00. F.o.b. 757 Yorkshire Road, Winston-Salem, N.C. 27101. Tel: PA48555, R. H. Witherington.

HAMMARLUND HQ-180C, excellent, as new, w/matching speaker, $315.00. D. A. Keller, 4011 Soutter Ave., S.E., Cedar Rapids, Iowa, 52403.

DETROIT Area ham paradise. Great DX location. 3 acre hilltop antenna farm. 60 ft. oaks. TA-33 on 70 ft. Rohn fold-over tower. Paneled, heated ham shack. Wonderful 13 room stone-front house, 25 ft. living room with fireplace and adjoining sun room; dining room; breakfast nook; modern oak kitchen, all built-ins. Bedroom, half-bath downstairs. 2 huge bedrooms, bath, upstairs. Shack; paneled study. Utility/photo lab, shop, recreation area. Fireplace: Basement. Call K8HHK, 313-MA-6-5825.

WORLD Radio Labs Meteor transmitter, AC supply, and PTT, $75.00; Hallicrafters SX-101 receiver, $175.00; Eico 722 VFO, factory-wired, $55.00. All in excellent condition, with manuals, for $280.00. W8HHX, 529 Oakview Dr., Kettering, Ohio 45429.

SELL: SB-34, mike, xtal, Calibrator, 80 and 20 Hustler, Mobile Mount, $350.00; SB2-LA, $175; Heath IT-21 tube tester, $35.00; manuals included. K1YGS, 142 Torrington Heights, Torrington, Conn.

CRYSTALS: C-W Crystals will be closed for vacation from July 1 to August 15th. We take this opportunity to thank every amateur, experimenter, builder and commercial crystal buyer who has favored us with their orders the many many years since 1933. We also thank ARRL and QST the oldest and finest organization in it's field. C-W Crystals, Rt. #2, Box 22-B, Marshfield, Missouri 65706.

FOR Sale: NCL-2000 in A-1 condx. Latest design RCA 8122s, $425.00. You pay freight. Frank Caswell, W1ALT.

DRAKE 1-A SSB rcvr. In mint condx. 10 hours use since complete factory check. $125.00 or trade for nice Gonset 2B 2 mtr. E. Muntean, 30250 Underwood, Warren, Mich.

NC-155, HA-90 VFO, Scout 580A. Rcvr and VFO new, 680A in gud condx. All for $200. WA4UYK.

WANTED: PMR-7-8 receiver, HA-10A dipper. State condition, best price. W2CE, Beck, 55 E. Bedell St., Freeport, L.I., N.Y.

COLLINS 75A4, for sale to best offer. With Collins blanker, 500 c/s, 2 kc/s and 3 kc/s filters. Don Lund, WAØIQN, P.O. Box 1664, Boulder, Colorado.

SELLING: HQ-180-C, $200; ARC-2 Transceiver, $50.00; new Chicago Trans., 2790/2350 volts at 250/350 mils, $30.00; Navy *RBM-3 revrs #1 and #2, 200 kcs to 20 mcs., with AC pwr. supply, like new, $75.00; FRA freq. shift conv., $20.00. Write: K2CTP, Leo W. Schubert, 73 Jefferson St., Brooklyn 6, N.Y. 11206.*

RTTY Gear for sale. Model 19 and 28 parts and service. Price list issued monthly. Mazer Enterprises, 17740 Bay Circle, Fountain Valley, Calif. Phone: (714)-962-4970.

WANTED: SX-115 Hallicrafters receiver. K2EGI.

TR-4, $480.00; AC-3, $68.00; DC-3, $108.00; RV-4, $68.00; factory sealed boxes. Warranty, naturally. Will sell separately. Mel Palmer, K4LGR, Box 10021, Greensboro, N.C.

COLLINS 75S-1 in excellent condition: $270.00; Collins 312B-3 speaker, $10.00. WA1CSZ c/o Larry Goldberg, Lindley Terrace, Williamstown, Mass. 01267.

SACRIFICE Versatile HT-37, 75S-1, antennas and 3 bedroom furnished residence on lovely and private ¾ acre near Daytona Beach. Tel: 904-677-4870 or HUntsville 205-536-2524.

DX-100 good condx, $85.00. McGee, 58 Campus Dr., No., Snyder, N.Y.

GOING TO College: Must sell HT-32, SB-300 with AM filter and 6 mtr. conv., TA33 Sr with 40 MTR. Adapter TA4OK with CDE TR4A rotor. Best offer gets equip. Will deliver within 300 miles. Tom Reomerski, 303 W. Delaware Ave., *Wilmington, Delaware 19809.*

SELL: HQ-129X with Q-mult. and speaker. Perfect condition. $85.00. Gonset Super 12, $25.00. W5LFN, Box 286, Umpire, Arkansas.

SENECA 6 and 2 meters for sale with Drake Filter Dow-Key relay, cooling fan, all cables, $150.00; also National NC-270 80-6 meter receiver, Cesco Reflectometer, make me an offer. WB2AEX, 3688 Jules Lane, Wantagh, New York 11794.

DRAKE TR-3 transceiver, $380.00. Dr. Robert Vann, 1928 Virginia Road, Winston-Salem, N.C. 27104. Telephone 919-722-2481.

DRAKE 2-B without a scratch, $180.00; Electro-Voice 729 cardiod microphone with accessories, in carton, $10.00. Vibrokeyer, in carton, $10. Japanese bug, $5.00. Thomas Biwer, WA9APT, *611 East Fairview, Arlington Heights, Ill.*

ANTIQUE Collector's item. Colin B. Kenney Company type #220 "intermediate Wave Receiver" 1914. Serial #L16523 W4. Superb condition. Listed antique price, $210.00. Sell for $155.00. Special Osborne 200 watt modulation transformer-transistor modulator or speaker to pair/6146s. Impedances 5.5ct/2700 ohms. Beautiful $30.00. Rider Manuals, F.o.b. Richard M. Jacobs, WAØAIY, 1015 Glenside Place, University City, Missouri 63130.

SELL SBE SB-34 with matching microphone, $295.00; Drake DC-3 power supply and MMK-3 mount, $85.00; all in excellent condx, original cartons. Bailey, W5FTW, 2319 New York St., New Orleans, La. 70122.

NC-303 with xtal calibrator $215.00; UTC VM5 600w, mod. trans., $40.00; 300w. Multi-Match mod trans $20. National HROSTA1 receiver with modified low noise front end and 10-15 meter xtal converter $60. Floyd Martin, Rt. 2, Sterling, Va., Tel: 703-430-2499.

HALLICRAFTERS HT-32B xmtr. Swan Mark I linear amplifier. Mint condition. $800.00, takes both. WA2KQZ, Paul Sussman, 1075 Sheepshead Bay Rd., Brooklyn, N.Y. 11229. Tel: 769-8185 after 6 P.M.

HY-GAIN 18JR High Tower, Jr., new, in factory sealed carton, $35.00; Astatic 10C mike on "G" stand, $15.00. F. S. Eggert, 11833 Wisconsin, Detroit 4, Michigan.

NCL-2000, $475.00. Too heavy OM W1QP (71) to lift. Factory sealed packing. Just overhauled and updated by National. Dr. Crosby, RD #1, Chatham, Mass. 432-1157.

61 ft. Vesto tower, safety platform, railing, mast, rotator, TA-36 beam, cables and control unit: $325.00. Klingbail, Davidson Rd., Rome, N.Y. 13440.

SELL: BC-603, BC-683, $25.00; power supply, $10.00. BC-342, $40.00. Ellis, 303 N. 13th, Richmond, Ind.

HOT Summer Specials: HX20-$125.00; HP10 and HP20, $20.00 each; SW240, $225.00; SW350, $315.00; GSB100, $199.00; HT-37, $245.00; SX-101 111, $149.00; 75A4, $349.00; Valiant, F.W., $145.00; demo SR-500, $325.00; new HT-37's, $345.00; new NC-270s, $179.00. Many others, free list. Howard Radio, Box 1269, Abilene, Texas 79604.

RANGER, $105.00. RME6900, $250.00. Mike Bellinger, 129½ Main, Ames, Iowa.

600 Piv at 750 Ma. Tophats, includes by-pass caps and resistors, 10 for $3.00. Postpaid U.S.A. Fully guaranteed. East Coast Electronics, 123 St. Boniface Rd., Buffalo, N.Y. 14225.

KWM2A S/N12076, 516F-AC. Both for $775.00. Gonset Gooney Bird 2 meter GC-105, $125.00. ADcom 350-12 mobile supply, $75.00. W5HBE, Box 30241, Dallas, Texas 75230.

FOR Sale: TR-4, AC-3, new, $550.00; HW-32, $115.00; transformer, *115/115, 7200 VCT, 1.0 amp., $25.00; Variac, 115V,* 20 amp., new, $25.00; transformer 115V/3000VCT, 0.3 amp., $5.00. 812 tubes, $1.00; SK-500 sockets for 4-400s, $7.50. 4X150s, 5, Yuba Dalmotor liquid-cooled kilowatt mobile linear, $100. Loudenboomer linear, $125.00. James Craig, 172 White Birch, Portsmouth, N.H. 03801.

WANTED: Gonset Communicator 1, II or IIA, 2 meters. Give price and condx. W2LAX, Schilling, 9 Zeliff Ave., Little Falls, N.J. 07424.

SELL: HW-32, HP-23 power supply, $130.00. Both are in xclnt condx. Gotham V-80 vertical, $5.00. ARRL Handbook, 3-el. 20-mtr. beam, $20.00. Kent Zimmerman, WA1CIZ, Weston Road, Weston, Conn.

LATEST Drake Receiver transmitter/reciter, 2 months old, R4A, T4, AC3, MS4, all xtals 160M-10M complete. Original guarantee and cartons. Presently $840 sacrifice, $635. Floyd Felloes WB2KOQ, Crimson Ave., Malverne, N.Y. 11565.

SALE Or swap for transceiver: NCL-2000, in warranty, beautiful. New output tubes. $485.00. Will ship express collect, factory carton. Foy Guin, W4RLS, Box 26, Russellville, Alabama.

WANTED: 30-50 Mc FM receiver. Sam Burke, 116 Flanders Road, Niantic, Conn.

FREE Copy of totally new ham publication. Send QSL or postcard today. Nothing like it before! Ham's Market Newspaper. Box 13934, Atlanta 9.

FOR Sale: Collins 32S-1; 30L-1, 516F-2, in top condition. Want 6 mtr. transceiver and Davco DR-30. Stephen Koczo, WB2FFK, 412 Bloomfield Ave., Caldwell, N.J. 07006.

FOR Sale: SX-140, HT-40. Heath VF-1 VFO. Dynamic DB-88 mike, 2 Novice crystals. All in gud condx. All or part, make offer. WAØERR. Mark Chattertown, Spencer, Iowa.

BIG Bargain: For sale: Gonset GSB-101 linear 1200 watt P.E.P. input, perfect condx. Tremendous signal, $175.00. Dan Safran, Cloverdale Blvd., Bayside, L.I., N.Y.

LINEAR: Hammarlund HXL-1, $285.00. Robert Vann, 1928 Virginia Road, Winston-Salem, N.C. 27104. Telephone 919-722-2481.

SELL: AF6-7 PMR-7 accessories; HW-22 HP23AC. WA3AJT, Wolf, Akron, Penna.

FOR Sale: KWM-1, AC supply, DX-Adapter, $375; SW-240, DC supply, perfect, $295, or best offer before August 1st. Louis Kocurek, Jr., W5VIV, 108 Thelma, San Antonio, Texas 78212.

T-150A (new W/Man.), $85.00. Globe Scout 65B (w/manl.), $35.00. VF-1 VFO (w/manl.), $15.00. Handbook keyer w/Brown paddle, $25.00. W4VRO, P.O. Box 794, Macon, Ga., 31202.

NCL-2000, like new, $400.00; Hallicrafters FR-274, SX-73, $150.00; 50 ft. Rohn #25 tower and Ham-M rotator, $150.00. SBE-34, like new, $300.00. W7WRS, Lyons, 1708 Valley View, Las Vegas, Nev.

FOR Sale: NCX-3 and NCX-A, $250; used Hy-Gain 248BDQ, $15.00; Eico 720, $35.00; Dow-Key DK-60-2C, $8.00. Pennwood Numechron clock, $10. Will ship. Kerry Nelson, WA9JJE, 1554 W. 183rd St., Homewood, Ill. 60430. Tel: (312)-798-6347.

SELL: 2B, 2AQ, 2AC, $200.00; HT-37, $225.00. All are in excellent condition. Will consider offers. Also Collins 75A-1, speaker. WA5ESW, 646 McClendon, Corpus Christie, Texas.

WANTED: Extra heavy-duty prop pitch rotator or similar. K5JZV, 5847 South Pittsburg, Tulsa, Okla.

GOT Too much stuff! HA-10 Warrior Linear, $150.00; Eico 753, expertly wired and tested, $150.00. WØGML, 5520 Porter, Wichita, Kans. 67204.

SELL: Collins 75A-4 2.1 3.1 filters; speaker, $360.00. Plate transformer 4250V CT 350 mils, 110 volts. W8VPC.

HQ-110 with clock and manual, $100.00; Gotham V-80 vertical with 10 ft. RG/8-U coax, $10.00. Dennis Quinn, 88 Woodrow Court, Sharon, Penna. 16146.

"HOSS-TRADER Ed Moory" says if you can pay cash and no *trade involved, you can purchase the following demonstration* equipment with factory warranty: SB-34, $329.00; Swan 350, $359.00; Drake TR-4, $499.00; Galaxy V, $339.00; NCX-5, $519.00; R4-A, $329.00; NCL-2000, $499.95; 75S-3-B, $498.00; Ham-M rotor, $89.95; new SR-500 and matching a.c. supply, reg. price $514.00, cash price $399.95; new Mosley TA-33, Beam and cemo Ham-M rotor, $169.95; Reconditioned and guaranteed gear: HT-37, $249.00; 600-L, $189.00; 2-B, $195.00; SX-111, $139.95; SB-33, $189.95; KWM-2, $599.00; 32S-1, $398.00; No reasonable cash offer refused on new equipment. Ed Moory Wholesale Radio Co., P.O. Box 506, DeWitt, Arkansas. Phone 946-2820.

GENERAL Radio interpolation oscillator; GR interpolating freq. standard with multi-vibrator; GR unit-time-freq. calibrator with P.S. Make offer or trade for SSB gear. W4ZDV, Rte. 1, Box 373, Englewood, Fla. 33533.

HEATHKIT SB-300, new, excellent condition, checked and aligned by factory. $250.00. Rev. Joseph Romano, 4 Prospect St., Essex Junction, Vermont. Tel: 802-878-2444.

JOHNSON 275 watt Matchbox (250-23), directional coupler and *indicator (250-37 and 250-38), $50.00; Heath OF-1 Q-multiplier,* $5.00; mint with manuals. John S. Catron, W5DZA, 826 Ranchitos, Santa Fe, N. Mex. Tel: 505-982-0894.

WANTED: Junk R-105A/ARR-15 receivers; need band dial and other parts. David Woerner, 823 Azalea, Houston, Texas.

KWS-1 Collins with p/s. Approximately 8 years old. $600 or best offer first received. E. E. Armstrong, 160 Putnam Park, Greenwich, Conn. 06830.

FOR Sale: Collins 30K transmitter and 310 exciter. Asking $200. W3WJC.

WANTED: Morrow MBR-5 receiver and Morrow MB560A transmitter. W3UQQ.

COLLECTORS! Trade Grebe receiver in original carton and other old radio gear for 75-S receiver or SSB transceiver. *W6JRY, Rte. 4, Box 613, Chico, California 95926.*

FOR Sale: KWM-2 with 516F-2 p/s. John G. Hipp, P.O. Box 431, New Milford, Conn. Tel: 203-354-8154.

PORTLAND, Oregon, would like contact with amateur for weekly QSO. K6EY, San Francisco.

SCHOOL Club would appreciate your old Handbooks, code records, crystals, other small gear, 73's, QST's, even CQ's. W5OPX, Nolan High School, Fort Worth, Texas, 76103.

SELL: Heath Mohawk RX-1 receiver. In vy good condition. Heath speaker, manuals, trimmers, $130.00. Will ship REA collect. Bill Robinson, 1640 Wandering, Monterey Park, California 91754.

COLLINS VFO's 70E-23 for KWS-1, new, $39.00; 70E-12 for 75A-3, new, $39.00; 70E8A for 32V, new, $29.00; 70K-1 for *KWM-1, new, $29.00; 70E18 for R-392, new, $49.00; 70H12 for* R390A, new, $49.00. Richard E. Mann, 430 Wilmot Road, Deerfield, Ill.

COLLINS KWS-1, in excellent condition, $750.00. Will deliver within 200 miles. Cliff Alsop, W9EKD, 5927 Primrose Ave., *Indianapolis, Ind. 46220, phone 255-4860.*

SWAN 350, 12V supply. Model 14-117. Unused, $112.00. W6NCT, 243 Rametto Road, Santa Barbara, Calif.

SELL: Latest model "Mohawk" rcvr. Perfect condition. $150.00. Ed Krenceski, WB2ASK, P.O. Box 341, *Canton, N.Y.*

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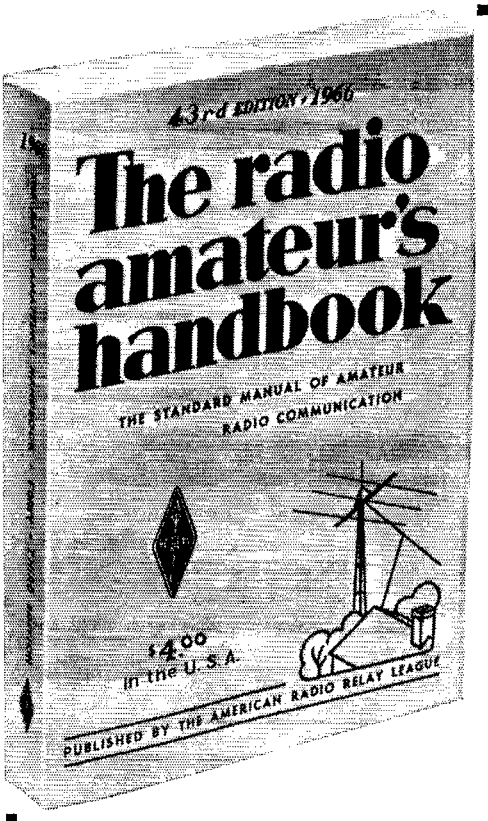

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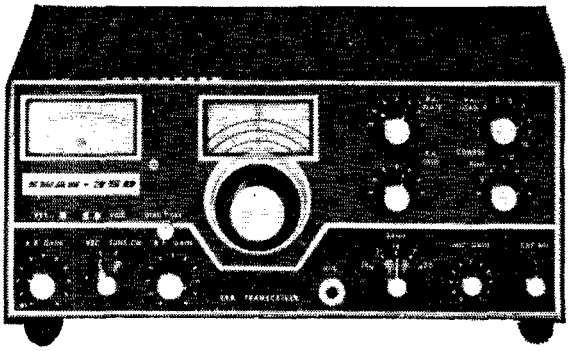

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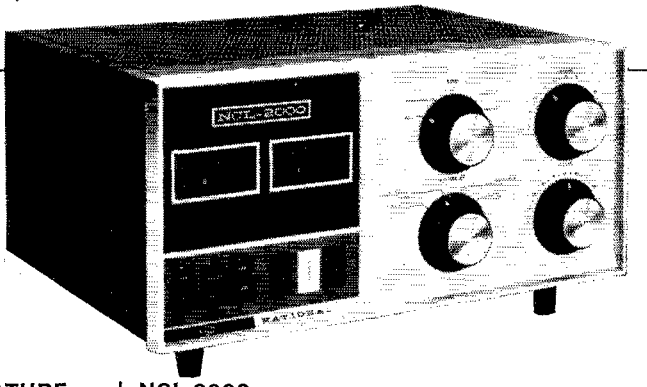

FEATURE	NCL-2000	COMPETITION
POWER	Entire equipment I.C.A.S. rated for full 1000 watt average, 2000 watt peak input; output tubes and all RF components rated for C.C.S. operation. Power input and efficiency identical on all bands — 80 through 10 meters.	
SIZE	Completely self-contained, including power supply, in desk-top cabinet (dimensions only 7⅝" H, 16¼" W, 12¾" D).	
DRIVE REQUIREMENTS	Adjustable passive grid input and use of high power ceramic tetrodes in final permits drive to full output with exciters delivering as little as 20 watts or as much as 200 watts.	
METERING	Separate rear-illuminated precision D'Arsonval plate and multi-meters for simultaneous measurements.	
ALC	ALC output to exciter for maximum talk-power with greatest linearity.	
SAFETY AND PROTECTIVE DEVICES	Fuses, time delay and plate current overload relays, plate power lid interlock and automatic HV mechanical shorting bar.	
CLASS OF OPERATION	Grid-regulated AB_2 permits easiest tune-up, low drive power for maximum exciter linearity, and protection from destructive peak currents.	
EASE OF TUNE-UP	Internal dummy load in grid circuit makes adjustment of exciter into amplifier possible without turning on NCL-2000 and without radiating a signal.	
STYLING	Award-winning design matches NCX-5 transceiver and complements **any** equipment.	
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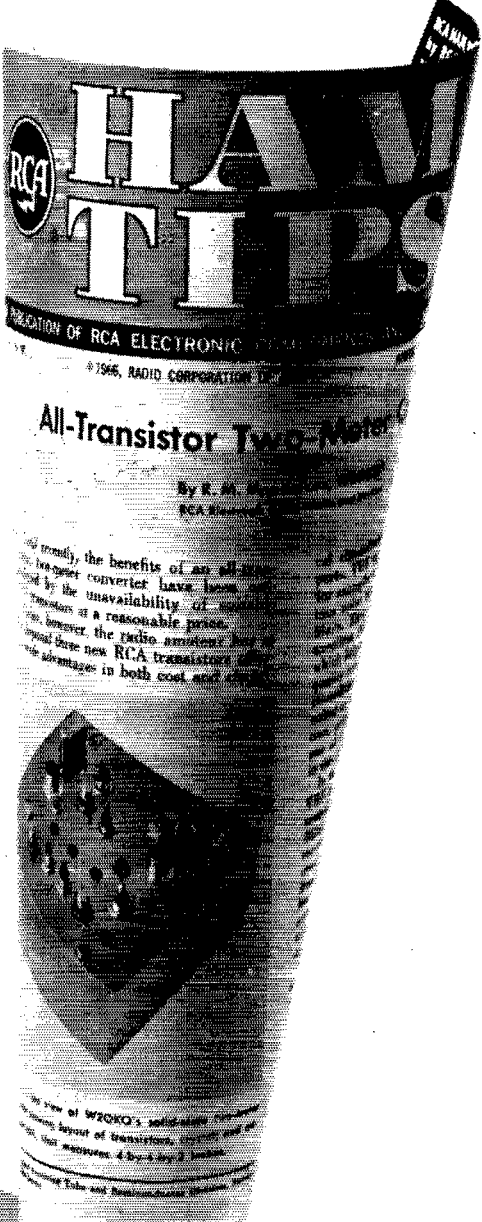

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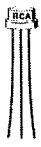

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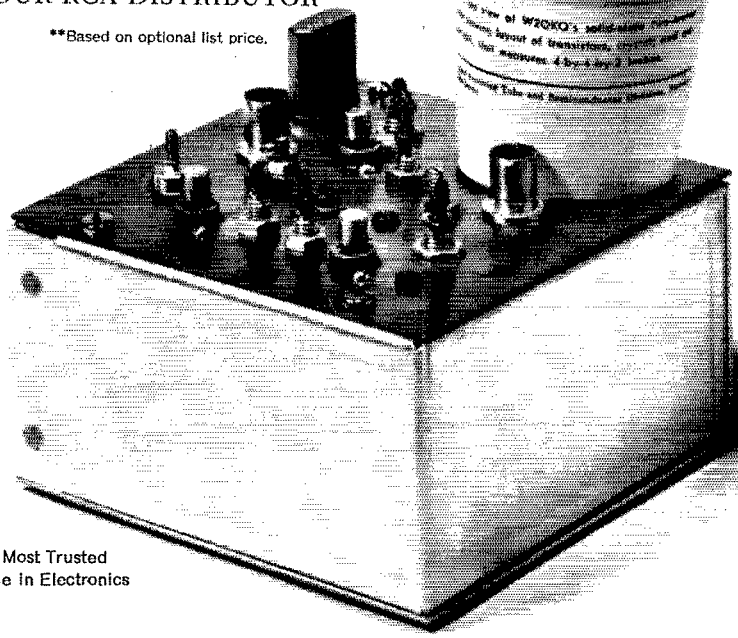

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