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QST

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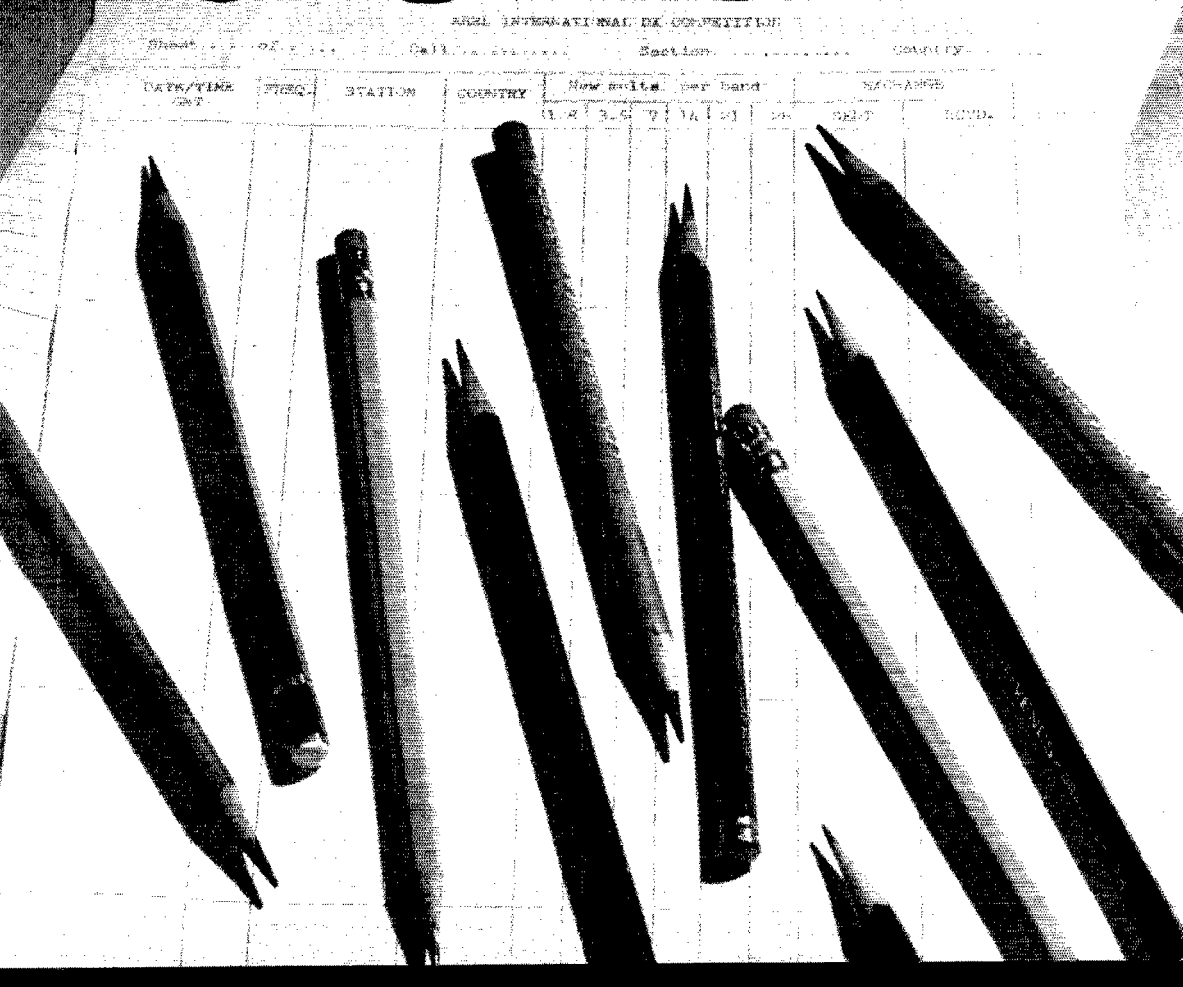
amateur radio



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OUNCER™

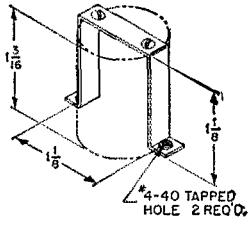
AUDIO TRANSFORMERS & INDUCTORS

FOR TRANSISTOR & TUBE APPLICATIONS

"O" Series

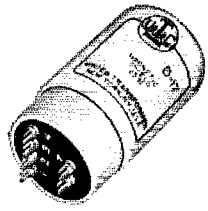
STANDARD OUNCER

Dia. .....7/8"
Ht. .....1 3/16"
Term proj. .....5/32"
Mtg. .....11/16"
Scr. 2-56
Wt. .....1 oz.



0-BR

Ouncer chassis mount bracket



Hipermalloy Shield shown fitting over ouncer unit

"P" Series

PLUG-IN OUNCER

Dia. .....1 1/32"
Ht. .....1 13/32"
Skt. .....St. Oct.
Wt. .....2 oz.

IDEAL FOR HAM, PORTABLE BROADCAST, HIGH FIDELITY, CONCEALED SERVICE, HEARING AID AND SIMILAR APPLICATIONS

For over thirty years UTC engineering and production talent has lead the industry in the development of high quality transformers, inductors, electric wave filters, magamps and high Q coils.

The UTC OUNCER series pioneered a breakthrough in the reduction of size and weight. "O" series units are fully impregnated and sealed in drawn aluminum cases. Highest quality characteristics are inherent in the conservative design. Frequency response from 30 to 20,000 cycles within ± 1 db. A hipermalloy shield providing 25 db is available.

Plug-In "P" series OUNCERS are identical to the "O" series but are sealed in bakelite housings of submersion proof design, with plug-in base to fit standard octal socket.

IMMEDIATE DELIVERY

From Stock

OUNCER TYPES	Pri Imp Range, Ohms	Sec Imp Range, Ohms	Level Range, mw
INPUT & MIXING TRANSFORMERS	From 7.5 to 50,000	From 50 to ½ megohm	From 6.3 to 30
INTERSTAGE TRANSFORMERS	From 25 to 100,000	From 10 to 1 megohm	From 6.3 to 1 watt
OUTPUT TRANSFORMERS	From 4 to 30,000	From 3.2 to 600	From 6.3 to 1 watt
INDUCTORS	From .25 hy to 300 hys		

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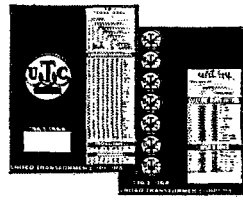
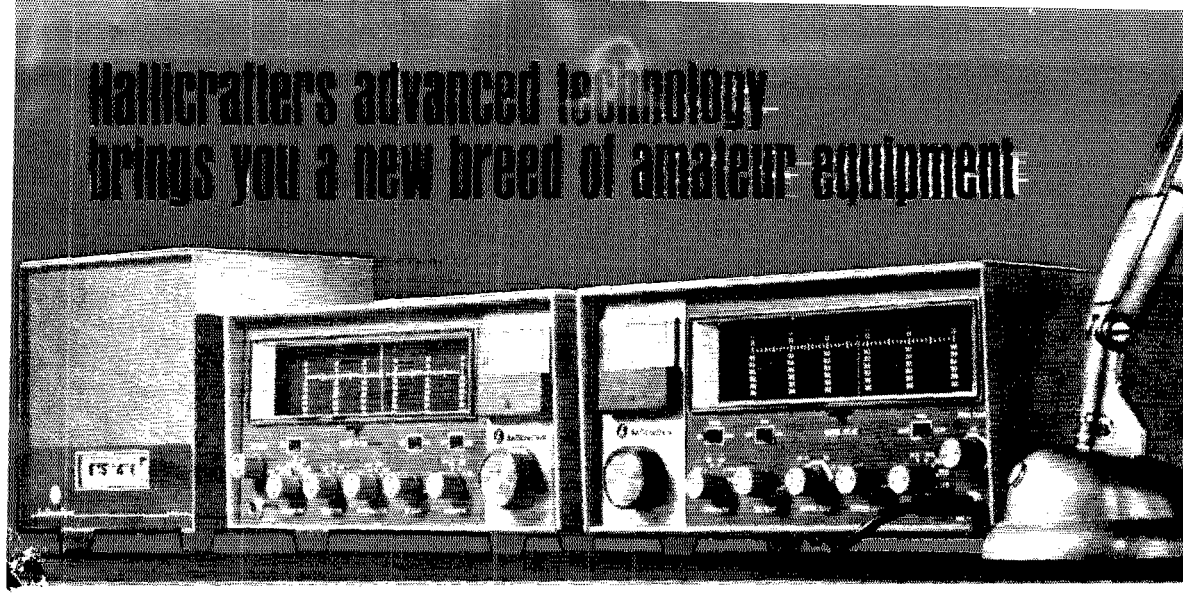


Hallicrafters advanced technology brings you a new breed of amateur equipment



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; (2) 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; Smiter.

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.

Available in Canada from Gould Sales Co.

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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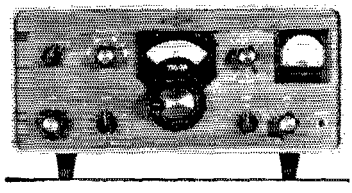
you've made a good QSO. And



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FEBRUARY 1966

VOLUME L NUMBER 2

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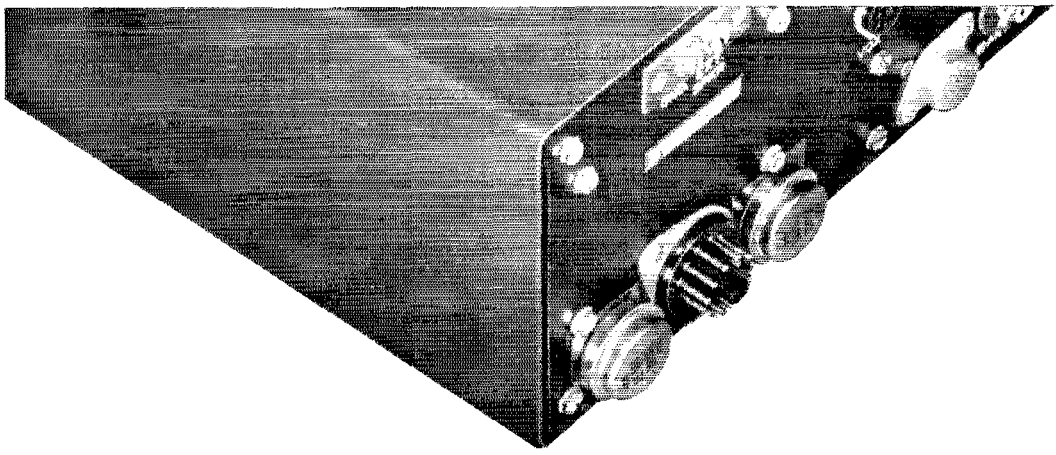
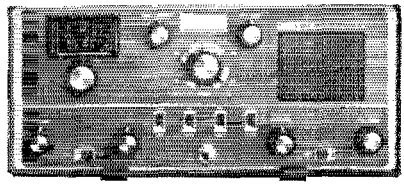


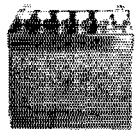
SBE has a corner on the market



Extra value is right around the corner in every SB-34 transceiver in the form of a very special built-in power supply.

This power supply will operate with 117V AC input...

and equally well on 12V DC...



The supply is transistorized—has a heavy-duty power transformer. One changes input voltages merely by using the appropriate AC or DC plug/cable set. Both are packed with every SB-34. (You see the input power plug and the two power transistors in the rear corner photograph of SB-34). This two-way power supply is standard, built-in equipment in every **SB-34** and **included** in the price so that there is no need to look for such fine-print statements as, "AC power supply extra" or, "Inverter for DC extra."

In SBE advertising one simple statement covers it all, **"Suggested price 395.00."** When you unpack a sparkling new **SB-34**, 4-band transceiver you get a single compact unit that is ready to play ... in your car ... or at home. You need only a microphone, an antenna, a source of power and a keen desire to work the world on sideband.

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Power input: 135W P.E.P. input. (Slightly lower on 15). **Frequency range:** 3775-4025 kc, 7050-7300 kc, 14.1-14.35 mc, 21.2-21.45 mc. **23 transistors, 18 diodes, 1-zener, 1 varactor,** 2-6GB5's PA, 1-12DQ7 driver. **Built-in speaker.** Prewired receptacles on rear accept **VOX** and **Calibrator**—both units optionally available. **Size:** 5"H, 11¼"W, 10"D.

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hy-gain HF VERTICAL

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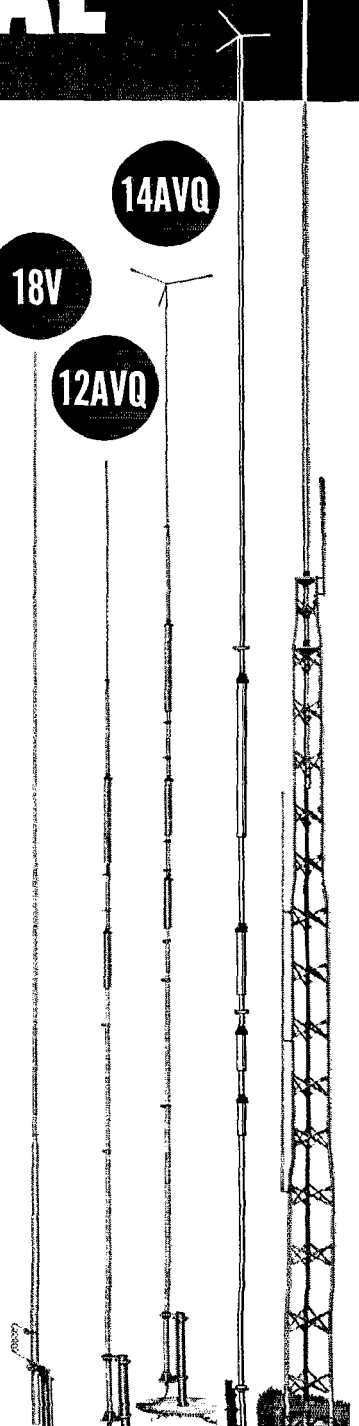

The Incomparable HY-TOWER for 10 thru 80 Meters

By any standard of measurement, the Hy-Tower is unquestionably the finest all-band vertical antenna system on the market today. Delivers outstanding omni-directional performance on DX as well as short haul contacts. Takes maximum legal power. Feeds with 52 ohm coax. SWR less than 2:1 on all bands. Positive action automatic band selection is provided by unique stub decoupling system that effectively isolates various sections of the antenna so that an electrical ½ wavelength (or odd multiple of a ¼ wavelength) exists on all bands. Structurally, the self-supporting Hy-Tower is built to last a lifetime...withstands 100 MPH gales. If you want the finest, you'll want a Hy-Tower. Model 18HT .....**$139.50** Net

The New Model 18AVQ. *A high-performance all-band vertical for under $50.00*

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A high performance trapless vertical for 10 thru 80 meters. Tunes to any band by *simple adjustment of feedpoint on base matching inductor. Feeds with 52 ohm coax.* Heavy gauge aluminum construction – mounts on ground, roof or tower. Exceptional portability. Model 18V .....**$16.95** Net

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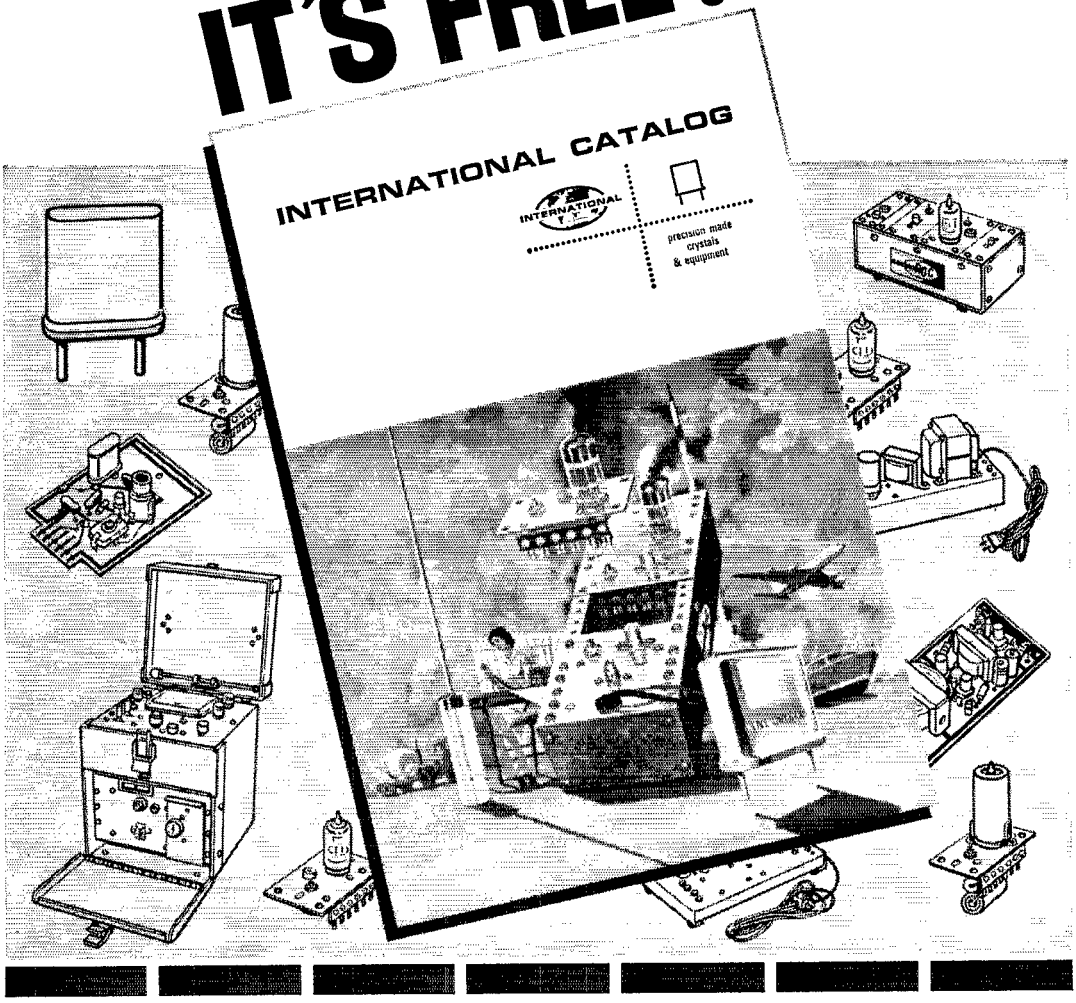

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It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors.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

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

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

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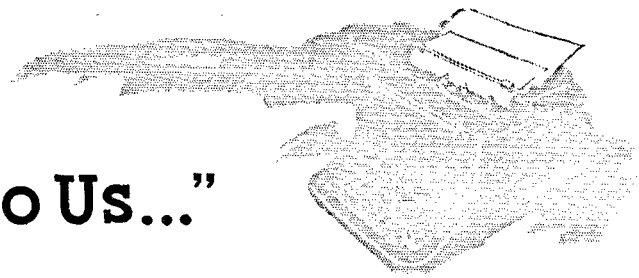


"It Seems to Us..."

FEWER NEWCOMERS

WHEN one attempts to appraise the growth of the amateur radio body in recent years, he runs into a confusing maze of figures — perhaps because the FCC computer is not yet completely programmed to turn out detailed comparisons with earlier manual breakdowns. However, there is one inescapable conclusion: the number of newcomers to amateur radio is seriously down the past couple of years, as compared with the earlier 1960s.

The number of new licenses issued by FCC in the Amateur Radio Service had been running about 33,000 yearly. During 1964 and again in the year just past, the over-all totals were on the order of 20,000.

Howcum?

There seems to be no set answer, but we can speculate on a number of possibilities. And we'd like to hear more ideas on the subject from our members.

It has been suggested that CB interest has drained some of the amateur potential. Yet if this were true, it would seem that the effect would have shown itself several years earlier. Further, FCC figures indicate that new CB licenses have similarly undergone a substantial drop in the past couple of years.

License fees? Could be, since they started at the same time the downward trend began. But we find it hard to accept, as a *major* reason, at least in the ham field. When many hours of study and code practice time are involved, as well as a substantial investment in equipment, can that many prospective hams be deterred by a mere $4? And, there is no fee for the Novice license.

Incentive licensing? Possibly, although difficult to see just how. This seems a weak point in that the Novice again is not affected, nor is the Technician (at least the one with long-term v.h.f. interest), and the drop in these classes has been in general proportion to the over-all total.

Tightened first-license procedures? Most likely a real factor. The Conditional eligibility restrictions undoubtedly have caused some slowdown. The extra paperwork for all mail exams — now with separate code and technical tests — may be part of the reason.

Competition of other interests? We think this may also be a strong factor. The scientifically-inclined high-school lad has, today, a wide choice of fields of "space-age" avocational interest, many of which did not exist, from a practical standpoint, a few years ago. Attendance at any school science fair shows the degree to which new areas of interest have opened up — perhaps considered much more glamorous by the youth of today.

With our nation as prosperous as ever, it would seem ridiculous to suggest economics as any kind of reason. Yet one aspect may well be a factor. Prosperity means also that people have money for private boats and airplanes and extended foreign vacations — areas of the economy which have been growing at a fantastic rate. The Boy Scouts have noticed that merit-badge interest in more sedentary avocations like stamp collecting, nature science, etc., has levelled off or dropped slightly, while the active hobbies such as fishing, hiking, skiing, etc., have mushroomed. It is not impossible, therefore, that prosperity has had a negative effect on our growth! One indisputable fact is that amateur radio has never multiplied as rapidly as we did during the early 1930 depression years, when radio parts were available for peanuts and people simply couldn't afford flying, boating, etc. for their leisure time — of which there was plenty. And all this right in the middle of an extended hassle over an earlier version of incentive licensing which FRC (FCC's predecessor) put into effect in 1932!

One ham has an interesting angle. "I started years ago as a short-wave listener," he said, "and was converted to ham radio after becoming engrossed in monitoring phone band conversations. Today the s.w.l. probably doesn't have a b.f.o. on his receiver — or, if he has, doesn't know how to use it for sideband reception. Since s.s.b. is so predominant these days, the typical s.w.l. never really gets exposed to ham activity to the same degree." Intriguing thought, eh?

Crowded bands scare off newcomers? Could be, with too many of us cramped below 14.35 Mc., due to propagation conditions. There is still v.h.f. space, of course. But if this is a real reason, we are fortunate that the situation is changing, and will do so more rapidly now, to provide more practical communications on

high-frequency bands and a bit of breathing space. It could spark another round of amateur growth.

One point does stand out over the years in the matter of newcomers to amateur radio — their real exposure and the effective planting of the ham virus comes with a visit to the shack of an already-licensed friend or acquaintance. Ham magazines, booklets and promotional pieces seem to have had little direct effect. It is the personal approach which has produced results.

So perhaps we amateurs are individually responsible for the reduction in newcomer interest. There was a time when nearly any amateur was happy to offer encouragement, assistance and even equipment to budding young hams. Are we all as quick to help others as we once were? Today, as always, many aspects of amateur radio simply cannot be gleaned from books. Some things must be learned through experience, or under the patient guidance of others. It can be mighty discouraging to an eager beginner to find that none of the local amateurs will help him join what is purported to be a closely-knit fraternal group. We wouldn't urge amateurs to recruit all their neighbors, but we think it will be highly beneficial to amateur radio if we remain forever ready to offer a helping hand to promising candidates interested in joining our ranks.

QST

COMING A.R.R.L. CONVENTIONS

March 19–20 — Michigan State, Saginaw
April 22–24 — ARRL NATIONAL, Boston, Massachusetts
May 28–29 — Roanoke Division, Natural Bridge, Virginia
May 27–29 — Southwestern Division, Anaheim, California
June 3–5 — West Gulf Division, Arlington, Texas
June 18–19 — Rocky Mountain Division, Colorado Springs, Colorado
September 15–16 — Ontario Province, Niagara Falls
October 15–16 — Hudson Division, Tarrytown, New York
October 21–22 — Great Lakes Division, Muskegon, Michigan

Prospective convention sponsors are urged to check with ARRL Hq. to avoid possible date conflicts.

Strays

"Ham of the Year" Award

The Federation of Eastern Mass. Amateur Radio Associations will once again present a cash award and a handsome plaque to a radio amateur in the first call district who has met one or more of the following qualifications:

1. Performed a meritorious public service to his community through the medium of amateur radio,
2. Made a major contribution to the science of amateur radio,
3. Helped greatly to stimulate interest in amateur radio in others,
4. Aided other radio amateurs to acquire a greater knowledge and skill in operating or building amateur radio equipment.

This award will be given at the ARRL National Convention on April 23, at the Sheraton-Boston Hotel.

Please send all nominations to Eli Nannis, Chairman, Awards Com., 37 Lowell St., Malden, Mass. The closing date for these nominations is April 6.

Jim Cole, WA5CTD/5 (343 Carpenter Hall, Texas Tech., Lubbock, Texas) would like to hear from radio amateurs who are members of the Order of DeMolay and who are interested in forming a radio net.

—•••—

Who says legal documents have to be dull and humorless? The following exchange between a spokesman for the broadcasting industry and Commissioner E. William Henry appeared in the official Report and Order on Docket 15881 (Other details in "Happenings", page 34) concerning higher license fees for radio and television stations:

"2. Additionally, the following poetic comment was filed with the Commission in this proceeding:

'A comment on proposals for higher filing fees
Needn't be long and complaining, or beg;
A few words of fabled wisdom should suffice:
— Don't kill the goose that lays the golden egg.' "

"Concurring Statement of E. William Henry —

To the poetic argument in Footnote 2 that these minuscule fees for handling applications may kill the goose that lays the golden egg, I would add:

'The broadcast goose, well-stuffed and sleek
Can ill afford to mourn,
If we, the FCC, now seek
One kernel of its corn.
In lands where private gain is banned
A goose so plump and fatty,
Would have its liver ground and canned
For governmental paté.
But here no feather will we harm,
No golden goose-fruit beg.
Fie on this flap of wild alarm —
It's simply laid an egg.' "

OUR COVER

Now is the time to sharpen your wits and your pencils for the 1966 DX Competition. See page 96 for dates and times.

The W1QWJ 432-MC. Kilowatt Amplifier

H. F. Efficiency with U. H. F. Circuits

THE amplifier pictured herewith is a modification of a design for 432 Mc. by W6FZA that appeared in August, 1964, *QST*.[1] There are many similarities, so our description of this contribution by Dick Stevens, W1QWJ, will be concerned mainly with points wherein his amplifier differs from the original.

Use of the 7203/4CX250B tubes, in place of 4CX300As, requires different sockets and a slight change in some dimensions. The mechanical layout of the W1QWJ amplifier is of interest, in that Dick used two standard aluminum chassis, plus some aluminum angle stock and sheet aluminum, to put together an assembly of exceptional rigidity. This is an important factor in an amplifier for v.h.f. or u.h.f. service, yet many builders neglect it, with the result that they experience drifting of operating conditions due to heating and mechanical instability.

Free flow of the cooling air is also an important consideration. It will be seen from Fig. 1 that this is achieved by using a large air intake (the right-angle plumbing fitting on the cover plate of the grid compartment) and screened holes in the top cover. The other end plate, visible in Fig. 3, also has a large screened air vent. These openings prevent building up appreciable back pressure, a condition that contributes to overheating troubles in many home-built amplifiers that have forced-air cooling. Use plenty of blower capacity, 100 c.f.m. or more.

[1] Margot, "A Practical Kilowatt Amplifier for 432 Mc.," August, 1964, *QST*, p. 47.

Structural Details

The input end of the amplifier is shown, with its cover plate removed, in Fig. 2. The chassis on which the tube sockets are mounted is 7 by 9 by 2 inches. A strip of ½-inch aluminum mounted horizontally 6 inches up from the bottom carries the tuning capacitors of the grid circuit, which will be described later. The input coupling loop, L_2 in Fig. 4, is supported on a standoff insulator at its right end, and by the stator bar of C_1, at the left.

The tube sockets are a bit different from those in most amplifiers described for amateur use. They are made up of parts by Johnson that may be used in any combination the builder desires. W1QWJ used the plastic base, with cathode grounding contacts that are also the mounting lugs. These assemblies are Johnson Part No. 124-114-1, visible in the grid compartment. In the plate compartment we see the screen bypassing rings (Johnson Part No. 124-113-1) and ceramic chimneys (124-111-1). Using this arrangement cuts down the builder's investment for air-system sockets, but it necessitates individual bypassing of socket terminals. See Fig. 5.

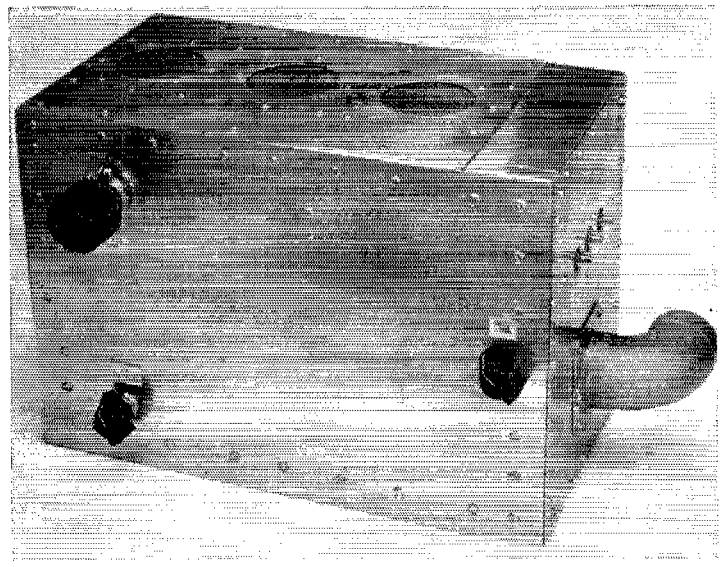


Fig. 1—Though the construction is not apparent from the outside of the enclosure, the W1QWJ 432-Mc. amplifier is built on two standard aluminum chassis. The smaller is mounted in a vertical position at the right end of this view, to house the grid circuit. Air intake is through the right-angle plumbing fitting mounted on its cover plate.

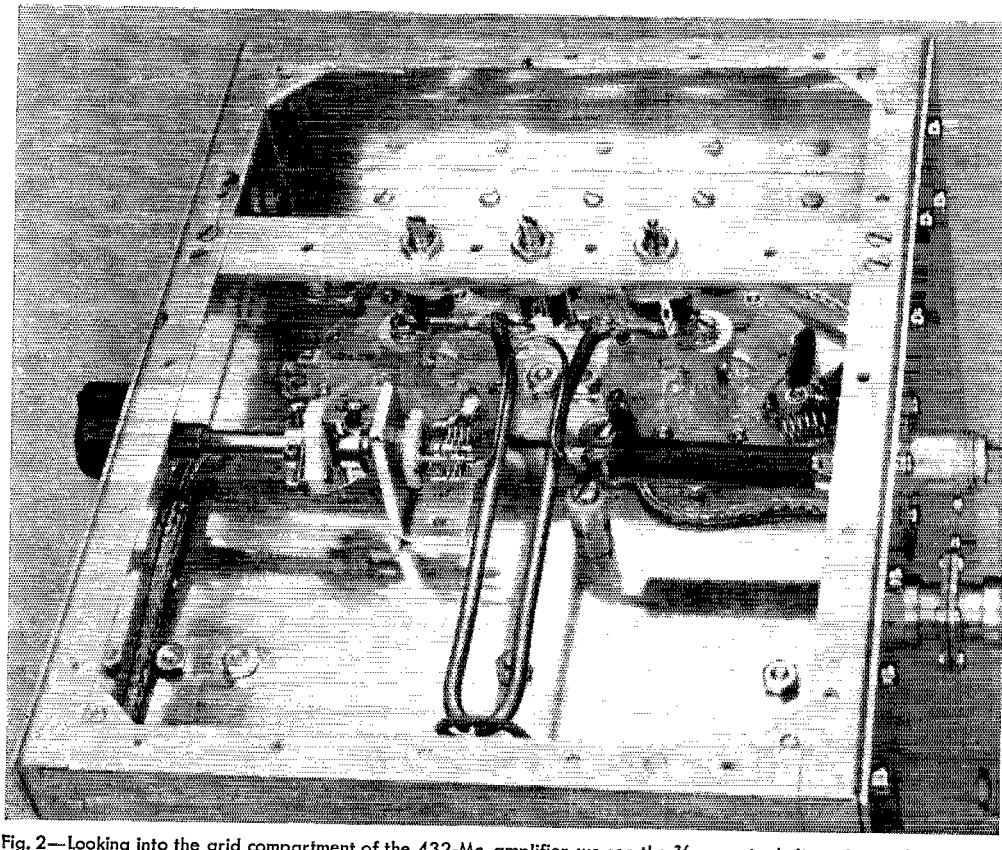


Fig. 2—Looking into the grid compartment of the 432-Mc. amplifier, we see the ¾-wave tank, its tuning and balancing capacitors, and the sockets for the two tubes.

The top view, Fig. 3, shows most of the plate circuit construction. The half-wave plate lines are copper pipes 1⅝-inch outside diameter and 6⅝ inches long, with spring finger stock ½ inch wide at the tube end, overlapped to give a 7-inch over-all length. The finger stock is first fastened in place with small screws, and then soldered. The pipes are supported at the far end from the tubes on 2-inch ceramic cone standoffs, shored up with bushings about ¼ inch high, to bring them to the proper height. These can be metal or insulating material.

Tuning is done, as in the amplifier by W6FZA, by means of a vane of aluminum 4⅛ inches wide and 3¼ inches long. This is supported on a ¼-inch fiber rod, which is rotated by means of a 5-to-1 planetary drive mounted on the front wall of the case. A shaft bearing on the rear wall maintains shaft alignment. The shaft center is 2½ inches in from the end and 1⅞ inches down from the top of the case. Using a planetary drive gives smooth control of the tuning. The actual tuning range is about one half of a knob rotation. This can be marked on the front panel, to prevent running the vane down to the point where it will touch the plate line. The vane is not grounded, so there will be no damage, other than a momentary detuning of the amplifier, should the vane actually touch the pipes, but it is just as well to prevent this from happening.

The bottom chassis is 7 by 11 by 3 inches in size. The bottom view, Fig. 5, shows the high-voltage by-passes, C_7 and C_8, near the center. At the left is the adjustable bias supply, not shown in Fig. 4. Provision is made for metering the screen and plate circuits individually. A switch on the front panel selects either screen circuit, or a combination of both, for monitoring on an external meter. Separate high-voltage feedthrough insulators, J_3 and J_4, on the back wall, permit separate plate metering, if desired. Screen voltage, heater voltage and a.c. for operation of the bias supply are brought in through an 8-pin fitting on the rear wall. A coaxial antenna changeover relay with N-type fittings is mounted on the rear wall.

Circuits and Wiring

The high input capacitance of the tubes prevents use of a quarter-wave grid circuit at 432 Mc. Even a half-wave line would be very short, so a ¾-wave circuit is used for L_1. This is plainly visible in the end view, Fig. 2. The main grid tuning capacitor, C_2, is a small butterfly. To help in maintaining electrical balance, C_3 and C_4 are

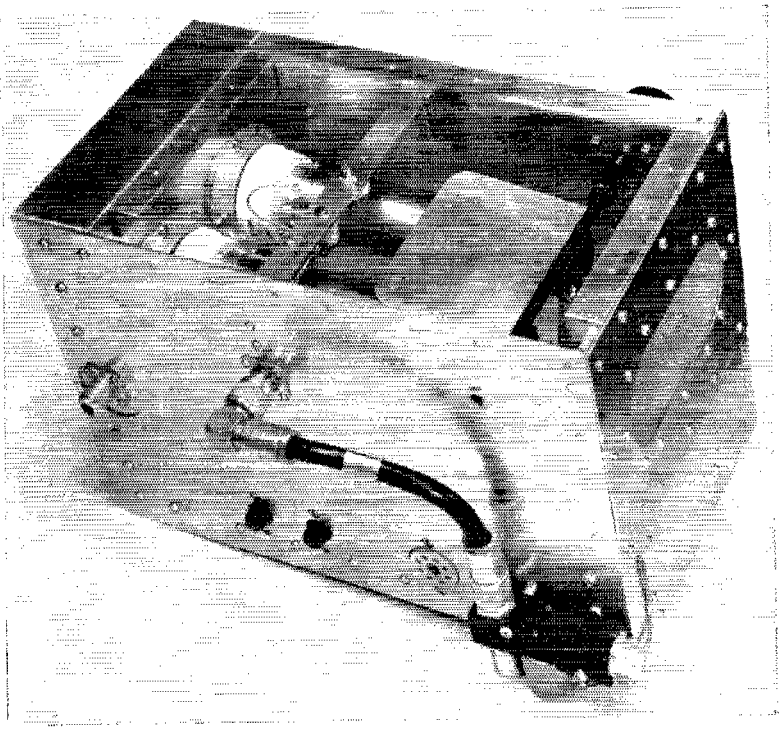


Fig. 3—Top rear view of the 432-Mc. kilowatt, showing the half-wave plate line and its tuning vane.

connected in parallel with each half of C_2. These three capacitors are mounted on the aluminum strip, also seen in the end view.

The half-wave plate circuit has already been discussed in some detail. Plate voltage is fed into the two pipes comprising L_4 through small r.f. chokes that are not visible in the photographs. These tap onto the pipes at 4½ inches back from the open end of the line, and run to the feed-through insulators that are seen in the right center portion of Fig. 4.

The heater and screen terminals are bypassed individually, as shown in Fig. 5. Leads from the sockets are brought down in shielded wire to feed-through bypass capacitors C_{16}, C_{17} and C_{18}, near the bottom of the grid compartment, where they run through the wall into the bottom of the assembly. They do not show in any of the pictures. The grid inductance, L_1, is connected to C_{11} at the bottom of the U, and thence to feed-through C_{19}, in line with the three similar capacitors mentioned above.

All circuits are extensively decoupled for r.f. before entering the bottom compartment, so the latter is not shielded, and ordinary hookup wire can be used therein.

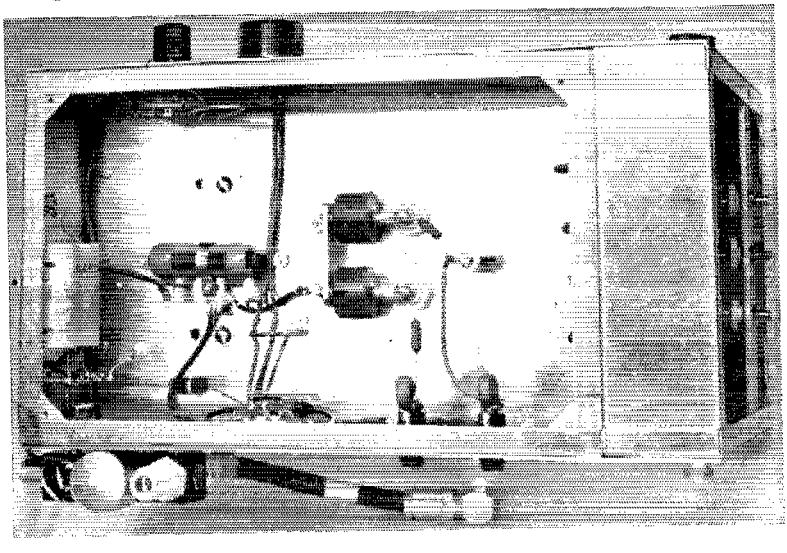


Fig. 4—Bottom view of the 432-Mc. amplifier. Bias supply is built into lower left corner of the main chassis. High-voltage leads and bypasses are at the right center.

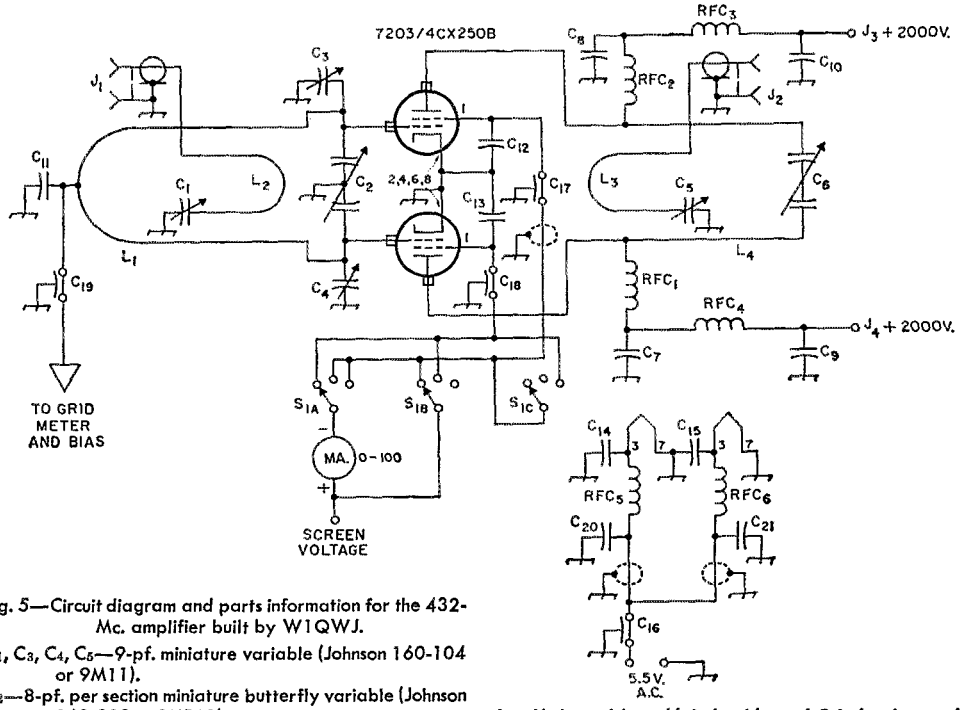


Fig. 5—Circuit diagram and parts information for the 432-Mc. amplifier built by W1QWJ.

C_1, C_3, C_4, C_5—9-pf. miniature variable (Johnson 160-104 or 9M11).

C_2—8-pf. per section miniature butterfly variable (Johnson 160-208 or 9MB11).

C_6—Aluminum tuning vane, 3½ by 4⅛ inches. See text and Fig. 3.

C_7, C_8—500-pf. 20-kv. TV-type capacitor.

C_9, C_{10}—500-pf. 6-kv. disk ceramic.

C_{11}, C_{12}, C_{13}, C_{14}, C_{15}—500-pf. button-mica.

C_{16}, C_{17}, C_{18}, C_{19}—500-pf. feedthrough bypass.

C_{20}, C_{21}—0.001 disk ceramic.

J_1, J_2—N-type coaxial chassis fitting, UG-58 A/U.

J_3, J_4—High-voltage feedthrough connector (Millen 37501).

L_1—U-shaped loop, ⅛-inch copper tubing. U portion 4½ inches long, with 1-inch ends bent 90 degrees. Overall length 11 inches, width ½ inch, c. to c.

L_2—U-shaped loop ½ inch wide and 2 inches long, with ¼-inch ends bent 90 degrees. Make from No. 14 wire 5 in. long. Space ⅛ in. from L_1.

L_3—U-shaped loop 2 inches long and 1 inch wide. Make from No. 14 wire about 5¼ inches long. Position about ½ inch above L_4.

L_4—1⅝-inch o.d. copper pipe, 6⅝ inches long, with ½-inch finger stock overlapped to make total length of 7 inches. See text and Fig. 3. Plate voltage taps are 4½ inches from the open end.

RFC_1–RFC_4, incl.—12 turns No. 24, ⅜ inch long, 3/16-inch diam. (Ohmite Z-460).

RFC_5 RFC_6—6 turns No. 18, ¼-inch diam., ⅜ inch long.

S_1—3-position 3-section switch.

Checking Amplifier Balance

Maintaining the highest possible operating efficiency is important if the amplifier is to be run at the maximum ratings for the tubes, since the efficiency is bound to be somewhat lower at 432 Mc. than would be expected on lower bands. A properly-balanced circuit is important here. Unless you have more than two tubes available there is not much that can be done about d.c. balance. It is checked by running any safe combination of d.c. grid bias, screen voltage and plate voltage that will permit about 250 ma. total plate current to flow without drive applied. If the two tubes are identical the screen currents should be the same. The plate currents will also be identical. If they are dissimilar, select the two tubes that are most nearly alike.

R.f. balance is adjusted by applying drive and adjusting the grid balancing capacitors, C_3 and C_4, so that the screen currents are as nearly equal as possible. Repeak C_2 each time either balancing capacitor is changed. The screen currents are a sensitive indication of r.f. balance.

Adjusting the plate circuit and output coupling for maximum power output requires a power indicating device in the coaxial line to the antenna or dummy load. Use about 1000 volts on the plates at first, and adjust the bias until about 150 to 200 ma. plate current per tube is drawn. Adjust the tuning vane position, the setting of the series capacitor, C_5, and the position of the output coupling loop, L_3, for maximum power output. Each of these settings will change somewhat with power level, so it is desirable to set up the coupling loop finally at the power level that will be run most often, or at the maximum power that will be used, since it is not possible to change it once the cover is fastened in place.

Operation

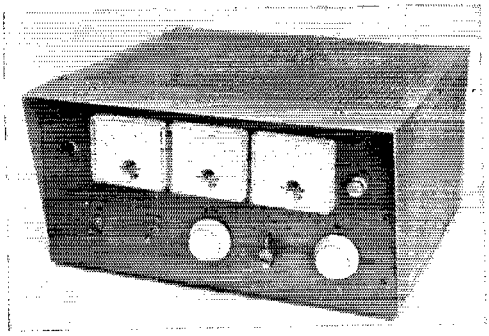
If the amplifier is to be operated Class C only, screen voltage can be set at 250 volts and left that way. Extremely good regulation is not important. For linear service there should be provision for increasing screen voltage to 350, and it

(Continued on page 144)

A Low-Cost 700-Watt Linear Amplifier

572Bs in Grounded Grid

BY LEWIS G. McCOY,* W1ICP



The enclosure around the completed amplifier is made from perforated aluminum stock and reinforced at the top with aluminum angle material. Across the bottom from the left are the a.c. and standby switches, plate tuning, band switch, and loading control. The knob at the upper right corner is the sensitivity control for the output meter.

In this day of low-priced kits it gets to be a real challenge to design a piece of gear for the home builder that will be attractive from a cost standpoint. This article describes a linear amplifier that meets this requirement. In fact, it does so by quite an appreciable margin when compared to any wired or kit amplifier with comparable power.

The amplifier shown in the photographs and Fig. 1 is capable of about 700 watts p.e.p. input on sideband or a like amount of power on c.w. What will probably come as a shock to the reader is the power supply (figuratively speaking!). Whenever high power is contemplated the usual stumbling block in cost is the power supply, particularly the power transformer. This power supply gets around that problem by using a power transformer that usually can be obtained for nothing. We say "nothing" because, after writing earlier articles describing equipment using this type of transformer, we know this is the general rule.

In the 1956 to 1959 era millions of TV sets were produced, and most of them used extremely husky power transformers. These sets have been reaching the obsolete stage, and they usually can be had for the asking from TV shops. Most of the transformers in these sets have high-voltage windings of about 700 volts, center-tapped, with current ratings of 300 to 400 ma. These transformers are built for continuous duty so they are real husky units, and in amateur service, which can be considered intermittent use, they will furnish high power. Such a transformer is used in this amplifier and provides an *easy* 700 watts input! (Rather than get into a long discussion about how much power can be taken from a given transformer, it is recommended that you read an article by W1DF that first introduced the "Economy Power Supply."[1])

In addition to keeping the power-transformer cost down, a careful check of the surplus market turned up several other items of standard values that were or could be used in the amplifier. More about this in a moment.

The Circuit

The amplifier uses a pair of 572Bs in grounded-grid operation. Drive is coupled to the filaments via C_1 and the filaments are isolated from ground by RFC_1, a homemade choke. One problem in using a TV transformer is that the 6.3-volt winding rarely is center-tapped. An artificial center tap is created by using R_1 and R_2 across the filament winding. S_1, between the junction of R_1R_2 and ground, can then be used as a standby switch. A pair of terminals, E_1 and E_2, are connected in parallel with S_1, and if desired, the standby function can be controlled by an external relay such as is provided in the VOX circuits of most exciters.

The grids of V_1 and V_2 are bypassed to ground for r.f., and the grid current is measured by M_1. The tank circuit is a pi network designed to cover 80 through 10 meters and designed to work into 50-ohm loads. A very necessary item in a grounded-grid amplifier is an output indicator. M_2 is connected into an r.f. voltmeter circuit and serves as an output indicator. The plate current is measured by M_3 which is connected in the negative side of the high-voltage line.

The power supply is a voltage doubler that provides a no-load voltage of about 2100 volts. This drops to about 1900 volts under a load of 400 ma. Power-supply filtering is taken care of

* Technical Staff.

[1] Grammer, "More Effective Use of Small Power Transformers," *QST*, Nov. 1952.

If you're good at smoking out useful parts in the surplus outlets, you can build this 700-watt grounded-grid amplifier for well under $100 — and that's hard to beat in the present market!

by a series string of high-capacitance electrolytics. Six 325-μf. 400-volt capacitors provide approximately 50 μf. at 2400 volts. This large amount of output capacitance provides excellent dynamic regulation.

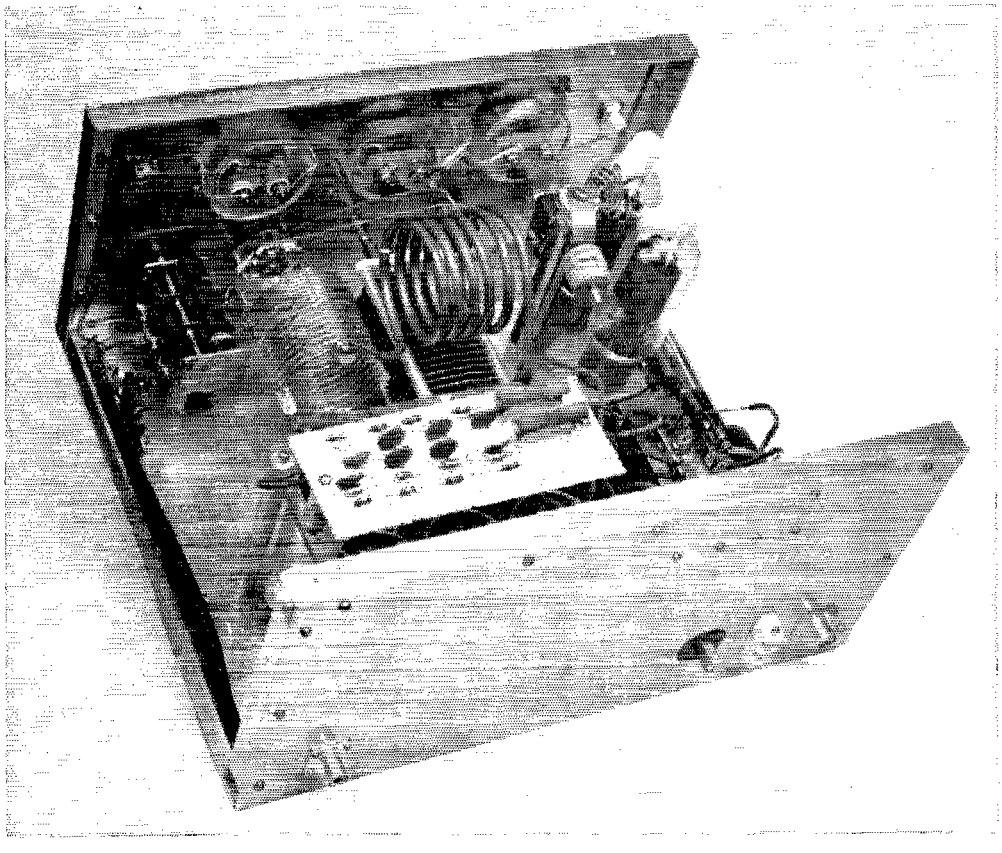
Getting the Parts

The power transformer used in this amplifier came from a 1951 17-inch RCA set. In searching through replacement catalogs it was found that nearly all makes of early sets had power transformers similar to this one. What you want to look for is one that will give 700 to 750 a.c. volts from the high-voltage secondary. Most 17-inch or larger TV sets used transformers having 300-ma.-plus ratings. Alternatively, if you are in an area where surplus stores are handy it is possible to pick up suitable power transformers quite reasonably (see Fig. 1, T_1). Look for transformers in the 700- to 800-volt range, with current ratings of 300 ma. or more. The maximum safe voltage with the rectifier-filter circuit given in Fig. 1 would be 800 volts. In a voltage-doubler circuit you can figure your no-load d.c. output voltage at 2.8 times the total a.c. secondary voltage, and 800 volts a.c. would give you about 2400 volts no-load d.c. output. This approaches the maximum rating on the electrolytic capacitor string.

While a particular type of plate tuning capacitor, C_4, was specified in Fig. 1, it is possible to substitute any similar capacitor as long as the maximum capacitance is 150 pf. and the plate spacing is at least 0.075 inch. Likewise, C_5, the output loading capacitor, is approximately 1200 pf. maximum, made up by connecting the three stators of a t.r.f.-type capacitor in parallel. Some surplus stores occasionally have high-capacitance variables on sale, and any value over 1200 pf. is suitable.

The chassis and enclosure in our unit are home-built from angle, sheet and perforated aluminum stock. Heavy-duty sheet material can be found in sheet-metal shops and the perforated and angle stock in almost any large hardware store. The layout of the amplifier is not particularly critical, so any cabinet large enough to house the unit could be used. Good buys in cabinets

This view shows the component arrangement toward the front of the chassis. At the far left, between the loading capacitor and the coax output lead, are the components for the r.f. voltmeter circuit, mounted on a terminal strip. The large copper-tubing tank-coil section is supported by its own leads. Not shown in this photograph is an aluminum baffle plate that is normally mounted between the front amplifier tube and the grid meter, to prevent heat from the tube from distorting the Lucite meter case. The aluminum plate is 5 inches wide and fits between the top and bottom of the cabinet.



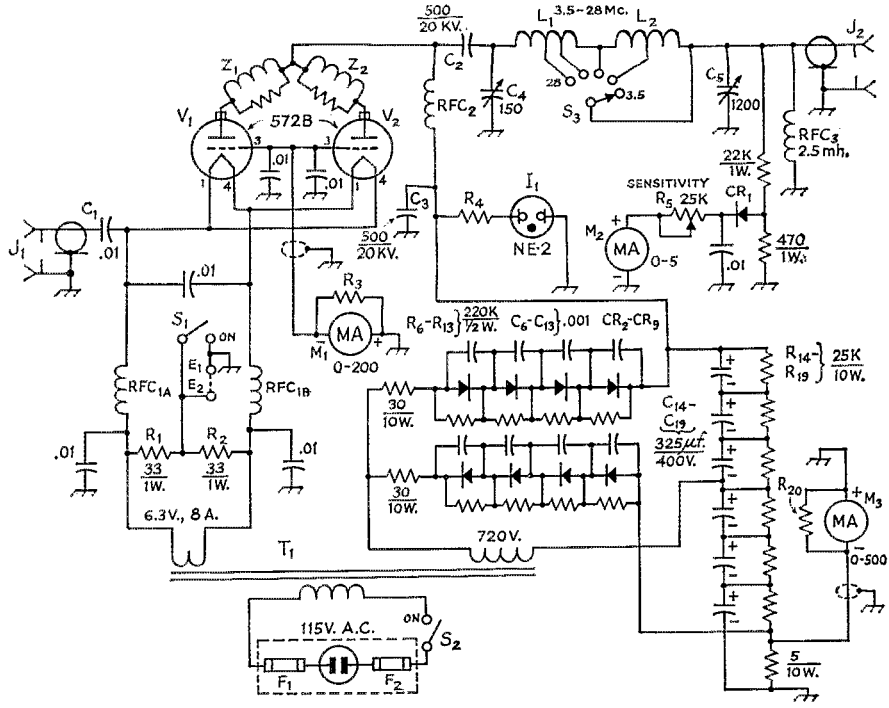


Fig. 1—Circuit diagram of the 572B amplifier. Resistances are in ohms; K = 1000. All 0.01 μf. capacitors not listed below are disk ceramic.

C_1, C_6–C_{13}—0.01-μf. disk ceramic.
C_2, C_3—500-pf. 20-kv. TV-type high-voltage.
C_4—150-pf. variable, minimum 0.070-inch spacing (E. F. Johnson 154-8, Millen 12515).
C_5—1200-pf. variable, t.r.f.-type, 3-gang, 400-pf.-per-section, stators connected in parallel.
C_{14}–C_{19}, inc.—325-μf. 400-volt electrolytic (Mallory CG3250T400D1).
CR_1—1N34A germanium diode.
CR_2–CR_9, inc.—600-volt p.i.v., 750-ma. silicon rectifier (Barry Electronics 600/750).
F_1, F_2—10-amp. fuse, fuse-in-plug assembly.
I_1—NE-2 panel mount neon lamp.
J_1, J_2—Coax fitting, SO-239.
L_1—6 turns ¼-inch diam. copper tubing, 3-inch dia. turns spaced ¼-inch apart, 20-meter tap, junction of L_1 and L_2; 15-meter tap, 3¼ turns from junction of L_1 and L_2; 10-meter tap 4¼ turns from junction of L_1 and L_2.
L_2—See text; 40-meter tap 7 turns from C_5 end of coil.
M_1, M_3—0–50 ma. (Barry Electronics Model 350P).
M_2—0–5 milliammeter (Barry Electronics Model 350P modified as per text).
R_1, R_2—33 ohms, 1 watt.
R_3, R_{20}—Meter shunts; see text.
R_4—1.88 megohms (four 0.47-megohm 1-watt resistors in series).
R_5—25,000-ohm control.
R_6–R_{13} inc.—0.22 megohm, ½ watt.
R_{14}–R_{19}, inc.—25,000 ohms, 10 watts.
RFC_1—28 bifilar turns No. 12 Formvar or Nylclad close-wound on ½-inch diam., 7½-inch long ferrite rod (Lafayette Radio 32R6103, formerly MS-333).
RFC_2—90 μh. 500-ma. r.f. choke (B & W 800).
RFC_3—2.5-mh. r.f. choke.
S_1, S_2—Single pole, single-throw toggle.
S_3—Single-pole, 6-pos. ceramic rotary (Centralab 2501).
T_1—Power transformer; see text (Barry Electronics 970960-1-1).
Z_1, Z_2—Parasitic suppressor; 3 turns No. 16, ½-inch diam., ½-inch long, wound over three 150-ohm 1-watt resistors in parallel.

can occasionally be found in surplus and radio stores. In other words, it pays to shop around to keep the construction costs down.

Also, 811As could be used in place of the 572Bs. 811As are cheaper, but you cannot run as much input as with 572Bs. Maximum input for a pair of 811As is approximately 500 watts. Both types of tubes take the same socket connections but other changes are needed to run 811As. Maximum plate voltage should not exceed 1500 volts with the tubes fully loaded to about 300 ma.

When 811As are run at their maximum plate voltage, 4.5 volts of negative grid bias is required. This could easily be obtained from three 1.5-volt flashlight cells connected in series. The plate voltage supply would require a different transformer. In a voltage doubler, the maximum secondary voltage of the transformer should not exceed 600 volts, which will provide about 1750 volts d.c. unloaded, dropping to about 1500 volts with the 811As fully loaded. The capacitor rectifier string would be cheaper because not as many components would be needed for the lower voltage. Only four of the high-capacitance units would be required. Mallory lists a 180-μf. 450-volt capacitor (CG181T450K1) for $2.50. Four of these would provide 45 μf. at 1800 volts,

which would be ample. The silicon rectifiers are rated at 600 volts p.i.v. so only six would be required.

A cost breakdown on the amplifier, excluding the metal work, resulted in a figure of about $75.00 for the 572Bs and about $50.00 for the 811As. This includes the three panel meters at $5.50 each. An additional saving could be effected here by using a single meter, switching it to read currents in the various stages. The 572Bs can be obtained for about $10.00 each[2] and the 811As for $3.85. The other expensive item is the bank of capacitors. The units specified in Fig. 1 sell for $3.00 each. From time to time, similar capacitors show up on the surplus market. The remaining components are standard catalog items.

Construction Details

To make the cabinet, a sheet of aluminum, 31 by 16 inches, was bent into the form of a U, the front and back being 8½ inches high. The U was stiffened by using 1 × 1-inch aluminum angle stock completely around the inside edge of the cabinet. The overhang effect is achieved by another U-shaped piece of aluminum formed around the front panel. This piece of aluminum also helps to hold down the wrap-around perforated aluminum. The inside and outside photographs show these details.

The amplifier tube sockets and RFC_2 are mounted on a 4 × 4-inch platform, 1¼ inches high. Check the height of the platform with the tubes in the sockets to make sure you have enough clearance between the tops of the tubes and the cabinet.

There are probably several ways that T_1 can be mounted. We made up a U-shaped clamp that fitted over the core, and the transformer was clamped to the bottom of the cabinet. Electrolytic capacitors of the type specified in Fig. 1 come with screw terminals. A piece of ¼-inch thick Lucite sheet, 7¼ by 4½ inches, was drilled to take the screw terminals of the capacitors and the assembly was then supported by corner pillars above the chassis base. Keep in mind that while there is only about 400 volts across each capacitor, there is about 2000 volts between the top of the string and chassis ground.

The silicon diode rectifiers and their associated components are mounted on a strip of perforated phenolic board. If this is hard to find, it is possible to use Lucite or poly sheet stock. The strip measures 2 by 7 inches and it is mounted directly above the capacitor string.

While any meters of appropriate values can be used, we used the 0-50-ma. units (surplus) specified in Fig. 1. If you should use these meters, they will need to be shunted to get the appropriate ranges. M_1 should have a full scale of 200 ma., or a multiplying factor of 4. The shunt is made from 40 inches of No. 32 enamel-covered wire wound on a 1000-ohm 1-watt resistor. The resistor is used only as a form so any value over 1000 ohms can be used. The plate meter, full scale, is 500 ma., or a multiplying factor of 10. Seventeen inches of No. 32 enamel wire will make the proper value shunt.[3]

Upon close examination of this type of meter, an internal shunt across the terminals can be seen through the Lucite case. By applying the tip of a hot soldering iron near the negative terminal we made a hole large enough to reach one end of the shunt and cut it. Upon checking after the shunt was removed, it was found that the meter movement is basically 0–5 ma., which is sensitive enough for use as the output indicator, M_2.

We used modified Air Dux 2008B5 Pi Dux assembly for L_2. The coil was modified by removing all but 8 of the close-spaced turns and all but 8 of the wide-spaced turns. For 20, 15 and 10, a huskier coil is required. The 6 turns are spaced over a 3-inch length and the coil is 3 inches in diameter. In the case of L_2, there are some ceramic surplus forms, 3 inches in diameter, that can occasionally be found in surplus (the BC-375 transmitter used them). If you can find such a form, or a suitable substitute, you can make your own L_2 coil. The inductance of L_2 is 11 μh. and you can get this inductance by winding 16 turns of No. 14 solid wire at a pitch 4 turns per inch, the coil being 4 inches long. The 40-meter tap would be 10 turns from the C_5 end of the coil.

Although it doesn't show too well in the photographs, we painted the panel to give the unit a more professional look. The lacquers and

[2] Scientific Instrument Research and Development Co., 525 Lehigh Ave., Union, N. J.

[3] For other types of meters a different shunt may be required. Details for making shunts are given in *The Radio Amateur's Handbook*, Measurements Chapter.

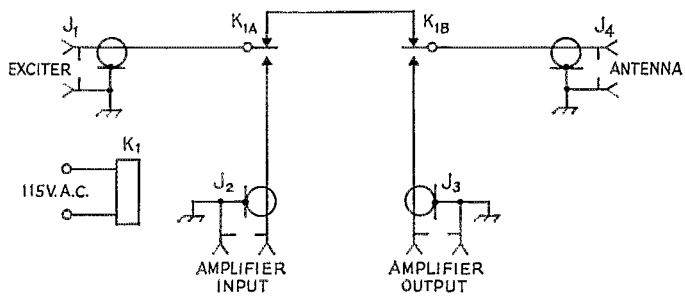
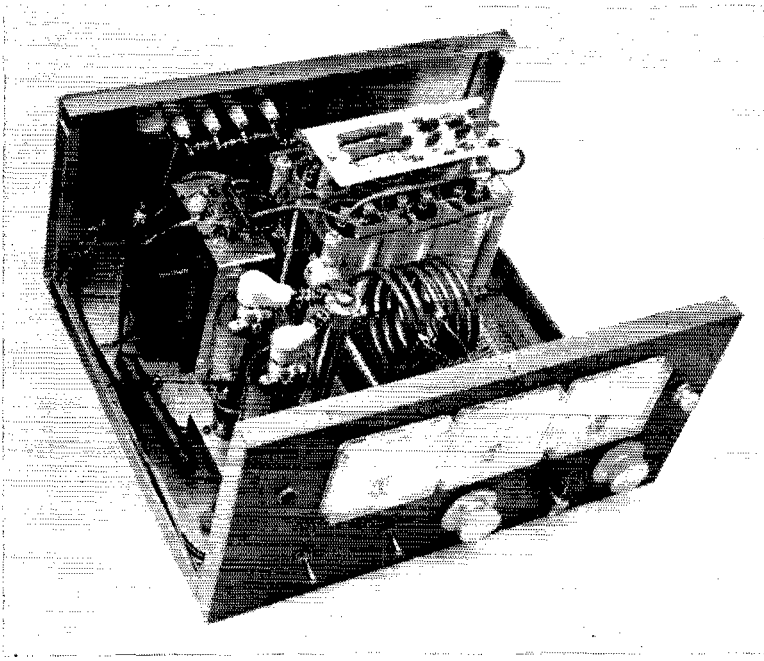


Fig. 2—Circuit for relay for transceive operation. K_1 can be any type antenna relay capable of handling the power used. The a.c. for the relay can be controlled by circuits in transceiver or by separate switch. J_1–J_4 are coax chassis connectors.



At the right rear is the rectifier and capacitor assembly. To the left is the power transformer. Standard terminal tie points are mounted on top of the aluminum bracket that secures the transformer to the cabinet base. The standoffs mounted on the rear wall support the dropping resistors for the neon panel lamp, the high-voltage indicator. At the left-hand side is the filament choke, RFC_1.

enamels that come in spray cans are excellent for this purpose. However, before you paint, make sure the panel is completely clean. Vinegar is an excellent material for removing finger and grease marks. Don't rush the job when applying the spray paints. It takes many light coats of spray to come up with a satisfactory job.

Tune-Up Procedure

If you've never tuned up a grounded-grid amplifier you are likely to find it differs considerably from other types. It is practically impossible to use the conventional plate-current dip in tuning this type of amplifier. The plate-current and grid-current meters are primarily used to check the operating conditions. What is required is an output indicator, and although an output meter of the type used here is only a relative indicator, it does show when you are getting the most output.

Tuning any linear amplifier is best accomplished with a scope. Details for using one have been covered many times in past articles, and information can be found in the ARRL *Handbook*. However, it is possible to tune up without a scope and be reasonably assured that the amplifier is linear, with no flat topping. With a pair of 572Bs as used here, the object is to adjust the driving power, tuning and loading controls to reach maximum output with a plate current of 360 ma. and a grid current of 40 ma., using a c.w. driving signal. Simultaneously, when you have arrived at the stated conditions, reducing the drive slightly should cause the output (and input) to start to drop. Under these conditions, the amplifier should be working linearly. Arriving at these conditions requires careful adjustment of the controls and the drive from the exciter. These conditions are, of course, for sideband or a.m. linear work. On c.w., you can drive the tubes harder and there is no real concern about linear operation.

Any of the exciters in the 30- to 150-watt range will provide more than adequate drive, as the tubes require only a driving power of about 30 watts. Of the 30 watts, about 20 watts will be fed through to the output.

There is no switching provision built into this amplifier for use with transceivers. However, it would be quite simple to add an antenna-type changeover relay for such operation. Such a circuit is shown in Fig. 2. The relay could be mounted in a small box which in turn could be mounted on the back of the amplifier.

However, an interesting thing was noted in using this amplifier with a transceiver. We connected the amplifier to an antenna system and used a transceiver to drive it, but a separate receiver was used. After using this setup for a few contacts, and noting no "hash" from the amplifier with the filament center tap grounded, we connected a speaker to the transceiver. The transceiver, of course, had closer coupling to the amplifier than the separate receiver and we certainly expected some hash or noise from the amplifier. There was none, but what was more surprising was the fact that there was enough signal coupling from the antenna, through the amplifier, to make it quite easy to copy signals with the transceiver. There was a very slight reduction in signal strength as compared with connecting the receiver directly to the antenna but not enough to really be concerned about. In any case, we would suggest that you try the system before adding a separate relay. It may well suit your needs. QST

An Analog of VOX

for the C.W. Mode

The CWX

BY DALE J. FISHER,* W4VQK

A CONVENIENCE that is frequently available with single-sideband transmitters is VOX (voice semibreak-in) control of the station operation. A closely-parallel control circuit, CWX, has been designed that provides similar automatic semibreak-in control for c.w. operation. The principle involved is also essentially the same as that of two "turner-onner" devices described in earlier issues of *QST*.[1]

Circuit

The circuit of the CWX is shown in Fig. 1. The operation of this circuit is as follows: When the key is open, both triode stages are biased so that none of the relays is energized. At the instant the key is closed, keying relay K_1 is energized with an overdriving current. Simultaneously, the closing of contacts K_{1A} grounds the grid of V_{1B}, causing K_2 to be energized (also with an over-driving current). K_2 switches line voltage to the antenna changeover relay K_3, and simultaneously turns on an "on-the-air" sign.

The transmitter is then keyed in the normal manner through contacts K_{1B}. K_2 will not open with normal character spacing because cutoff of V_{1B} is delayed by the time constant of C_1 and R_2. However, if there is a pause in keying, the grid voltage of V_{1B} will rise from ground potential exponentially (because C_1 must be charged through R_2), and will eventually reach the value set by potentiometer R_1. R_1 thus sets the "hold" time of K_2. With the constants shown in Fig. 1, R_1 has a hold-time range from about ½ second to 4 seconds. It is suggested that the hold time be adjusted to about 1 second.

Now, if the operator sends a letter T, K_1 will follow the key, but K_2 will remain in the energized (transmit) condition for the duration of the hold time, after the character has been completed. If a string of characters is sent, the CWX will change from the receive to the transmit mode at the instant that the first character is started, and it will remain (hold) in the transmit mode until a space between keyed characters, equal to or greater than the hold time, first appears. Whenever the next string of characters begins, the CWX will repeat the above action. If the operator wishes to listen, he need only pause for the hold time, at the end of which K_2 will return the station to the receive mode. Thus the transmitting key itself controls the entire station, switching it between receive and transmit conditions in a manner exactly analogous to the automatic switching provided by the signal from a microphone by means of a VOX circuit.

Interlock

A unique feature of the CWX is an interlock to ensure that the antenna change-over relay has arrived at the transmit position before any r.f. comes out of the transmitter. The interlock is obtained by wiring a normally-open pair of external auxiliary contacts on the antenna relay in series with contacts K_{1B} of the keying relay. Thus, even though contacts K_{1B} may be closed, the transmitter will not be keyed until contacts K_{3B} are closed. The desired interlock action is achieved by proper adjustment of the auxiliary contacts K_{3B}. These contacts must be adjusted so that they close later than the internal contacts K_{3A} when K_3 is energized.

It will be noticed that one key terminal is at ground potential, while the other terminal is always at low voltage with respect to ground. The current that must be handled by the key contacts is well under 100 μa.

Construction

The components of the CWX can be housed in a 10 × 4 × 2½-inch aluminum box or chassis. Shielded wire should be used for all connections to grids, as indicated in Fig. 1. Otherwise, there is nothing critical about the wiring or placement of components. It is not necessary to provide a heat sink for the Zener diode. Either screw

* 22 Outer Drive, Oak Ridge, Tenn. 37832.

[1] Hiehle, "An Automatic Transmitter Turner-Onner," *QST*, May, 1950.
Campbell, "Tattoo — Automatic C.W. Transmitter Control," *QST*, August, 1956.

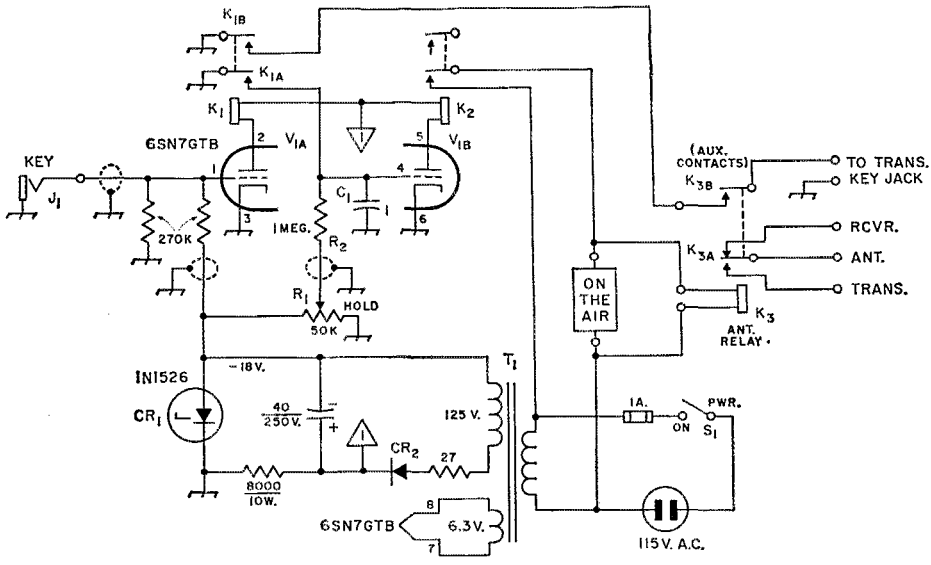


Fig. 1—Circuit of the CWX control unit. Resistances are in ohms (K = 1000). Resistors are 1-watt, unless indicated otherwise. Capacitances are microfarads (μf).

C_1—1-μf. Mylar.
C_2—40-μf. 250-volt electrolytic.
CR_1—18-volt 10-ma. 1-watt Zener diode (International Rectifier).
J_1—Open-circuit key jack.
K_1—D.p.d.t. relay, 10,000-ohm 5-ma. coil (Potter & Brumfield KCP11), or similar relay with three poles (KCP14); see text.
K_2—Same as K_1, 2 poles (see text regarding use of second pole).
K_3—Coaxial antenna relay with external auxiliary contacts (Dow-Key DK60-G2C, 115-volt a.c. coil).
R_1—Linear-taper control.
R_2—1 megohm, 1 watt.
S_1—S.p.s.t. switch, any type.
T_1—Power transformer: 125 volts, 50 ma.; 6.3 volts, 0.6 amp. (Stancor PA-8421, 2-amp. filament winding not used).

terminals, or phono jacks and plugs can be used for external connections.

Testing

The keying relay must follow the key, whatever type it may be — straight key, bug or electronic key. To check this, connect an ohmmeter across the terminals of the key before it is plugged into the CWX. Send a string of dots, and then a string of dashes, and observe the ohmmeter reading for each string. With typical adjustment of a bug or a keyer, the ohmmeter will hover, respectively, at about 50 and 75 per cent of the short-circuit reading. Now connect the key to the CWX and connect the ohmmeter to the output keying terminals. Again send a string of dots, and a string of dashes. If the ohmmeter readings are the same as before, relay K_1 is following the key.

When the first keyed letter that switches the CWX from the receive to the transmit mode begins with a dot, it is necessary that the dot be heavy enough so that the external auxiliary contacts of K_3 close during the dot. If this is not the case, a keyed letter L would be transmitted as a D, for example. All dots from an electronic key have the same weight and, with normal adjustment, this error will not occur up to fast keying speeds. However, the absence of this error, for the chosen weight and speed, should be verified by test with a monitor. Since the heaviness of dots is less reproducible with a manual key, one cannot be certain that a beginning dot of a first letter will be transmitted. For this reason, when a manual key is used, the CWX should be switched from the receive to the transmit mode by starting each sequence with a letter T, or a BK. It should be pointed out that this malfunction may occur with any relay-operated automatic control system, including VOX. It is not unique to the CWX.

Optional Modifications

If an electronic keyer is being used, rather than a straight key or bug, V_{1A} and K_1 may duplicate a portion of the keyer. If an extra normally-open contact pair is available on the keying relay of the keyer, then it will not be necessary to build the V_{1A}-K_1 circuit in constructing a CWX unit; it will be necessary to build only the V_{1B}-K_2 circuit.

If desirable, the final amplifier of the transmitter could be blocked off during receive pe iods by applying cutoff bias voltage by means of the spare contacts of K_2. Alternatively, these contacts could be used to mute the receiver.

If side-tone keying is desired, it could be accomplished by substituting a 3-pole relay at K_1. The same type of relay suggested under Fig. 1 is obtainable with 3 poles, although its maximum operating speed may not be as high as the two-pole model. QST

THE many requests for information on the use of the EF 183/6EH7 variable-mu frame-grid pentode mentioned by the author as an r.f. amplifier in an earlier *QST* article[1] have forced the following conclusion: there still exists that breed of radio amateur who would rather rebuild his present equipment than trade it in on a new model to obtain the best possible performance. This article is dedicated to that breed.

A knowledgeable reader of this article may correctly point out that atmospheric and man-made noise levels will normally exceed the low noise levels in the author's receivers. But that is how it should be! A quick method of checking receiver performance is to disconnect the antenna and note what happens to the audio-output noise level. It should drop when the r.f. gain is wide open and the receiver is set at its upper frequency limit. It should also be possible to peak up the antenna noise with the antenna trimmer control. If these two checks are marginal, then pull out the r.f. amplifier tube to cause a drop in noise. If the noise still doesn't drop, you know that the mixer or converter stage is contributing more noise than the r.f. amplifier or the atmospheric and man-made noise levels coming in from the antenna. Improving the receiver is now up to you.

6BZ6 pentode was used for several years as an r.f. stage, but it was always unstable above 20 Mc. The present 6EH7 has been used as an r.f. amplifier in the guinea pig since early 1962, and it will continue in that role until a better tube is invented. This article not only discusses how to use the 6EH7 to obtain better performance, but it also discusses the principles used by the author to evaluate new tubes as they are introduced on the market.

The following list presents most of the factors which should be kept in mind when planning receiver front-end improvements.

1) R.f. stages which were originally designed to operate with remote-cutoff pentodes should be rebuilt with better remote-cutoff pentodes and not sharp-cutoff pentodes or any triodes.

2) The transconductance of the new pentode should be higher than that of the old pentode.

3) The cathode current of the new tube should not exceed 20 milliamperes.

4) The grid-to-plate capacitance of the new pentode should be equal to, or less than, that of the old pentode.

5) The sum of the pentode's shot noise and partition noise should be as small as possible.

6) The dynamic plate resistance of the new pentode should not be less than .5 megohm.

Improving Your Receiver With a

Many articles on receiver improvements have appeared in the amateur magazines and there are sections in the ARRL *Handbook* on this subject, so no attempt will be made to give credit to all reference material used in this article. Some credit is due the old HQ-120X receiver which has served as a guinea pig during the past decade of rebuilding and experimentation. This particular receiver (a Navy version of the HQ-120X) went through the Second World War and was salvaged from a junk heap around 1950. The first attempts to improve it were started when W1NXY[2] discussed some changes in the post-war HQ-129 receiver. This consisted of changing the mixer stage to obtain lower noise operation. Revisions in the r.f. stage were already underway when W5UOZ[3] discussed this and other areas of the same receiver. Not all of the work through the years on the guinea pig resulted in improvements — the cathode-coupled triodes and cascoded triodes were tried out as r.f. amplifiers and rejected for reasons discussed later on. A

7) The cost and availability of the new tube should be such that the average receiver can readily be modified.

8) The heater voltage must match that of the old tube.

The factors given above are not all independent, so a compromise must usually be reached when considering an assortment of tubes. Various methods of weighing the importance of these factors are discussed in the following sections of this article.

Pentode versus *Triode*

A number of articles have appeared on the subject of receiver improvements by using triodes to replace pentodes, but it is the author's experience and opinion that the resulting loss in r.f. gain and selectivity do not justify the reduction in tube noise. The loss in gain and r.f. selectivity is a result of the low dynamic plate resistance of the triode which swamps the Q of the resonant r.f. plate circuit. These plate circuits were originally designed to yield the desired Q when operated with the high plate resistance of pentodes. The dynamic plate resistance is in parallel with the plate circuit when considering the equivalent circuit of the tube, plus the plate circuit. For this reason, a plate resistance which is below 0.5 megohm is not desirable.

* HRB-Singer, Inc., P. O. Box 60, State College, Pa.

[1] Balogh, "A Low-Noise 2-Meter Converter," *QST*, April, 1964.

[2] Santangelo, "Second Guessing the Experts on the HQ-129A," *CQ*, April, 1952.

[3] Stüeber and Noe, "HQ-129X Receiver Improvements," *CQ*, May, 1959.

High Transconductance

If there had to be just one criterion for evaluating receiver pentodes, it would be for higher transconductance. This primary characteristic determines the obtainable gain as well as the shot noise and partition noise. But in any practical application, higher gain can be utilized only if the stage is stable, and this is primarily a function of the tube's grid-to-plate capacitance. Thus, higher transconductance can be handled only if the C_{gp} is about equal to that of the old tube. Also, in practical applications, higher gain presupposes the end result of detecting weaker r.f. signals, but the minimum detectable signal is determined by the combined atmospheric, man-made and tube noise present at the front end of the receiver. We cannot do anything in the receiver to change the atmospheric and man-made noise levels. The tube noise of a pentode is usually considered to be the sum of the shot noise and the partition noise. The shot noise is reduced by higher values of transconductance. The partition noise is reduced by a combination of higher transconductance and a smaller ratio of screen current to cathode current. Some sharp-cutoff pentodes are on the market (the 7788 is one example) which yield low shot and partition noise by having both high transconductance and a low ratio of screen-to-cathode currents.

use two different approximations, one from the *MIT* reference [4] *and the* other from the *Radiotron* reference.[5] The results of both equations are then used to establish a ball-park figure for the equivalent noise resistance of the tube in question. The equations appear below:

$$\text{(MIT) } R_{eq} = R_{SHOT} + R_{PARTITION} = \frac{2.5}{g_m} + \frac{20I_{SG}}{g_m I_K} \text{ ohms}$$

$$\text{(Radiotron) } R_{eq} = \frac{I_P}{I_K}\left(\frac{2.5}{g_m} + \frac{20I_{SG}}{g_m^2}\right) \text{ ohms}$$

where gm = Transconductance in mhos
I_K = cathode current in amperes
I_P = plate current in amperes
I_{SG} = screen grid current in amperes

A selection of both sharp and remote-cutoff pentodes is listed in Table I to show the results of the two equations. Keep in mind that a high-gain (high-transductance) pentode is desired which has the lowest possible equivalent noise resistance. The other columns in Table I are discussed elsewhere. The information on the sharp-cutoff tubes is provided as reference material for use when selecting a low-noise mixer stage. The reader can observe that the 6EH7

Frame-Grid R.F. Pentode

BY JOEL BALOGH,* K3CFA

But such tubes, even if a remote-cutoff version were available, would not be usable for improving a communications receiver because the total cathode current (45 ma. for the 7788) might cause heating in the Litz wire of the coils in the receiver. For this reason, an upper limit on the total cathode current was set at 20 ma. The price of the 7788 would also be a disadvantage for this particular tube.

Evaluating New Tubes

The data on the new tubes which are introduced on the market, seldom include specific mention of shot and partition noise, so recourse must be taken to compute this information from the data which are furnished. Shot and partition noise is usually spoken of in terms of the equivalent resistors which would give rise to the observed noise voltages. This analogy arises from the observable noise voltage which is present across the terminals of any resistor due to the random motion of the electrons which are present in the resistance material. This has the classical name of Johnson Noise. The equations which are in use for computing the values of these equivalent resistors are usually approximations instead of precise equations. This makes the computation easier. But it also results in a variety of approximation equations. The author here prefers to

has the lowest computed equivalent noise resistance of the remote-cutoff pentodes listed in Table I.

Ratio of Transconductance-to-C_{gp}

As mentioned previously, a high-transconductance pentode will have merit as an r.f. amplifier only if the grid-to-plate capacitance is low enough to give stable operation. The 6EH7 does not have the lowest C_{gps}, as shown in Table I, but it does have the highest g_m. The obvious way to get a relative comparison between r.f. pentodes, is to look at their ratios of g_m/C_{gp}. This is tabulated in one of the columns of Table I. Again, the 6EH7 shows up as the best tube when the criterion is for the highest g_m-to-C_{gp} ratio.

Ratio of g_m/C_{gp}-to-R_{eq}

For the case where a new tube may not have the lowest R_{eq} but does show the highest g_m/C_{gp} ratio (or vice versa), a relative comparison based on the ratio of g_m/C_{gp}-to-R_{eq} would be helpful. This latter ratio is tabulated in the last column of

[4] *Vacuum Tube Amplifiers*, p. 625, MIT Radiation Lab. Series, Vol. 18, McGraw-Hill, 1948.
[5] *Radiotron Designer's Handbook*, p. 937, Fourth Edition, Distributed by RCA, December 1957.

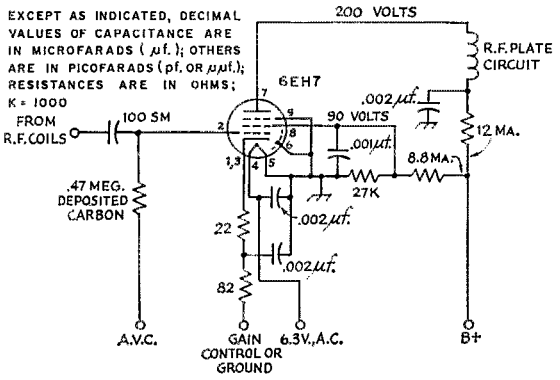


Fig. 1—Circuit diagram of a gain-controlled frame-grid r.f. amplifier.

Table I. The lowest value of the two approximated R_{eq}'s was used for computing this ratio. Again, the 6EH7 is the best available tube for use as a gain-controlled r.f. amplifier when the criterion is for the highest g_m/C_{gp}-to-R_{eq} ratio.

Selecting a Mixer Tube

With a few exceptions, most of the comments on selecting an r.f. tube apply to the task of selecting a mixer tube. Since the plate and grid circuits are not tuned to the same frequency, feedback by way of C_{gp} should not produce instability. Some mixers are desired which have a broad-band response (such as in converters), so a lower value of dynamic plate resistance can be tolerated. This lower value cannot be tolerated, though, if the mixer is in a communications-type receiver where high-Q i.f. transformers follow the mixer stage. The 6EJ7 sharp-cutoff pentode (Table I) is a good candidate for mixer service. The author uses four of them in this role, in four different receiving systems. The 6EJ7s have also been put to use as i.f. amplifiers in an f.m. tuner and a pre-i.f. noise-silencer.

An R.F. Amplifier Circuit

The 6EH7 has been used as an r.f. amplifier by the author in the HQ-120X receiver as well as an Eddystone 888A ham-band receiver and an RME DB-20 preselector. The circuit shown in Fig. 1 represents an r.f. amplifier which can be adapted for use in any receiver covering all, or parts, of the 0.55-Mc. to 30-Mc. range. The unspecified plate and screen-dropping resistors must be selected on the basis of the available supply voltages and the required plate and screen circuit currents. Please note the specified values of cathode and screen bypass capacitors. These values were selected to form series-resonant circuits where the inductance is in the form of the capacitor leads. Do not use larger values of bypass capacitors unless the amplifier is for use only on lower frequencies. A 0.01-μf. bypass can be used at 7 Mc. and lower, while a 0.1-μf. bypass can be used at 2-Mc. and lower. The unbypassed 22-ohm cathode resistor is used to compensate for variations in input capacitance and resistance which otherwise would occur when cathode or grid voltages are changed. Pin 6 is used to ground the tube's internal shield. An external shield is also recommended. The heat-dissipating style such as IERC's TR-6-6020B will assure long tube life. Something not shown in Fig. 1, but which is always used by the author, is a shield partition which straddles the tube socket. A piece of 1/32-inch sheet brass, which is about 3 inches square, is installed to pass between Pins 1 and 9 and between Pins 5 and 6. Pins 5, 6, and 9, the center post of the socket, and the grounded ends of the bypass capacitors, are then soldered to this brass plate.

Of course, the r.f. circuits will have to be realigned after the new tube is installed.

A Mixer Circuit Using the 6EJ7 Pentode

The mixer circuit which was used in the HQ-120X appears in Fig. 2. A separate local oscillator using a 6AK5 was installed on a subchassis underneath the main chassis. The 9-pin socket for the mixer was mounted on an adaptor plate which replaced the old 8-pin socket. The variable cathode resistor and the trimmer capacitor between the oscillator plate and the mixer grid are adjusted so that the mixer has high gain while remaining stable over the entire frequency range. Too much oscillator injection or too little mixer bias will produce "birdies." A triode local oscillator should *not* be used if pulling of the oscillator frequency is to be avoided on the higher frequency bands.

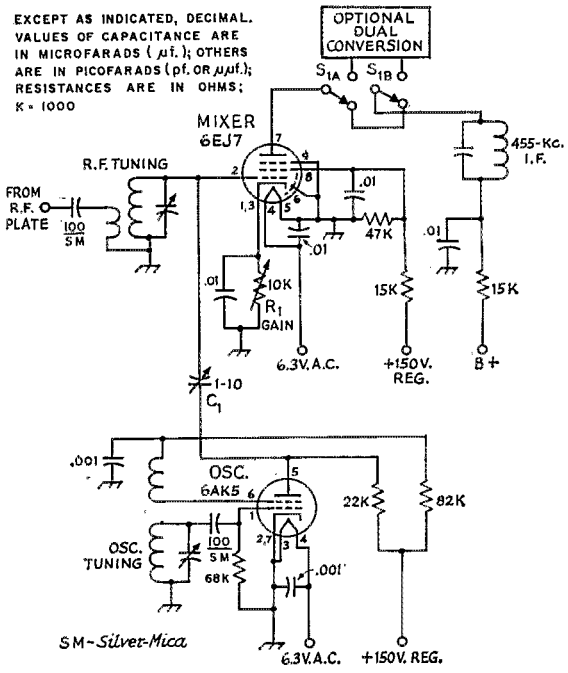


Fig. 2—Circuit diagram of an improved mixer and local oscillator for the HQ-120X receiver.

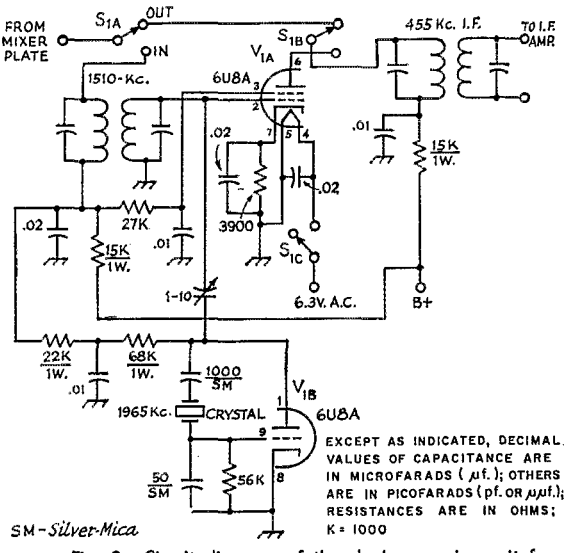


Fig. 3—Circuit diagram of the dual-conversion unit for the HQ-120X receiver.

Dual Conversion for the HQ-120X Receiver

The image rejection of this receiver was not very good when operating above 10 Mc. because of its relatively low i.f. of 455 kc. A subchassis was installed under the main chassis of the HQ-120X which provided dual-conversion capabilities above 10 Mc. A three-pole, double-throw wafer switch was mounted behind the front panel with its shaft coming out just to the left of the sensitivity control and below the send-receive switch.

The schematic of this dual-conversion unit is shown in Fig. 3. It uses a 6U8A triode-pentode, with the triode serving as a crystal-controlled oscillator and the pentode as the mixer. The frequency of this crystal can be between 1855 kc. and 2055 kc. The 1965-kc. unit was obtained from one of the surplus crystal companies. The cathode resistor of the pentode might have to be adjusted a little to obtain stable mixer operation. Of course, the first local-oscillator circuits had to be realigned when the dual-conversion feature was incorporated in the receiver. The fixed-padder capacitors which were in series with the oscillator coils, for the two bands above 10 Mc., were replaced with Arco 307, 350-1180 pf., variable padder capacitors. A signal generator which provided marker signals every 1 Mc., as well as a variable-frequency signal, was useful for the realignment work.

Changing the HQ-120X over to dual conversion entailed a lot of work, but the elimination of the image problem was well worth it. The elimination of the images was especially rewarding when using this receiver as a tunable i.f. in the 14-Mc. to 18-Mc. range, which is the output frequency of the 2-meter converter used by the author. The noise present at the image frequency tended to degrade the performance of the converter by approximately 3 db. when the 455-kc. i.f. was used at 14 Mc.

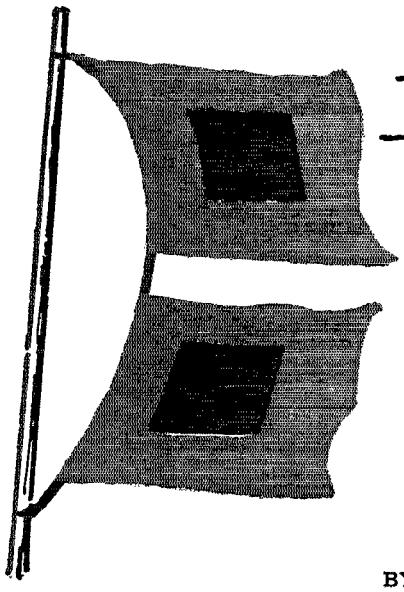
Actual Results

Some reasonable questions come up every time the subject of receiver improvements is

(*Continued on page 142*)

Table I — Tabulation of Pentode Tube Data

	Tube Type	*Plate Voltage*	*Screen Voltage*	*Cathode Current ma.*	*Plate Current ma.*	*Screen Current ma.*	g_m *μmhos*	C_{gp} *pf.*	r_p *meg-ohms*	*Equivalent Noise Resistance*		*Ratio* $g_m/C_{gp}\ 10^{12}$	$g_m/C_{gp}\ 10^9$ *Req.*
										MIT ohms	*Radio-tron ohms*		
Remote or Semiremote	6SS7	250	100	11.0	9.0	2.0	1,850	.004	1	3320	10,680	.463	.139
	6SK7	250	100	11.8	9.2	2.6	2,000	.003	0.8	3450	11,100	.666	.193
	6BJ6	250	100	12.5	9.2	3.3	3,600	.0035	1.3	2160	4,260	1.03	.477
	6SG7	250	150	12.6	9.2	3.4	4,000	.003	1	1980	3,100	1.33	.674
	6BA6	250	100	15.2	11.0	4.2	4,400	.0035	1	1820	3,520	1.25	.685
	6DC6	200	150	12.0	9.0	3.0	5,500	.02	0.5	1370	1,830	.275	.202
	6BZ6	125	125	17.6	14.0	3.6	8,000	.015	0.26	822	1,140	.533	.648
	6JH6	125	125	17.6	14.0	3.6	8,000	.015	0.26	822	1,140	.533	.648
	6HR6	200	115	17.5	13.2	4.3	8,500	.006	0.5	875	1,490	1.42	1.62
	6EH7	200	90	16.5	12.0	4.5	12,500	.0055	0.5	637	776	2.27	3.56
Sharp Cutoff	6BH6	250	150	10.3	7.4	2.9	4,600	.0035	1.4	1770	2,330	1.31	.739
	6SH7	250	150	14.9	10.8	4.1	4,900	.003	0.9	1630	2,850	1.63	1.00
	6AK5	180	120	10.1	7.7	2.4	5,100	.02	0.5	1420	1,880	.255	.180
	6AU6	250	150	14.9	10.6	4.3	5,200	.0035	1	1590	2,660	1.48	.930
	6BC5	250	150	9.6	7.5	2.1	5,700	.02	0.8	1210	1,360	.285	.236
	6CB6A	125	125	16.7	13.0	3.7	8,000	.015	0.28	867	1,150	.533	.616
	6DE6	125	125	19.7	15.5	4.2	8,000	.025	0.25	847	1,280	.320	.378
	6AC7	300	150	12.5	10.0	2.5	9,000	.015	1	722	720	.600	.838
	6AH6	300	150	12.5	10.0	2.5	9,000	.03	0.5	722	716	.300	.419
	6HS6	150	75	11.6	8.8	2.8	9,500	.006	0.5	769	668	1.58	2.37
	6FS5	275	135	9.2	9.0	0.17	10,000	.03	0.24	287	278	.333	1.20
	6EW6	125	125	14.2	11.0	3.2	14,000	.04	0.2	503	392	.350	.893
	6EJ7	200	200	14.1	10.0	4.1	15,600	.0055	0.51	532	352	2.84	8.07
	6688	180	150	14.4	11.5	2.9	15,900	.018	0.09	410	308	.884	2.87
	7788	135	165	40.0	35.0	5.0	50,000	.035	—	100	79	1.43	18.1



HURRICANE BETSY

A Summary and Analysis of Amateur Radio Performance in One of the Worst Storms Yet

BY GEORGE HART,* W1NJM

When Hurricane Betsy entered on "stage right" out of her spawning grounds in the South Atlantic, around the first of September, no one knew exactly where she was headed, but everyone expected she would reveal her destination in a day or so. She wandered north of Puerto Rico and headed slowly northwestward of the Bahamas in a course that promised minimum destruction to populated land masses. It looked as though she might curve northward and eastward and get lost in the North Atlantic and spare us completely as few full-fledged hurricanes such as Betsy have ever done.

But even in the early stages she showed signs of being erratic. On August 30 she paused, as though undecided, north of P.R. and Hispaniola, and did a little pirouette, changed direction from northwest to southwest, then resumed her west-northwest course which gradually curved northward until by Sept. 5 she was pointed right at the Hatteras areas. By this time the residents of Southern Florida were drawing deep breaths of relief.

Much to everybody's surprise, Betsy then went around in another loop, completely reversing direction, and headed straight for the Bahamas, where by Sept. 7 she was doing her considerable worst. Then she went due west and raked the Florida Keys, then into the Gulf of Mexico and curving northward to sock New Orleans and proceed inland and eventually disintegrate into squalls and rainfall.

Amateur organizers all over the east, and particularly the southeast, watched Betsy's progress with interest and some apprehension. First the fine Florida ARPSC organization went into action, then states along the gulf as Betsy approached the New Orleans area. We have reports galore and will summarize them herewith in chronological order.

* National Emergency Coordinator, ARRL.

Florida

Both Florida SECs reported what happened in their respective sections and throughout the statewide organization. W4IYT tells us that the Florida AREC plan went into operation on Sept. 7 at 0300Z with a "Condition Three" (full emergency), with nets C and D in full swing. As the hurricane brushed the tip of the Florida peninsula and raked the Keys, net managers adjusted their schedules to meet the traffic loads. All key city stations were on the job. Despite the fury of the wind, most commercial communications (now largely underground) remained intact. W4BUG and VP7NS made contact and first informal damage reports from Nassau were received.

On Sept. 8 the nets went on Condition Two (limited emergency), and by Sept. 10 had fallen into Condition Four (aftermath). But as the Hurricane approached the North Gulf Coast they again sprang into life, this time with W4MLE in charge of state operations. Again no communications emergency developed, although both civil defense and the Red Cross utilized the ARPSC circuits for formal message traffic. Stations in Atlanta maintained liaison with Florida Nets C (3940) and D (3651) and also WARN, and a circuit was set up with New Orleans to conduct direct communications between New Orleans and Atlanta, the latter the Southeast Area headquarters for the Red Cross.

High tides were a major concern in Western Fla., and the Weather Bureau requested tide readings from coastal points between Apalachicola and Cedar Key. These were obtained by K4PVP and forwarded hourly to Tallahassee via the Florida Emergency Net (QFEN).

As the storm went ashore at New Orleans, the Weather Bureau requested a radar observation from the New Orleans Weather Bureau, with whom they had lost contact. Efforts to reach the New Orleans Weather Bureau were futile. New Orleans amateurs were available but they had no way to contact the Weather Bureau in the absence of telephone facilties.

Florida nets on 3940 and 3651 operated until 0800Z, when traffic flow slowed to a trickle. After this, individual Florida stations were on hand to assist on 3910 and adjacent frequencies.

Mississippi

The Mississippi RACES net was in operation, as was the Miss. C.W. Net, and amateurs throughout the state were active in these and in WARN, RN5, and Louisiana and Florida nets. Many Miss. amateurs were active trying to assist harassed operators in the New Orleans area where Betsy was really raising cain.

Louisiana

This was the state hardest hit by Betsy, requiring intensive activity from amateurs all over the state and from Eastern Texas. We have many reports and will summarize them one by one without, however, being repetitive from one to the other.

Delta Division Newsletter No. 9 from Director W5LDH summarizes the operation very well. Let us quote from it:

"Hurricane Betsy . . . left us with a communications breakdown the likes of which probably hasn't been equalled in our history. The area hams did a magnificent job. Cooperation with all official agencies was excellent. At the request of the city health officer a group of us organized a medical emergency net to enable him to speak with doctors . . . to supply the medical needs for thousands of evacuees. Within a matter of a few hours . . . we had 15 ham mobile units in operation at 15 different shelters. In some cases this was the only means of communication for three days and nights.

"There was a team of Texas amateurs who brought . . . generators and a complete mobile van which they set up in front of police headquarters. Local hams . . . handled hundreds of messages for the Red Cross, civil defense, police and fire departments. Welfare traffic is still being handled. So many are deserving of credit. . . ."

W5LDH follows this up with a detailed letter in which he described the fury of the storm when it hit New Orleans on Sept. 9, and the damage wrought by it until it began to subside on the 10th, permitting intensive operations to commence on the morning of the 11th. W5LDH met with RACES RO K5MEC and city c.d. director and health officer to arrange for radio contact between evacuee shelters and City Hall. K5USU, himself a doctor, was NCS for the medical emergency net. Fifteen mobiles were strategically placed at shelters within two hours and requests for supplies at the shelters started to flow. K5EOE, another doctor, set up at City Hall and made direct contact with the Red Cross and Salvation Army. Messages concerned such items as snake-bite serum, tetanus vaccine, needles, syringes, digitalis, etc. There were about 30,000 evacuees to be cared for in the shelters. W5FMO handled a great deal of traffic on 3905, the medical net operated on 3915, and the Texans who came to assist — about whom more later — set up on 3930 kc. Six meters was tried, but without success.

FCC issued an order declaring a voluntary communications emergency from 3910 to 3920 kc., and this was well respected throughout the emergency.

Most of the remaining Louisiana reports come from Louisiana SCM W5PM, who went to considerable trouble and effort to collect them. Although Jack disclaims any writing ability, his own individual report is quite meaty, and we'll summarize it along with the rest:

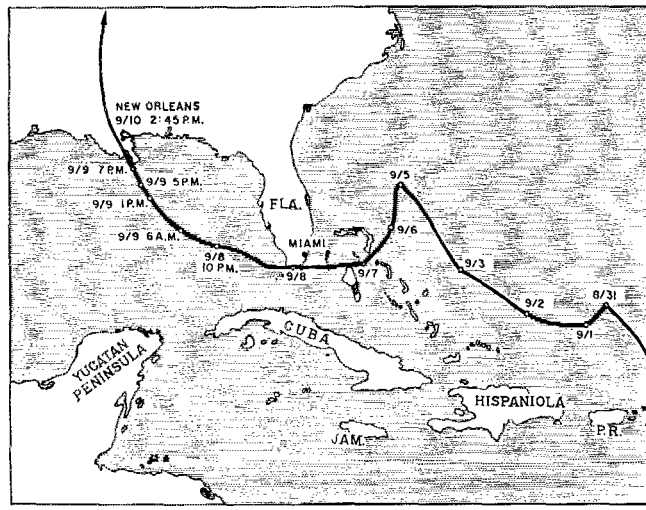
W5PM, Covington, La.: Tracked Betsy beginning Aug. 23 when she was still in the Leeward Islands. Early contact was made with Director W5LDH, SEC W5BUK and former SCM W5FMO, all of whom subsequently lost power and had to switch to emergency supplies. W5PM and K5RSH handled welfare traffic for families in Covington, although power was off for from three to five days. The Delta S.S.B. Net was active and did a fine job.

K5AAM, La Place, La.: Only station active in St. John's Parish. Handled 17 welfare messages, two condition reports, overhauled two generators, burned eight gallons of gasoline, damaged one tower, consumed 23 cups of coffee. Says he has several interesting stories to tell "some day."

W5EXI, Lafayette, La.: Ten Lafayette amateurs were on the air and helping in various emergency nets.

W5FMO, Metairie, La.: Started a hurricane watch on 3910 kc. at 7 A.M. Sept. 9, got set up for emergency power. At 11:08 P.M., power went off and generator was started. Phone went out afternoon of Sept. 10. Handled emergency traffic, welfare and weather reports. Was only station in New Orleans on 3910 kc. for a few days. W5CGX in Texas acted as NCS for three nights, later W5CEW took over. Calls came in from both coasts and the Canadian border; about 1500 requests for information were handled, about 500 of which got replies. No formal message procedures were used. Traffic was handled for the Pontchartrain Levee Board at Lulling, the Monsanto Chemical Co. at Hahnville and the St. Charles Hospital. Blood, medical supplies, doctors, ice, and food orders were some of the items requested. W5FMO lists 24 amateurs who were outstanding in the above work.

A very nice report came from *W5IQH, Franklin, La.* He states that he activated the c.d. station in Franklin early on the morning of Sept. 9, checked out the equipment, procured and activated an emergency power source and by 4 P.M. was on the



Spawned in the equatorial Atlantic Hurricane Betsy whirled her erratic way first westward, then northward reversing directions twice before she did her worst damage west of New Orleans, La.

air on six meters in contact with Morgan City, Lafayette, New Iberia and Abbeville; Lafayette was area headquarters and was in contact with Baton Rouge and New Orleans. Local Red Cross and evacuation centers along with hospitals, police jury and sheriff's departments were maintained in close contact with c.d. on 2 meters. All went smoothly before, during and after the hurricane, with all commercial power out and telephones at a minimum. Eight amateurs assisted Dr. W5IQH in the operation. On the morning of Sept. 10 an emergency call was received for radio help in Lafourche Parish from the sheriff's department there, so W5IQH threw some gear into his Cadillac and rendered material assistance for emergency traffic at Morgan City and then at Thibodaux. After they were straightened out, he went on to New Orleans where he contacted W5FMO and handled some traffic for the state police, broadcast stations, and a few health and welfare and other messages. While going through part of New Orleans trying to make a message delivery he was once trapped in flood waters; when he informed the NCS (W5FMO) of this the latter replied that this was the first time he had ever worked a "maritime mobile" in downtown New Orleans in a Cadillac. W5IQH winds up his report with some constructive criticism which we'll reserve for a "field bulletin."

K5KQG, Houma, La.: The amateurs in this area were not prepared for the destruction wrought by Hurricane Betsy and were for the most part unable to operate because of the storm. Those with emergency power whose antennas stayed up were ineffective because they had no telephones with which to deliver local traffic. Nevertheless, 211 messages were handled by the group of eight amateurs. The most important message had to do with a broken natural gas main near a high school which housed a large group of refugees. An emergency message originated by W5MCC/5 in LaRose was instrumental in getting the main turned off.

W5ZBC, Bossier City, La.: Put in over 100 hours handling traffic for the Red Cross and broadcast and TV stations, totalling some 50 formal messages and countless informals. Even handled traffic with Alaska and Antarctica on 20 meters during the emergency.

W5CEZ, Maplewood, La., RM for Louisiana: The Louisiana Section Net (LAN) went into operation on 3615 kc. at 2303Z Sept. 9 with W5CEZ as NCS and remained in operation until 0606Z Sept. 10 when conditions prohibited further operation and activity was switched to the WARN Net on 3552 kc. Fourteen stations participated during this period. NCS responsibilities were rotated along with liaison with WARN and RN5. There were three stations in the net in New Orleans, but before operation ended all three were obliged to QRT for their own personal safety as wind and water took their toll. W5CEZ operated continuously during the above-mentioned period, and at 1150Z on Sept. 10 returned to WARN when no one could be heard on the LAN frequency. Contact with New Orleans was made on MARS. Closed up station to go to work at 1400Z, resumed operation at 2300Z on LAN, which was again in continuous operation until 0437Z Sept. 11. After that, traffic was cleared by prearranged schedule and via MARS. W5CEZ resumed operation at 1300Z on Sept. 11 and continued intermittently until 0410Z Sept. 12. The same pattern was followed throughout the following week — nine hours a day at work, six to eight hours a day on the air, until Sept. 17 when "business" tapered off. A total of 202 messages were handled going to and coming from the disaster area — a dedicated job by Carter Simpson, W5CEZ.

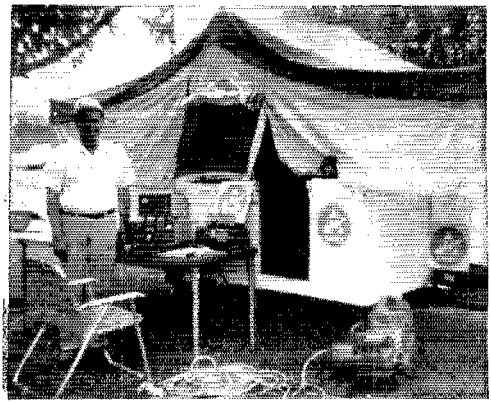
W5GHP, New Orleans, La.: Started operating Sept. 9 at 1700 CST on LAN on 3615 kc., then went to RN5 at 1945. Along with WA5EID and WA5KQN, stood a rotating watch on 3550 kc. for emergency calls. Was then evacuated to shelter and unable to return until 0600, when found antennas down but towers still up. Set to work putting up antennas and by 1200 had both 40- and 80-meter dipoles back up. Power was restored at 1100. Reported into 40-meter hurricane net and handled traffic until 1730, when LAN was back in session. At 1945 went to RN5 as NCS, stayed with this net for both sessions as NCS and handled much traffic. Sleep required Friday night. Called to work Saturday morning (Sept. 11), back on air at 1300 working with medical group under K5USU. Later returned to LAN and more traffic. Back to RN5 at 1945, received more New Orleans traffic, mostly H & W, some Red Cross. Secured at 2330 CST. Work Sunday, back on LAN at 1700 and both sessions of RN5 during the evening. Was only New Orleans station in Region net, received 274 messages, about 35% deliveries due to lack of telephone. High praise for K5USU and the medical net.

K5FYI, Metairie, La.: This report was in the form of a semi-humorous narrative. The following are the factual parts: Sent home from work at 1600 CST, refueled on the way. Checked equipment in shack and started listening. Landlines were already out. Handled personal welfare traffic for a neighbor. Power off when branch of oak tree in back yard severed high tension wire. Stayed in house. Next morning (Sept. 10) found yard in shambles, antennas down. Jury rigged an a.c. line into shack from car alternator, used mobile rig in car for six-meter operation, 75-meter s.s.b. rig in shack and reported into nets on both 6 and 75, relayed many messages out of New Orleans on six meters via the 75-meter net. Emergency antenna was set up in remains of trees in yard. Went in car to various other amateurs' houses, found all had H & W messages but were without means of sending them, so peddled them on 75 meters. Refueled at only station in area pumping gas, blew irreplaceable fuse in inverter trying to load it up too much, became just another hurricane victim.

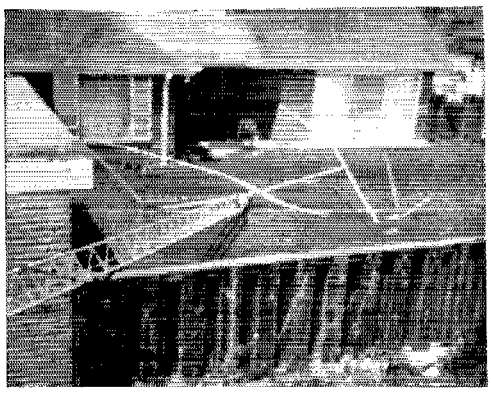
W5DNL sends us a color print of his antenna and tower on the ground after the hurricane. He says "Many of us operated around the clock at any station that could be operated. We were the *only* means of communication."

W5ZJO in Baton Rouge copied weather bureau

The Nashville (Tenn.) AREC and Radio Club activated this station at Red Cross headquarters to handle Health & Welfare messages. Shown above is the 75-meter rig with (l. to r.) WA4JMZ, W4KAT (EC), K4RKM and WA4OEQ.



K5HXR, RO for Harris County, Texas, led an expedition to New Orleans, where they set up this camper first on K5USU's lawn, then at the police station. That's K5HXR himself in the photo.



W5DNL's steel tower was a casualty. It was set in a cubic yard of concrete and guyed. One element was buried three feet into the ground and the sudden jerk on the coax feedline pulled a coax connector out of a steel cabinet in the shack.

reports on RTTY from New Orleans, relayed to Air Force bases on 2 meters via MARS and to local industrial plants via landline.

WA5JVL in New Orleans spent the day before power was lost with WA5DXA transmitting weather advisories and bulletins and helping to set up an emergency net on v.h.f. During the hurricane itself he handled several messages.

W5MWU in New Orleans operated at Red Cross headquarters on Monday (Sept. 13) and Tuesday handling traffic in and out of town. He was assisted by K5YMM.

Texas

Although most of Texas was spared the greatest fury of Betsy, we do have a significant report from K5QQG, EC for Harris County (Houston), Texas, on the outstanding support they gave to the stricken New Orleans area. As a prelude, let it be said that in the early stages, before the ultimate destination of Betsy became known, there was much activity in the Houston area preparing for the worst. As soon as it became evident that Betsy would have little effect on the Houston area, operations were suspended. This was about 1500, Sept. 9. At about 2000 CST, a group of five amateurs decided to go to New Orleans to offer their assistance, taking with them W5HNI's fully-equipped trailer. K5FOG drove for RO K5HXR in his homebuilt camper, while the latter operated the transmitter. Also in the caravan were K5ARC and W5DNE in their own mobile units.

They arrived at Baton Rouge at about 0300 (Sept. 10) but were unable to be of any assistance at that point. K5HXR and K5FOG went on to New Orleans, arriving there at 0500. After much inquiring without much success, they finally wound up encamped on the lawn of K5USU and participated in the medical net. At a meeting of officials at 1600 (Sept. 10), K5USU was given authority to assign the amateurs, and he had the Houston amateurs set up their station at the police station and assist in handling H & W messages, many of which previously had been filed in the waste basket. One significant contribution was their assistance in clearing up a situation at a truck-weighing station in Orange Grove, Miss., where overloaded trucks bound for New Orleans with emergency supplies were being held up. K5HXR got in touch with WA5ETL in Columbus, who contacted Miss. State Police and the situation was immediately rectified so that the trucks could go through, overloaded or not.

K5HXR/5 and others continued in operation from 1400 Sept. 11 until 1000 Sept. 12 at this location, then were released and returned to Houston.

Miscellany

As usual, amateurs far and wide got in on the act, some serving useful functions in assistance to harassed amateurs in and immediately adjacent to the affected area. We cannot give full details of all operations, but here is a summary of some of the salient ones.

WA8CGZ was written up by the Detroit *Free Press* for his work in relaying weather advisories between Florida points in the "Hurricane Net."

WØEXQ in St. Louis relates an incident which shows that amateurs were getting the H & W inquiries delivered in New Orleans. Messages filed with WØECE and WØDVU had already been delivered in New Orleans when telephone communications were reestablished a few hours later.

The Davidson County, Tenn., AREC set up to handle H & W messages for the local Red Cross chapter. Six- and 75-meter transmitters at the chapter house were activated.

W6FFN reports handling some H & W traffic for the Covina (Calif.) Branch of the American Red Cross on the emergency net operating on 14,225 kc.

We have a letter from KZ5WC, president of the Canal Zone Amateur Radio Assn., commending KZ5MM on her services in relaying messages and acting as net control in the hurricane net.

And finally, we should make mention of the work of W5LDH, Delta Division ARRL director, in tracking down a report that an irresponsible amateur had spread an unfounded rumor of a death toll of 200 in Plaquemines Parish. The result of the investigation reveals that the Orleans Parish coroner was erroneously quoted and that no amateur had made such a statement. Letters from the coroner and the New Orleans director of health to ARRL President Hoover both were high in their praise of amateur operation during the emergency. "Without them," said the coroner, "there would have been no possible means of communication." "We were provided," said the director of health, "with a headquarters radio unit and mobile units to shelters which lacked telephone service. With this communications network we were able to function effectively." QST

Smith-Chart Calculations for the Radio Amateur

PART II[1]

BY GERALD L. HALL,* K1PLP, EX-KH6EGL

Determining Actual Antenna Impedances

To determine an actual antenna impedance from the Smith Chart, the procedure is similar. The electrical length of the feed line must be known, and the impedance value at the input end of the line must be determined through measurement. In this case, the antenna is connected to the far end of the line and becomes the load for the line. Whether the antenna is intended purely for transmission of energy, or purely for reception makes no difference; the antenna is still the terminating or load impedance on the line as far as these measurements are concerned. The *input* or *generator* end of the line would be that end connected to the device for measurement of the impedance. In this type of problem, the measured impedance is plotted on the Chart, and the TOWARD-LOAD wavelengths scale is used in conjunction with the electrical line length to determine the actual antenna impedance.

For example, assume we have a measured input impedance to a 50-ohm line of $70 - j25$ ohms. The line is 2.35 wavelengths long, and is terminated in an antenna. We desire to determine the actual antenna impedance. Normalize the input impedance with respect to 50 ohms, which comes out $1.4 - j0.5$, and plot this value on the Chart. See Fig. 7. Draw a constant-s.w.r. circle through the point, and transfer the radius to the external scales. The s.w.r. of 1.7 may be read from the S.W.V.R. scale (at A). Now draw a radial line from prime center through this plotted point to the wavelengths scale, and read a reference value, which is 0.195 (at B), on the TOWARD-LOAD scale. Remember, we are starting at the *generator* end of the transmission line.

To locate the load impedance on the s.w.r. circle, we add the line length, 2.35 wavelengths, to the reference value from the wavelengths scale, and locate the new value on the TOWARD-LOAD scale; $2.35 + 0.195 = 2.545$. However, the calibrations extend only from 0 to 0.5, so we must subtract a whole number of half wavelengths from this value and use only the remaining value. In this situation, the largest integral number of half wavelengths that can be subtracted is 5, or 2.5 wavelengths. Thus, $2.545 - 2.5 = 0.045$, and the 0.045 value is located on the TOWARD-LOAD scale (at C). A radial line is then drawn from this value to prime center, and the coordinates at the intersection of the second radial line and the s.w.r. circle represent the load impedance. To read this value closely, some interpolation between the printed coordinate lines must be made, and the value of $0.62 - j0.18$ is read. Multiplying by 50, the actual load or antenna impedance is $31 - j9$ ohms, or 31 ohms resistance with 9 ohms capacitive reactance.

Problems may be entered on the chart in yet another manner. Suppose we have a length of 50-ohm line feeding a resonant quarter-wave vertical ground-plane antenna. Further, suppose we have an s.w.r. monitor in the line, and that it indicates an s.w.r. of 1.7 to 1. The line is known to be 0.95 wavelength long. We desire to know both the input and the antenna impedances.

From the data given, we have no impedances to enter onto the chart. We may, however, draw a circle representing the 1.7 s.w.r. See Fig. 8. We also know, from the definition of resonance, that the antenna presents a purely-resistive load to the line; i.e., no reactive component. Thus, the antenna impedance must lie on the resistance axis. By observing the Chart with only the s.w.r. circle drawn, we see two points which satisfy this requirement in Fig. 8. These points are $0.59 + j0$ and $1.7 + j0$. Multiplying by 50, these values represent 29.5 and 85 ohms resistance. This may sound familiar, because the *ARRL Handbook* tells us that when a line is terminated in a pure resistance, the s.w.r. in the line equals Z_R/Z_0 or Z_0/Z_R, where Z_R = load resistance and Z_0 = line impedance.

If we consider antenna fundamentals, we know that the theoretical impedance of the ground-plane antenna is approximately 36 ohms. We therefore can quite logically discard the 85-ohm impedance figure in favor of the 29.5-ohm value. This is then taken as the actual load-impedance value for the Smith Chart calculations. The line input impedance is found to be $0.64 - j0.21$, or $32 - j10.5$ ohms, after subtracting 0.5 wavelength from 0.95, and finding 0.45 wavelength on the TOWARD-GENERATOR scale. (The wavelength reference in this case is 0.)

Determination of Line Length

In the example problems given so far, the line length has conveniently been stated in wavelengths. The electrical length of a piece of line depends upon its physical length, the radio frequency under consideration, and the velocity of propagation in the line. If an impedance-measurement bridge is capable of quite reliable readings at high line-s.w.r. values, the line length may be determined through line input-impedance measurements with short- or open-circuit terminations. A more direct method is to measure the line's physical length and apply the value to a formula. The formula is:

* Hopkins St., Wilmington, Mass. 01887

[1] Part I of this article appeared in the January issue.

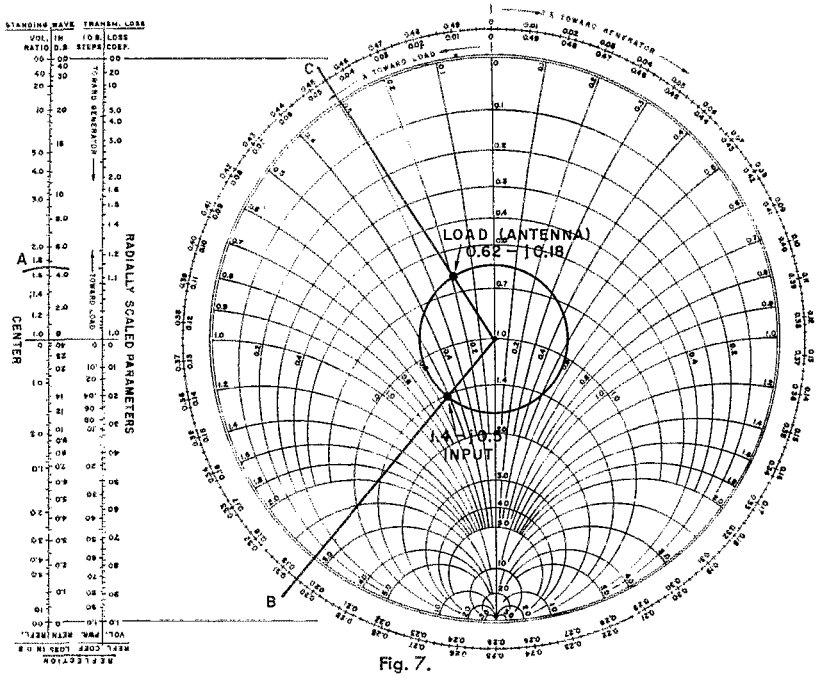


Fig. 7.

$$N = \frac{LF}{984K}$$

where

N = Number of electrical wavelengths in the line,

L = Line length in feet,

F = Frequency in megacycles, and

K = Velocity or propagation factor of the line.

The factor K may be obtained from transmission-line-data tables, such as appear in the *Handbook* in the chapter on transmission lines. Common coaxial cables with solid dielectric, such as RG-8, 9, 11, 17, 19, 58, 59 and 83 have a velocity or K factor of 66.9 per cent. Teflon-dielectric, or combination solid- and air-dielectric lines, have a higher velocity factor — up to 93 per cent for some special types of coaxial line. Most 300-ohm receiving-type balanced Twin-Lead has a velocity factor of 82 per cent; 75-ohm receiving-type ribbon line 68 per cent, transmitting type 71 per cent. Open-wire lines and ladder-type TV lines will exhibit a velocity factor of 97 to 97.5 per cent. All types of line having a solid dielectric can vary in velocity factor from the values given here, depending on the age and condition of the dielectric material. As the dielectric deteriorates, the velocity factor will become lower, and usually the associated dielectric losses will become higher. This is especially true of ribbon-type lines, where the dielectric material is exposed directly to the weather in most installations. In applying the velocity factor to the formula, the percentages must be converted to their decimal equivalent.

Line-Loss Considerations

The problems presented so far have ignored attenuation, or line losses. Quite frequently it is not even necessary to consider losses when making calculations; any difference in readings obtained would be almost imperceptible on the Smith Chart. When the line losses become appreciable, as with very long lines in terms of wavelengths, or with high s.w.r. values, loss considerations may be warranted. This involves only one simple step, in addition to the procedures previously presented.

Because of line losses, the s.w.r. does not remain constant throughout the length of the line. Power reflected from a mismatched load is attenuated as the wave travels toward the generator. As a result, there is a decrease in s.w.r. as one progresses away from the load. To truly represent this situation on the Smith Chart, instead of drawing a constant s.w.r. circle, it would be necessary to draw a spiral inward and clockwise from the load impedance toward the generator. The rate at which the curve spirals toward prime center is related to the attenuation in the line. Rather than drawing spiral curves, a simpler method is used in solving line-loss problems, by means of the external scale TRANSMISSION-LOSS, 1-DB. STEPS in Fig. 9. Because this is only a relative scale, the db. steps are not numbered.

If we start at the top end of this external scale and proceed in the direction indicated toward generator, the first db. step is seen to occur at a radius from center corresponding to an s.w.r. of about 9 (at A); the second db. step falls at an s.w.r. of about 4.5 (at B), the third at 3.0 (at C), and so forth, until the 15th db. step falls at an s.w.r. of about 1.05 to 1. This means that a line terminated in a short or open circuit (infinite s.w.r.) and having an attenuation of 15 db., would exhibit an s.w.r. of only 1.05 at its input.

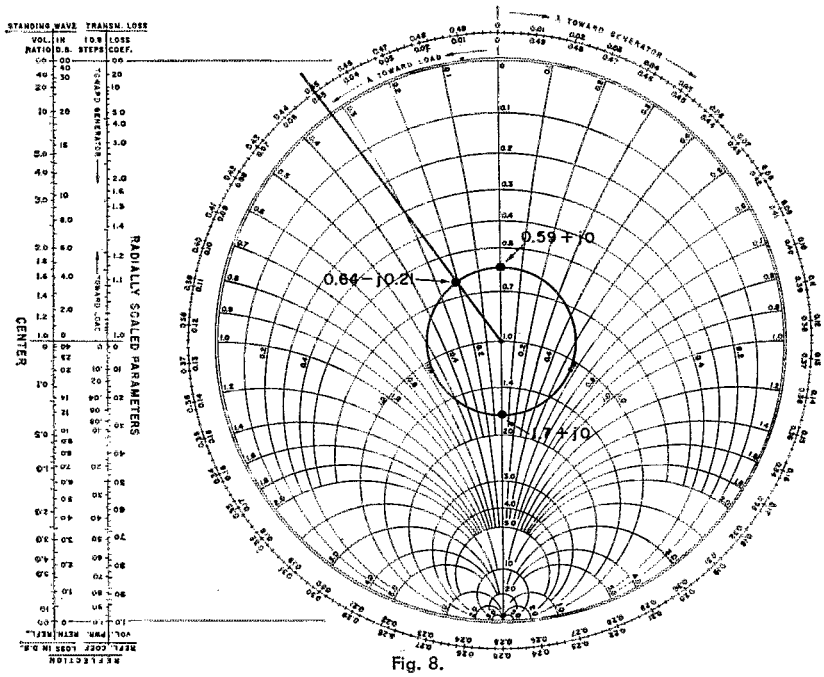


Fig. 8.

It will be noted that the db. steps near the lower end of the scale are very close together, and a line attenuation of 1 or 2 db. in this area will have only slight effect on the s.w.r. But near the upper end of the scale, 1- or 2-db. loss has considerable effect on the s.w.r.

In solving a problem utilizing line-loss information, it is necessary only to modify the radius of the s.w.r. circle by an amount indicated on the TRANSMISSION-LOSS, 1-DB.-STEPS scale. This is accomplished by drawing a second s.w.r. circle, of either greater or lesser radius than the first, as the case may be.

Assume that we have a 50-ohm line 0.282 wavelength long, with 1-db. inherent attenuation. The line input impedance is measured as $60+j35$ ohms. We desire to know the s.w.r. at the input and at the load, and the load impedance. As before, we normalize the $60 + j35$-ohm impedance, plot it on the Chart, and draw a constant-s.w.r. circle and a radial line through the point. In this case, the normalized impedance is $1.2 + j0.7$. From Fig. 9, the s.w.r. at the line input is seen to be 1.9 (at D), and the radial line is seen to cross the TOWARD-LOAD scale at 0.328 (at E). To the 0.328 we add the line length, 0.282, and arrive at a value of 0.610. To locate this point on the TOWARD-LOAD scale, first subtract 0.500, and locate 0.110 (at F); then draw a radial line from this point to prime center.

To account for line losses, transfer the radius of the s.w.r. circle to the external 1-DB.-STEPS scale. This radius will cross the external scale at G, the fifth db. mark from the top. Since the line loss was given as 1 db., we strike a new radius (at H), one "tick mark" higher (toward load) on the same scale. (This will be the fourth db. tick mark from the top of the scale.) Now transfer this new radius back to the main chart, and scribe a new s.w.r. circle of this radius. This new radius represents the s.w.r. at the load, and is read as about 2.3 on the external S.W.V.R. scale. At the intersection of the new circle and the load radial line, we read $0.65 - j0.6$ as the normalized load impedance. Multiplying by 50, the actual load impedance is $32.5 - j30$ ohms. The s.w.r. in this problem was seen to increase from 1.9 at the line input to 2.3 (at I) at the load, with the 1-db. line loss taken into consideration.

In the example above, values were chosen to fall conveniently on or very near the "tick marks" on the 1-DB. scale. Actually, it is a simple matter to interpolate between these marks when making a radius correction. When this is necessary, the relative distance between marks for each db. step should be maintained while counting off the proper number of steps.

The total losses in a given piece of transmission line are dependent upon several factors, primarily frequency, line length, and s.w.r. Transmission-line data tables show "matched-line" losses for various types of lines at various frequencies, usually expressed in decibels per hundred feet. RG-8/U, for example, has an attenuation of 0.28 db. per hundred feet at 3.5 Mc., 0.65 db. at 14 Mc., 0.98 db. at 28 Mc., 2.65 db. at 150 Mc., and so on. The *A.R.R.L. Antenna Book* has quite complete tables of common transmission-line data. Attenuation for a given piece of line may be computed from table data; the attenuation in db. is directly proportional to the line length.

Adjacent to the 1-DB.-STEPS scale lies a LOSS-COEFFICIENT scale. This scale provides a factor

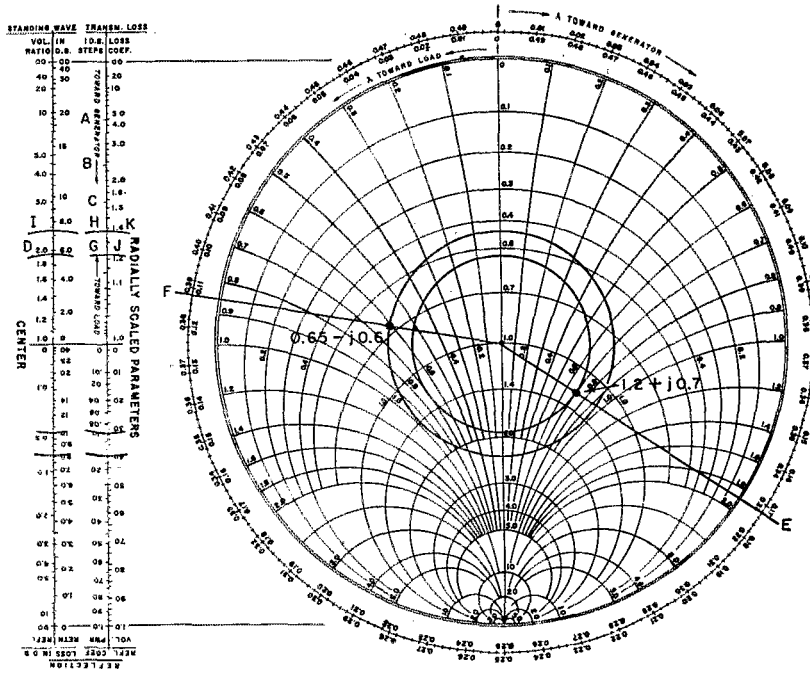


Fig. 9.

by which the matched-line loss in db. should be multiplied to account for the increased losses in the line when standing waves are present. These added losses do not affect the standing-wave ratio or impedance calculations; they are merely the additional dielectric and copper losses of the line caused by the fact that the line conducts more average current and must withstand more average voltage in the presence of standing waves. In the above example and in Fig. 9, the loss coefficient at the input end is seen to be 1.21 (at J), and 1.39 (at K) at the load. As a good approximation, the loss coefficient may be averaged over the length of line under consideration; in this case, the average is 1.3. This means that the total losses in the line are 1.3 times the matched loss of the line (1 db.), or 1.3 db.

Two additional external scales may find limited use in amateur applications. These are the REFLECTION-LOSS IN DB. scales. Both of these scales are related to the REFLECTION COEFFICIENT OR POWER scale, but express values in db., rather than in a power ratio. The RETURN scale expresses the ratio of total forward power to reflected power in db. This is sometimes called the *reflection loss*, although it does not necessarily represent an actual loss of power. If an impedance match is made at the sending end of the transmission line with a generator or a transmitter, a "reflection gain" takes place which neutralizes the "loss" at the load end. The REFLECTED scale expresses the ratio of total forward power to nonreflected power in db. This would represent the power consumed in the load (or power radiated by an antenna, plus ohmic losses), referenced to the total forward power in the line.

Summary

To summarize briefly, any calculations made on the Smith Chart are performed in four basic steps, although not necessarily in the order listed.

1) Normalizing and plotting a line input (or load) impedance, and constructing a constant s.w.r. circle.

2) Applying the line length to the wavelengths scales.

3) Determining attenuation or loss, if required, by means of a second s.w.r. circle.

4) Reading normalized load (or input) impedance, and converting to impedance in ohms.

The Smith Chart may be used for many types of problems other than those presented as examples. The transformer action of a length of line — to transform a high impedance (with perhaps high reactance) to a purely resistive impedance of low value — was not mentioned. This is known as "tuning the line," for which the Chart is very helpful, eliminating the need for cut-and-try procedures. The Chart may also be used to calculate lengths for shorted or open matching stubs in a system. In fact, in any application where a transmission line is not perfectly matched, the Smith Chart can be of value.

The Chart can also be used in solving other types of problems which were not brought into the scope of this article. Such problems include the use of the Chart for admittance, conductance, and susceptance calculations, or the computation of equivalent series or parallel components of an impedance or admittance. In short, the Smith Transmission Line Calculator or Chart is a very versatile tool for either amateur or professional use. QST

Happenings of the Month

FCC DENIES FEE REDUCTIONS

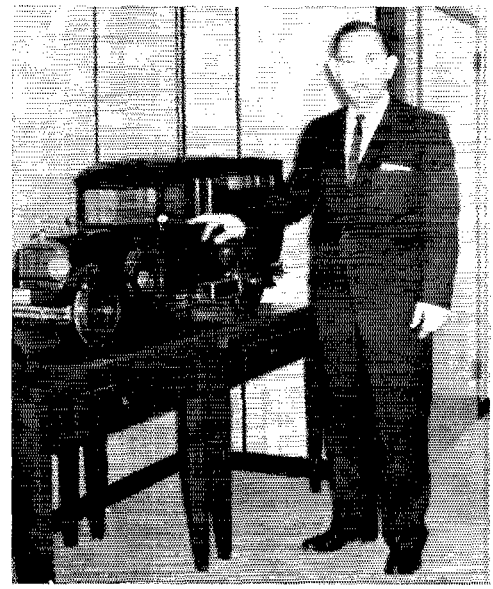
As long-time readers of *QST* are aware, the ARRL has consistently fought license application fees charged by FCC because (1) the amateur service is non-commercial, and a minimum burden on FCC through self-policing and a high proportion of internally-administered exams; (2) the fees do not go directly to FCC to provide increased services; and (3) the rates charged the various services do not, in the League's opinion, reflect the material benefit derived therefrom nor the amount of effort required by the Commission in processing the applications. Though the League and other organizations lost their joint plea to the Federal Court of Appeals at Chicago and the later request for review by the Supreme Court, the League continues to explore every opportunity to attempt cancellation or reduction of fees.

Thus, when the Federal Communications Commission last March published a Notice of Proposed Rulemaking on changes in license application fees, Docket 15881, the League was among the ten petitioners. ARRL's comments, the only ones filed for the amateur service, requested reduction of new and renewal application fees to $2, of special-call fees to $4, and elimination of fees for club and special event stations.

On November 24, the Commission released its Report and Order in the docket, in large measure adopting its own proposals and rejecting requests for additional changes from the commenting groups. Two of the adopted proposals confirmed existing informal policies affecting amateurs: there are to be no fees for reciprocal operating permits, and no fees for special temporary authorizations (STAs) such as may be used for special events amateur stations being operated for six months or less. FCC also deleted Sections 97.53 and 97.55, because the same information already appears in Subpart G, Part I of the FCC regulations covering the general rules for all services.

The text of the order occupies several pages; the paragraph of greatest interest to amateurs appears below:

"27. ARRL recommended setting all amateur filing fees at $2; reduction of the fee for special call signs from $20 to $4; and exemption from the fee requirement of applications for amateur stations at special events (Boy Scout encampments, fairs, etc.), and for applications filed by *bona fide* radio organizations. We do not feel that any of these suggestions should be adopted. The amount of the fee to be paid by amateurs has been discussed at length by the Commission in previous documents and further consideration and discussion is not warranted. The same is true with respect to the fee for special call signs. As to exempting *bona fide* amateur clubs, ARRL has not shown how the requirement for paying a fee of $4 every five years imposes a "severe burden" on such organizations. With respect to the suggestion for exempting applications for stations at special events, it should be noted that formal applications (and fees) are not required for authority to operate a station for less than six months. If the station is to be operated for more than six months, the payment of a $4 fee in connection with the filing of an application therefore is not inappropriate."



W3BA points to model of the Packard "hearse" used for radio-enforcement work by the Radio Division, Department of Commerce, in the early 30s.

KRATOKVIL RETIRES

Frank M. Kratokvil, W3BA, Chief of the Field Engineering Bureau, FCC, retired from government service on December 31, 1965, after more than 37 years in radio regulatory work.

He began his career as a radio amateur in 1923, obtaining the call letters 9PG at the age of fifteen and probably had the first amateur-f.m. radio station operated in the city of Chicago.

Frank is a graduate of the Armour Institute of Technology with a BS in EE; Later he obtained the Professional EE degree. Upon graduation he joined the Radio Division, Department of Commerce at Detroit, rising to the position of Inspector in Charge. He was also Inspector in Charge of the Dallas and Buffalo offices of the Commission. Throughout his career Frank fought to

further the interests of amateur radio while, of course, presenting a strong enforcement attitude in the true tradition of the old-time radio inspector.

Mr. Kratokvil was Supervisor of the South Atlantic Area during the war for the Radio Intelligence Division of the FCC.

Alert to the rapidly changing needs in radio-law enforcement, Mr. Kratokvil has emphasized the role of mobile-radio monitoring. He also increased the interest in amateur radio operation on the part of the Bureau through more inspection and analysis of amateur-radio violations.

Because in his career he has handled thousands of complaints of interference, Mr. Kratokvil has become a leading authority on the nature of interference problems. In addition, through conducting thousands of radio operator examinations during his service out in the field, he has become known to many radio amateurs.

Frank had two articles published in *QST* in 1965: "FCC Amateur Station Inspections," page 36, June, and "Amateur Radio Station Operation From a Monitoring Enforcement Viewpoint," page 32, December. His home is in Beltsville, Maryland.

SUSPENSIONS AND REVOCATIONS

The license of Robert B. Cooper, Jr., as trustee on behalf of the Horizons Publications Amateur Radio Club of Oklahoma City, Oklahoma, WA5FWJ, has been revoked effective November 22, 1965. The licensee had been requested by the Commission to furnish information on the station in communications dated May 21, and June 15, 1965, but no response was received. In July, FCC issued an Order to Show Cause, but no reply was made to that either. Accordingly, the club station license has been revoked for violation of Section 308 (b) of the Communications Act and Section 1.89 of the regulations, which require that licensees keep the Commission informed of their current mail address and that they reply to Commission correspondence within specified times.

The amateur radio station license of Wilbur Gerhard, W3PHF of Allentown, Pennsylvania, has been revoked by the FCC effective November 13, 1965. The Commission had tried to obtain information from the licensee on May 21 and June 14, 1965, but received no answer. Accordingly, an Order to Show Cause was released on August 2, and since response still was lacking, the revocation followed, under the provisions of Section 308 (b) of the Communications Act. Similarly, the Advanced Class amateur license held by Mr. Gerhard, has been suspended for the remainder of its term.

The FCC has suspended the operator licenses of four Berkeley, California, amateurs for six months. Allen M. Citragno, WA6GIN, Samuel R. Nagel, WA6TLW; Hugh Douglas Williams, WA6IZW; and Nicholas Richard Pehelkin, WB6BGY at various times between June 11 and 18 wilfully used or operated a radio station without a license in that behalf granted under the provisions of the Communications Act, and used the station to wilfully and maliciously interfere with the radio signals of another radio station in violation of Section 97.125 of the Commission's rules. Originally, the FCC had issued one-year suspensions, but statements were filed by the amateurs asking for review, after which the suspensions were reduced. Mr. Citragno holds a General Class license; the other three are Technicians. The suspensions were placed into effect in early October. QST

• *New Apparatus*

TRP TUNAVERTER

A Tunaverter is a tunable transistor converter which is available for each band from 160 to 15 meters. The i.f. output of the converter is 830 kc., suitable for an automobile radio, home broadcast set, or one of the popular hand-held portables. For those who wish to use a Q5'er, an i.f. of 550 kc. can be obtained. The Tunaverter contains a 9-volt transistor battery, so the only connections required to get it working are the antenna and i.f. output cable.

The TRP converters are available with or without a b.f.o. The beat oscillator is permeability-tuned with a panel control; the output frequency is the same as the i.f. frequency chosen. The converter itself is a single transistor mixer-oscillator. The input circuit and oscillator tank are capacitor-tuned. The tuning rate is reduced with a 6:1 planetary drive for smooth tuning on s.s.b.

The model shown in the photograph is the 750, covering 3.8–4 Mc. The unit is contained in a 4 × 3 × 2-inch case with a top mounting bracket for mobile installation. The price class of the Tunaverters without b.f.o. is $20 and $25 with b.f.o. They may be purchased from Herbert Salch & Co., Woodsboro, Texas. — *W1KLK*

Transistor Preamplifiers for 50

Low-Cost Low-Noise Amplifiers for the V.H.F. Man

No doubt about it — the age of the transistor is here. This applies nowhere more than in the v.h.f. and lower u.h.f. ranges. Once costly and tricky to use, transistors for up to at least 500 Mc. are now cheaper than vacuum tubes, and devices using them tend to be easier to build and adjust. Like all improvements, transistor r.f. amplifiers do not yield pure dividends, however. Transistors are sickeningly easy to blow, and they overload more readily than tubes of comparable performance. Still, the time has come when those of us who are interested primarily in good weak-signal reception cannot afford to overlook the solid-state approach.

Transistors capable of good performance at 50 or 144 Mc. have been available for several years, but a transistor convertor or pre-amplifier for 432 Mc. was a rarity as recently as a year ago. Everyone knew that excellent u.h.f. transistors were being made, but their use was confined mainly to amateurs who had access to expensive limited-production items then rapidly making their appearance. Today good u.h.f. transistors are becoming mass-production items, available to everyone at moderate prices.

* V.H.F. Editor, *QST*.

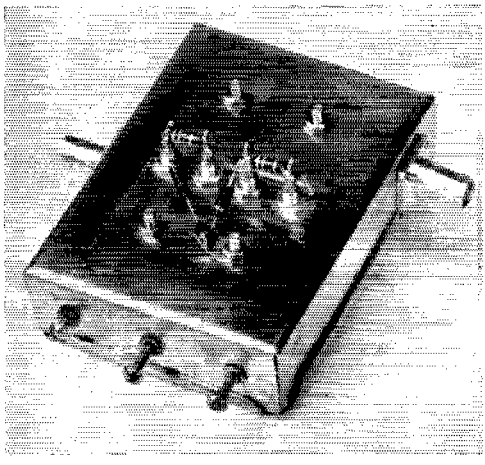


Fig. 1—A two-stage preamplifier for 432 Mc. The box is silver-plated brass, but flashing copper could be used with equally good results. Connections to the bases and collectors are brought out on feedthrough bypass capacitors, to permit changing the operating conditions.

At lower frequencies they're becoming more interesting, too, if for no other reason than their ridiculously low cost. If you haven't yet given transistors a whirl, here are some simple ways to get started.

432-Mc. Two-Stage Preamplifier

The comparative worth of transistors over tubes seems greatest at the upper end of the range, and they are especially useful in 432-Mc. reception. The general layout used in our 432-Mc. preamplifier follows a design worked out by K2AOP,[1] and used recently in various forms by W2DWJ, W3SDZ, K2CBA and others. Contributing a mechanical idea or two, we threw the thing together, and almost from the time we first put 9 volts on its terminals it became obvious that this little box would make our best tube amplifiers look sick. It does, both in the laboratory and in nightly on-the-air workouts.

The transistors most often used at 432 Mc. are RCA's 2N3478s, intended for the u.h.f. TV trade, and now generally available at under $2.00 each. We used the 2N2857 by the same maker, a much more expensive u.h.f. transistor, not enough better to merit the difference in cost, for our purposes. Either transistor is capable of noise figures under 5 db., which is better than you're likely to get with anything except the best parametric amplifiers.

Coil-and-capacitor circuits are usable with transistors at 432 Mc., but the trough-line arrangement shown is easy to make, and it is probably better in rejection of unwanted signals than if lower-Q coil circuits were used. Lines L_1, L_2 and L_3 are ¼-inch copper tubing, fitted tightly into holes in one end of the box, and soldered directly to the fixed elements of the ceramic trimmers at the other. No need to use expensive glass trimmers — the Centralab 829 series, 30 cents each, do the job nicely. The end of the tubing is countersunk slightly with a ¼-inch drill, to fit over the silvered end of the trimmer. This is better mechanically and electrically than using the flexible wire lead on the trimmer for making this connection.

Dimensions of the box are shown in Fig. 3. We used 1/32-inch brass, but flashing copper is good enough, and easier for the kitchen-table

[1] Clark, "A Semiconductor Converter for 432 Mc.," December, 1965, *QST*.

Through 432 Mc.

BY EDWARD P. TILTON,* WIHDQ

worker to handle. We silver-plated the box and lines, which made the completed amplifier pretty (for a while) but probably accomplished little else. Without silver plating, copper is better than brass electrically, though brass works beautifully with hand tools and is easily silver plated.[2] The partitions are also brass, held in place with two spade lugs each.

The transistors are in the left and center compartments, about 1¾ inches up from the bottom, as seen in Fig. 2. They hang by their leads, a method that might not be desirable for a receiver to be shot into space, but entirely satisfactory for amateur use. The base leads go directly to feed-through capacitors, C_4 and C_6. The bias networks, R_1–R_2 and R_3–R_4, are connected externally.

The emitter leads are connected to the junctions of the blocking capacitors and 1000-ohm resistors, without support other than that afforded by these parts. The collector leads run through ¼-inch holes in the two partitions. As indicated in Fig. 4, the collector circuits are in the center and right-hand compartments. Collector voltage is fed in through C_5 and C_7, from the top of the box.

Adjustment

Tuning of the preamplifier is very simple. The circuits are first peaked for maximum gain, and the input circuit is adjusted for best signal-to-noise ratio. No attempt was made to adjust the tap positions, as the amplifier seemed to work up to the specifications for the transistors, just as assembled. The value of R_1 in the bias network of the first stage is the principal critical factor, and it will vary with different types of transistors. We used a 5000-ohm control at this point, with a 10-ma. meter connected in the negative lead to monitor the total current drain. With the 2857s the optimum value for R_1 was about 2800 ohms, and the current to the first stage was about 2 ma. Higher current drain causes noise to rise faster than signal level, and much lower current costs some gain. About 200 ohms either way is enough to make a noticeable difference in noise figure or gain. With the 2N3478 a lower value may be better.

The value of R_3 can be juggled to suit requirements. It is not often necessary to run this stage at maximum gain, since noise figure is controlled mainly by the first stage. With about 1000 ohms at R_3 we had plenty of gain, with complete stability. More gain is available, with higher resistor values (more current drain) but instability may develop with some transistors. If there is a justification for the higher-priced units, greater stability under high-gain conditions is probably it. There should be no problem in getting adequate gain with the 2N3478s, and holding gain down by means of R_3 need not "cost you" in noise figure.

Total drain at 9 volts is about 4 ma. Higher or lower voltages may be used if R_1 and R_3 are adjusted in the manner outlined above, using the lowest current drain that gives optimum noise figure (R_1) and gain (R_3).

432-Mc. Results

The preamplifier as presently used at W1HDQ has a gain of about 19 db., and it can have more, if it is needed. We do not like to quote noise figures, for most of us cannot measure them accurately, but we can measure *comparative* performance fairly well. This amplifier is definitely better than any vacuum-tube amplifier we've ever tried, by at least 2 db. in noise figure, a difference that is plainly audible in weak-signal reception, as well as with a signal generator. For reference purposes we have used the same crystal-mixer converter for some years, and a running record of front-end performance improvements has been kept. With the transistor amplifier, as with any of several good tube jobs, the noise figure is set by the amplifier, to the extent that the mixer can be detuned by several decibels before any change in signal-to-noise ratio is detectable.

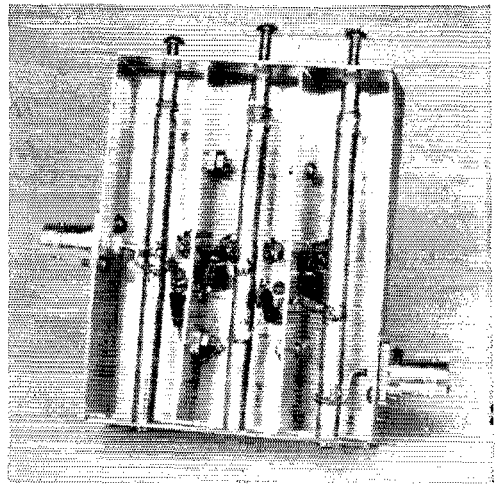


Fig. 2—Interior of the 432-Mc. amplifier, with the input circuit at the left. Partitions are held in place with spade lugs, and no heavy soldering is required.

One good on-the-air check has to do with detection of radar signals near 432 Mc. when the radar antenna is other than on-line to us. With the best tube amplifiers, the radar signal (from 65 miles away) is inaudible under dead-band

[2] Three methods for doing silver plating at home are described in Chapter 13 of *The Radio Amateur's V.H.F. Manual.*

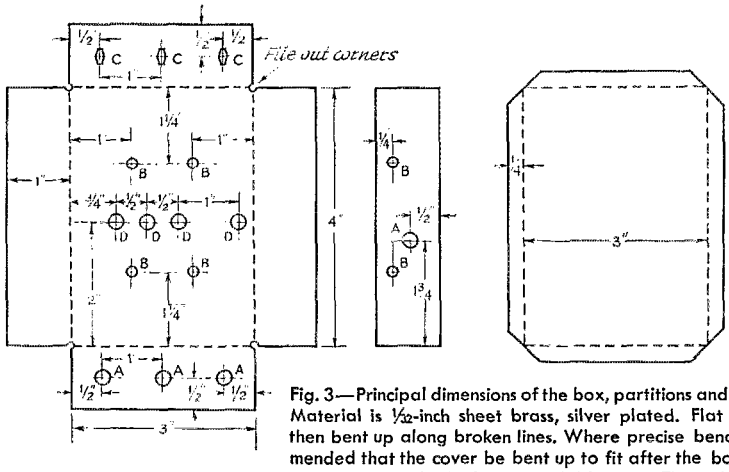


Fig. 3—Principal dimensions of the box, partitions and cover for the 432-Mc. amplifier. Material is 1/32-inch sheet brass, silver plated. Flat plates should be cut as shown then bent up along broken lines. Where precise bending cannot be done it is recommended that the cover be bent up to fit after the box is made. Hole sizes should be checked with available parts. Those shown are as follows: A—¼ inch, B—No. 28 drill, C—No. 28 drill, with 3/32 by 1/32 notches, D—3/16 inch. The three "A" holes in the bottom lip of the case should be a press fit for the tubing used for L_1, L_2 and L_3.

conditions, except when the main lobe swings around toward us, which it does every 11 seconds. With the transistor preamp, the radar buzz can be heard faintly, and seen on the panoramic scope, throughout the entire sweep. The improvement with the preamp is obvious on any signal that is close to the noise level. Readability of weak phone signals, particularly, is definitely better when the transistor job is used. Rejection of spurious signals is also improved, thanks to the preamp selectivity.

How about front-end burnout, the fear of many hams who have not tried transistors? A conventional coaxial relay may be all that is needed, depending on the transmitter power and relay leakage. This was checked carefully by looking for evidence of r.f. in the line to the converter input, and we strongly recommend that this be done by anyone about to install a transistor amplifier. With our normal 150 to 200 watts going into the antenna we see a rise of 0.2 ma. in total preamplifier drain, from r.f. coming down the receiver line. The amplifier was used for about a month this way, and a slight drop-off in performance was detectable. The need for better protection is indicated; perhaps another relay in series.

The circuits at 432 Mc. represent excellent shorts across the transistors for any lower-frequency r.f. power that is likely to come in on the 432-Mc. antenna, so burnout by r.f. pickup is probably least troublesome in amplifiers for this band. We would hesitate to take chances, however, and it is recommended that the antenna be

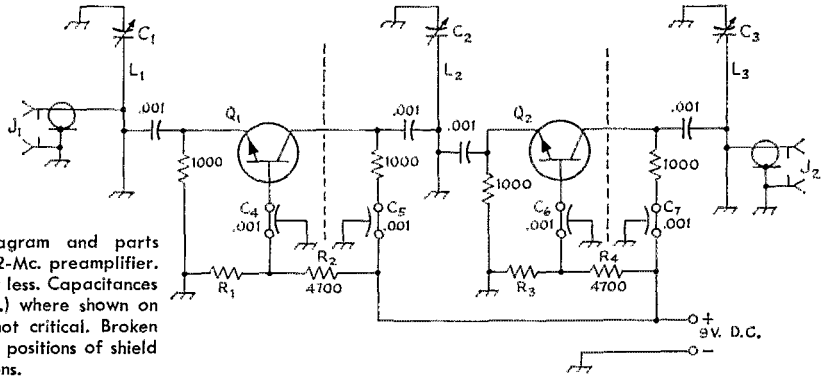


Fig. 4—Schematic diagram and parts information for the 432-Mc. preamplifier. Resistors are ½-watt or less. Capacitances are in microfarads (μf.) where shown on the diagram; values not critical. Broken lines show approximate positions of shield partitions.

C_1, C_2, C_3—1 to 7.5-pf. cylindrical trimmer (Centralab 829-7).

C_4, C_5, C_6, C_7—0.001-μf. feedthrough bypass; 500-pf. also usable (Centralab FT-500 or 1000).

J_1, J_2—Coaxial connector, BNC type.

L_1—¼-inch copper tubing 3½ inches long. Drill out end slightly to fit over capacitor body. Tap L_1 at 2 inches and 1¾ inches, L_2 at 1 inch and 2 inches, L_3 at 2 inches and ½ inch, all up from grounded end. See Fig. 2.

Q_1, Q_2—2N2857 or 2N3478. See text.

R_1—Adjust for maximum gain and best signal-to-noise ratio. Value in original was 2800 ohms with a 2N2857 for Q_1.

R_3—Adjust value for maximum gain, if necessary. 1000 ohms used with 2N2857 for Q_2, purposely lower than maximum-gain value. See text.

R_2, R_4—Labeled for text reference.

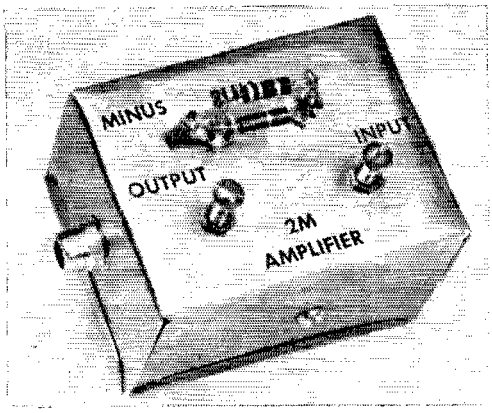


Fig. 5—Single-stage preamplifier for 144 Mc. Appearance of the 220-Mc. unit is identical. 50-Mc. amplifier is similar, but for slug-tuned coils. Base and collector voltage terminals are brought out on feedthrough capacitors.

disconnected from any transistor preamplifier *whenever it is not in use.* Make it a habit, right from the start.

Single-Stage Amplifiers for 50, 144 and 220 Mc.

Many v.h.f. receivers and converters are only slightly deficient as to noise figure and/or gain. Converters for 144 or 220 Mc. having front ends of the 6BQ7 variety, and many band-switching receivers that cover the 50-Mc. band, are examples. With these a single-stage transistor amplifier may improve the signal-to-noise ratio as much as it can be done with any relatively simple methods.

There is little point in straining for the last fraction of a decibel in noise figure at 144 Mc., and much less need for it at 50 Mc. External noise is the limiting factor in weak-signal reception on these bands, so often only a little more r.f. gain is needed to make a receiver seem to "come alive." The ultimate in weak-signal reception at 50 or 144 Mc., insofar as receiver front-end design is concerned, is well within the capabilities of even low-priced transistors of today.

Single-stage preamplifiers were built with several different transistors, and tested on all three v.h.f. bands. The 144-Mc. model is shown in Figs. 5 and 6. The 220-Mc. amplifier is identical, except for the coil sizes. The 50-Mc. one is similar, but has slug-tuned coils and fixed padder capacitors. See Fig. 8. Noise figures of all three are better than is possible with anything but the most expensive tubes, even with transistors currently selling at under one dollar.

The boxes were cut from flashing copper, as shown in Fig. 7. These are similar in size and shape to the smallest standard Minibox, which may be used equally well. The partition has a ¼-inch square notch in its bottom edge. The transistor is suspended in this notch, with its case lead soldered to the partition above the notch. The collector lead is in the output side of the box, and the base and emitter leads in the input side. The dimensions given are only approximate. If you are going to make your own box, drill the holes before bending. Hole locations in the partition can be marked with a sharp instrument, through the holes in the box sides, and then drilled to line up with the latter. Two self-tapping screws hold the partition in place, and no soldering of it or the box cover is necessary.

Adjustment and Results

As with the 432-Mc. amplifier, no adjustment of tap positions was made, as the amplifiers worked more than well enough as shown. The value of R_1 for optimum gain and noise figure can be found by experiment with a 5000-ohm control, replacing it with a fixed resistor near the value it shows when adjusted for best amplifier performance. Depending on the transistor used, and the frequency, optimum values will run between 500 and 1500 ohms. It has been found that 680 ohms is a usable value in all three amplifiers, when using the RCA 2N3478 and 40235 transistors.

Tuning is merely a matter of peaking the tuned circuits for maximum signal. If oscillation breaks out (a terrific roar is heard if the stage takes off) adjust the value of R_1. The lower the value the lower the current drain, and the lower the stage gain. If R_1 is made variable it will be found that as the resistance is increased above about 400 ohms the gain rises rapidly. Eventually the noise also rises abruptly, and then comes the oscillation, but before the stage actually takes off the signal-to-noise ratio will be adversely affected. The best setting is quite easily determined by ear; or by watching the S meter on a weak signal.

Various voltages can be used, if the bias is adjusted for optimum performance. Currents measured at various voltages, with optimum values of R_1, were as follows: 9 volts — 1.8 ma., 10.5 volts — 2 ma., 12 volts — 2.4 ma. The 50-Mc. amplifier worked creditably with voltages as low as 4½ (0.8 ma. current drain), though there is some drop-off in gain and probably

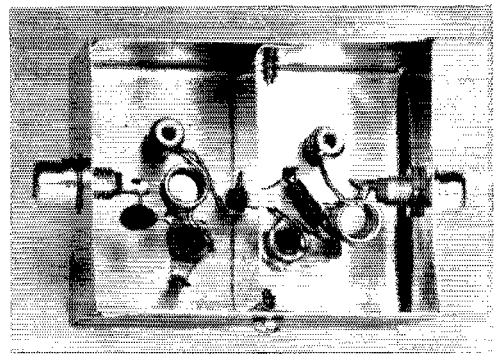


Fig. 6—Interior of the 144-Mc. amplifier, with input side at the right. 220-Mc. amplifier appearance is similar but for smaller coils. 50-Mc. amplifier has slug-tuned coils with fixed capacitors in parallel, and inductive coupling loops for input and output circuits.

greater susceptibility to overloading at this low current drain.

Almost any v.h.f. transistor will give a noise figure around 3 db. at 50 Mc., which is far better than you can use at this frequency. Gain is 12 db. or more, enough to make quite a difference in the *apparent* performance of a good many 50-Mc. receivers, particularly the bandswitching types designed mainly for use on lower bands. It should be made clear that this may be the result of the extra gain giving the receiver's a.g.c. system something to get its teeth into, and the main dividend may then be little more than S-meter readings which are more like those the receiver shows on lower bands. These receivers are usually low on front-end gain at 50 Mc., so their meters do not read realistically on 50-Mc. signals ordinarily.

This may be enough to satisfy users who tend to be entranced by a lively S meter. Actually, on c.w. signals that are all but buried in the noise there may be little or no improvement in actual readability, since the noise coming in on the antenna may already be the limiting factor in reception, and it is amplified along with the signals by the preamp. On phone signals that are marginally readable, the preamp may help some, depending on how bad the receiver is without it. One thing is sure: if you can hear an appreciable noise increase as you put the antenna on your "barefoot" receiver, all the preamp will do is make the meter readings higher.

The picture is better at 144 Mc., especially if you have a converter with a 6BQ7 front end, or something less effective. We checked the 2-meter preamp with an old Communicator, which, though battered from more than 100,000 miles in several different cars, is still not bad on receiving. We realized an improvement in front-end noise figure of about 4 db., and the extra gain made the meter considerably more responsive on weak signals. There is a perceptible improvement in readability of marginal voice signals in quiet locations. Noise figure is about the same as with a good Nuvistor stage. If you already have a Nuvistor converter, or a 417A job, don't expect a transistor to do anything for you on 144 Mc.

At 220 Mc. the transistor still works just about as well as at 144, whereas most tube amplifiers drop off rather fast above the 2-meter band. One of these transistor preamps will really hop up a 220-Mc. converter with a dual-triode front end, and ours even made a perceptible improvement when used ahead of a *good* 417A at 220.

Just a word of warning: if you check a transistor preamp with something like a Communicator, don't connect it in the main line to the antenna. You might hit the send/receive switch inadvertently. This will take out a transistor instantly, as will any r.f. surge down the preamplifier input line. Don't leave the preamp connected to your 2-meter antenna when you transmit on some other band, or the next time you listen on 2 the band may sound awfully dead! Surges from even fairly distant lightning discharges may ruin transistors, too.

What Transistor?

The rush to small portables in f.m. and TV manufacturing has spawned whole families of new transistors that work well up to at least 220 Mc., and some that outperform tubes all the way up through the u.h.f. TV range. They're cheap and they require less in the way of accessories than tubes. We make no pretense of being able to recommend one over another. We've tried only silicon n.p.n. types from one maker. This leaves several similar types of other brands that may do just as well, and several germanium transistors, usually of the p.n.p. type. Going through silicons was time-consuming, so we stopped when we found good ones at under a dollar.

The 2N2857 works beautifully in every v.h.f. and u.h.f. circuit in which we've tried it, but not many hams are likely to pay $24.75 each for transistors. The 2N3478 is almost equally good, up through at least the 420-band, and it is currently available at $1.90 net. The 40235 (98 cents) looks like a sure winner at 50 and 144 Mc., and it is probably at least as good as any but the most expensive tubes at 220 Mc. For this band and for 432, however, the extra dollar for the 2N3478 is probably a good investment. The 40235 is a new one, and you may not find it in the catalogues or on radio-store counters,

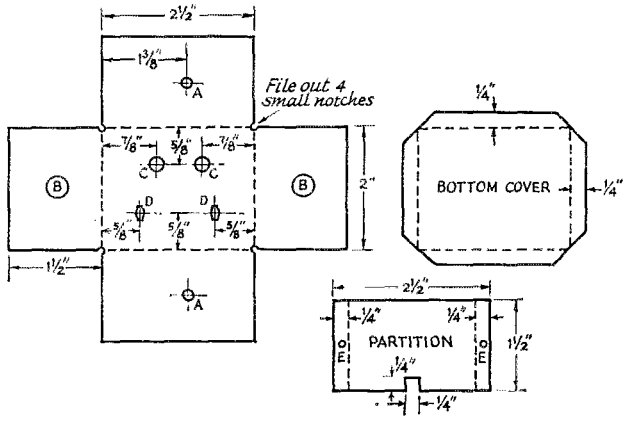


Fig. 7—Box, cover plate and partition details of the single-stage amplifiers. Material is flashing copper. Bend up along broken lines, adjusting size of partition and cover to fit box after it is assembled. Hole sizes are as follows: A—No. 28 drill, B—¼ inch, C—3/16 inch, D—No. 28 drill with 1/32 by 3/32 inch notches, E—No. 42 drill.

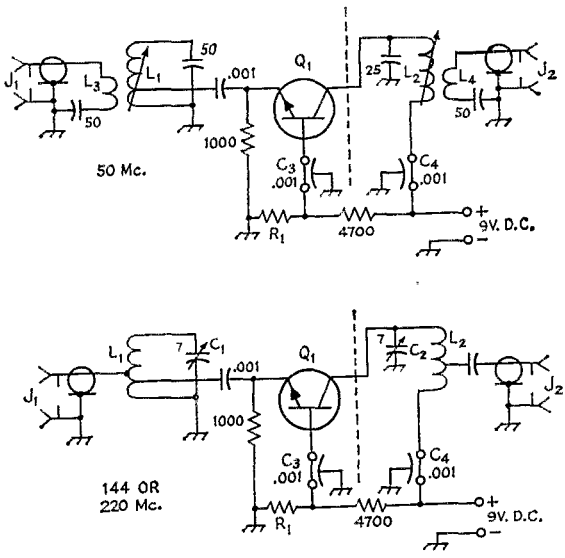


Fig. 8—Circuit diagrams and parts information for single-stage preamplifiers for 50, 144 and 220 Mc. Inductively-coupled input and output circuits, with slug-tuned coils and fixed padder capacitors, are the main differences in the 50-Mc. unit (upper diagram). Circuits for 144 and 220 Mc. are identical.

C_1, C_2—1 to 7.5-pf. ceramic trimmer (Centralab 829-7).

C_3, C_4—0.001-μf. feedthrough capacitor. 500-pf. also usable (Centralab FT-1000 or FT-500).

J_1, J_2—Coaxial fitting or phono jack.

L_1—50 Mc.: 6 turns No. 22, ⅜-inch long on ¼-inch iron-slug form (Miller 4500). Tap at 1 turn from ground end.

144 Mc.: 5 turns No. 18, ¼-inch diam., spaced wire diam. Tap at 1 turn for emitter, 1¾ turns for antenna.

220 Mc.: 3½ turns No. 18, ¼-inch diam. spaced 2 wire diam. Tap emitter at 1 turn, antenna at 1¼ turns.

L_2—50 Mc.: 9 turns like L_1, no tap.

144 Mc.: 6 turns like L_1, tapped at 2 turns.

220 Mc.: Same as L_1, but tapped at 1 turn.

L_3, L_4—2 turns insulated hookup wire around cold ends of L_1 and L_2 respectively.

R_1—Adjust value for best signal-to-noise ratio and gain for transistor and battery voltage used. 680 ohms average for 9 volts and silicon transistors.

Q_1—2N3478 or 40235. Former gives slightly better performance at 144 and 220 Mc. Many other types usable.

but it is in production and distributors should have it soon. We found 2N3478s at a local distributor's, but not 40235s, though they are of the same make. We'll skip germanium types, though there are many that do well at 50 Mc., and a fair number that work at higher frequencies. Mostly they are p.n.p. types, which means that polarity must be reversed from that shown in our drawings, when they are tried. RCA's SK series has some useful v.h.f. units, and they are for sale almost everywhere.

About Overloading

This is the catch with transistors. The v.h.f. spectrum is full of signals these days, and you're almost certain to hear more of the ones you don't want with transistors than with tubes. Keeping down spurious responses in a transistor front end calls for some special circuit considerations. You don't just take a circuit that worked well with tubes and put transistors in place of them.

The writer's simple 50-Mc. transistor transceiver[3] heard everything in the spectrum until a selective antenna coupler was incorporated in the setup as used for mountain portable work. The 2-meter preamplifier of Fig. 5 had several nasty spots of combined TV and f.m. hash spread through the band, when first tried at W1HDQ, where the tower lights of various high-powered v.h.f. services twinkle on an adjacent ridge just west of Hartford. The sound channel of a local TV station mixes with f.m. stations in the transistor stage, which passes the sum frequencies on to the following receiver. There is little entertainment value in such combinations! You may not have this particular problem, but the chances are pretty good that you'll find it or something similar when you first try transistors.

Somewhat more spurious-signal trouble is almost inevitable with transistors, but it can be minimized with proper circuit design. Selectivity in the input circuit is of prime importance. The high-Q lines take care of this nicely in the 432-Mc. amplifier. In the 50-Mc. unit, Fig. 8, it will be seen that a much smaller coil is used for L_1 with a higher value of tuning capacitance than is customary for tube circuits. In the grounded-base circuit shown, the input impedance is very low, which means that the emitter must be tapped down close to the grounded end, or the selectivity of the input circuit will be destroyed. Also, you don't tap the 50-ohm line input as high on the circuit as would be done with tubes, if a tap is used as in the 144- and 220-Mc. amplifiers. The 50-Mc. input circuit has almost the physical appearance of a 2-meter circuit for a tube job, and L_1 in the 2-meter amplifier looks rather small to the worker who is still thinking of vacuum-tube circuits.

Various external selectivity-inducing devices can be used, but it doesn't make much esthetic sense to build a tiny transistor preamplifier or converter, and then hook it up to a coaxial tank of the size needed to give good selectivity at the signal frequency. However, you don't get something for nothing, and attention to front-end selectivity is one of the prices you pay for the exceptional weak-signal performance that transistor amplifiers are capable of providing.

Matched antennas help, too. Long-wire antennas, and various makeshift devices that may work well enough in a pinch with vacuum-tube converters, are out for transistors. Make sure that the antenna looks like something close to 50 ohms when you hook it up to a transistor rig designed for 50-ohm input — but that's another story. QST

[3] Tilton, "Featherweight Portable Station for 50 Mc.," November, 1964, *QST*, and Chapter 7 of *The Radio Amateur's V.H.F. Manual*.

AMATEUR RADIO PUBLIC SERVICE CORPS

CONDUCTED BY GEORGE HART,* W1NJM

"No Formal Procedure Was Used. . . ."

Buried in our account of the Hurricane Betsy emergency, no doubt unnoticed by most of you, was the sentence: "No formal message procedures were used." This applied only to one particular operation, of course, and was by no means the general pattern during the emergency. But the fact that no "formal procedure" was used in some cases was noticed by more than one critic during the operation.

In the stress of an emergency, there are good reasons why a great many formal procedures are omitted and the operation has a tendency to become "hairy." For example, you're operating your mobile, completely equipped with "Emergency Radio Unit" and "RACES" signs when someone pokes a tired, perspiring face in the window.

"You got c.d. headquarters on the line?" he asks, abruptly. You haven't, but a quick call brings back the c.d. control station.

Your friend then grabs the mike and rasps into it: "This is O'Flaherty! We need medical help down here. Tell Col. Adams we're in trouble. Doctors, nurses, equipment, everything you can send. Got that?"

A hesitant voice at the other end asserts that the "message" was received, whereupon O'Flaherty shoves the mike back into your hands and bustles away before you have time to say boo.

This was a message? It sure was. Was it traffic? A good question. It certainly wasn't "formal" traffic. What should the operator have done? Conditions in such circumstances are often on the frantic side. Maybe after O'Flaherty hurried away a Red Cross official poked his head in the other side and wanted to talk with Red Cross headquarters, and the operator was so harrassed and confused that he forgot that O'Flaherty existed and plunged forthwith into this new problem.

Most mobiles keep an incomplete log under such conditions, and some don't keep any log at all. They are so busy just communicating that they don't have time for it, much less for writing "formal" messages. Not only that, they get mighty exasperated with administrators who sit behind their desks, calm and peaceful, and write rules stating that all messages must be in writing, in standard form, and authenticated with the full name and title of the originator. Baloney, they say, in the stress of an emergency this often just isn't possible, much less sensible.

And who can say unequivocally that they are wrong?

As in most controversial issues, however, there are two sides to this one too. Under certain conditions formal procedures and written records might indeed be impractical — for the field or mobile station. When one frantic field station is in contact with another frantic field station, we can even visualize a situation in which *no* record of the communication might exist. But this is an unusual circumstance. Usually there is a net control station with more than one operator available — or if only one operator, at least he is warm, comparatively rested and sitting at an operating position with a pencil and paper, or typewriter, maybe even a tape recorder on hand. The burden of recordkeeping falls largely on this station and its staff.

One of the worst criticisms we amateurs have received from non-amateur officials we have served has been that we have a tendency to be too "hammy," too casual, too informal, and that because of this we not only waste a lot of valuable on-the-air time but fail to keep proper records of our communications that can be referred to later in case of need. We are too prone to stating our opinions, passing along information from uncertain personal knowledge that has nothing to do with communications problems.

K3FYS, Phila. Co., Pa., EC and her OM spent a week in Florida recently. One of the stops was at W4IYT, and this photo was taken of Andy (W4IYT, E. Fla. SEC) at the key, K3FYS with mike in hand, K4YSN behind her and Mollie's OM.

* National Emergency Coordinator.

"How is it up there?" asks one ham operator of another during a temporary lull on an emergency circuit.

"Oh, it's bad, bad," says the other. "The water is about forty feet above normal and there must be a couple hundred people drowned."

Nothing official about this, it's just one operator talking to another; but a reporter is listening on a borrowed receiver and his dispatch conveys this information to the public, attributes it to "an unidentified ham operator." Official eyebrows are first raised, then furrowed. It turns out that the water was only fifteen feet above normal and only ten people were drowned. Ham radio gets a bad name, an investigation is launched, maybe the reporter gets canned (then again maybe he gets a raise), a retraction is printed, but retractions aren't news and don't receive the prominence of the sensational statements they are retracting, and the damage is done, by innocent amateurs interested only in serving the public. The above is fiction, but it *has* happened.

Was this "traffic"? Of course not, it was just rag chewing. Something wrong with rag chewing? No, not under ordinary circumstances, but on an emergency communications circuit, particularly on voice, we have to be careful what we say, because no telling who is going to be listening and repeating (quote or misquote) it.

For this and other reasons, we hate to see emergency communication conducted without formal procedures. We hate to hear a message passed in the form of "tell Col. Smith that Podunk needs fresh drinking water." Who wants it? Who is asking for it? When was it asked for? Where or to whom should it be delivered? Who (what station) originated the message? Where was that station located? These are all questions that may come up, questions that *we* should be able to answer because, while we do *not* (and should not) supply the content of messages, we do supply the handling of them and *this* is our responsibility.

In "command" communications, the log of the station(s) over which it was conducted should indicate who was communicating with whom about what. It is a legal requirement that their names appear in the log. A tape recording with recorded-on dates and times is very helpful in this respect and is very convenient — but it still does not relieve us of the responsibility of insisting on knowing who is talking to whom and the official capacity of each. Messages by hearsay should definitely *not* be transmitted, such as: "Col. Smith wants to get word through to headquarters that. . . ." Let Col. Smith send the messenger with a *written* and *signed* message. It takes but a few seconds to give it a number, check it, jot down the time and date and to what station it was transmitted.

Sometimes this is not practical. *Usually*, it can be done. Let's not allow the exceptional to become an excuse for laxity in our public service communications. — *W1NJM*.

NORTHEAST BLACKOUT

When the lights went out in most of New England and New York on Nov. 9, no widespread communications emergency occurred. The telephone systems, for the most part, remained operative either on battery power or emergency generators or both. Other public and private communications systems for the most part continued to operate, or were returned to operation long before power was restored. So this is not a report of amateur radio participation in a communications emergency.

Nevertheless, the extent to which amateurs mobilized and stood by during the tense hours of darkness was in itself impressive and attracted much public notice. Amateurs were everywhere — in their homes with emergency power, in their radio-equipped automobiles, at civil defense and Red Cross installations. In a way, it is a pity that they were not utilized — but a blessing that they were not needed. We are now told officially that the possibility of a repetition of such a blackout is "remote.' Before the blackout, it was officially considered to be impossible. We see this as no signal to relax.

The hardest-hit population concentration of all was the New York City Metropolitan Area. Power failed there, as over the entire affected areas of New England and New York, at 1720 EST Nov. 9 and was off for approximately twelve hours — right in the middle of the commuter rush of millions of people hurrying home from work. No need to imagine the confusion and potential for panic — it has all been said in newspapers, magazines, and on radio and TV.

New York boasts one of the best AREC organizations around, and a pretty good RACES set up too. Both were in action during the blackout, working together and separately as the situation dictated.

In Manhattan proper, WA2VKK, EC and assistant RO for N.Y. County, arrived at c.d. headquarters at 1740 EST, to be followed very shortly by four others. Power was supplied by one of the city's communications vans and all operation was non-amateur. However, at the Manhattan Boro Control Center Assistant EC WB2HMS and two other operators established nets on 2 and 10 meters. SEC K2OVN and K2PSQ from Brooklyn, unable to get home, also checked in at Manhattan control. The RACES city-wide net on 2 meters went on the air at 1930 and all counties except Richmond (Staten Island) reported in. The AREC/RACES 10-Meter Net was also activated by WB2AWX. This net handled about 60 messages until 2330, when it closed down. One mobile operated from Consolidated Edison Energy Control Center until forced out of operation by engine trouble. WA2VKK advises that 20 amateurs, both AREC and RACES, operated in Manhattan.

Meanwhile, over in Brooklyn, the Kings County AREC was activated by EC WA2UCP at 1738. Nets operated on 2, 6 and 10 meters under their respective ECs. Some of the stations were on emergency power, some mobile, others were on hospital circuits and had full power. Also active was the Brooklyn RACES Boro Control and a Hospital Amateur Radio Network. Many stations in New Jersey were also in the nets, standing by to help. WA2UCP maintained liaison with the state emergency net on 75 meters.

A number of incidents occurred. WA2OCK reported from the Flatbush General Hospital that their blood bank was melting, and dry ice was dispatched. One c.d. director was caught in a traffic jam and a chain reaction was set off through W2NEM-100 to WA2OCK to WB2FXN to W2NEM-200 to W2NEM-300 to W2NEM-400 who furnished emergency transportation for the c.d. director. AREC/RACES mobiles were sent with flashlights to assist stranded persons. One mobile reported a large area without water; this was relayed to W2NEM-200 who reported it to public works.

The state c.d. director was available through W2SZ in Troy, on the 75-meter net, and was kept informed of conditions and of the existence of the emergency communications channel availability. AREC mobiles picked up stranded persons and took them home, distributed candles, quieted down any hysteria bordering on panic by their presence and calm efficiency, the ultimate pay-off for regular drills and organization. Almost nobody went off the air, they all operated right through the black night until power was restored to most areas at 0320, to others as late as 0620, and to the subways by 0830. WA2UCP says there were *no* TVI complaints!

WA2TAQ, Queens County EC, starts his report with: "As

in any unannounced emergency the AREC was automatically activated." AREC and RACES operate together in Queens, and within fifteen minutes after power failed, RACES Borough Control was on the air. Within minutes after that, three nets were operating, one each on two, six and ten meters. Stations were activated at Queens General Hospital, at the Peninsula General Hospital, at Queens Chapter of the Red Cross and at the Queens Blood Bank in Jamaica. Mobiles proceeded in an orderly and methodical fashion to important intersections and to the assistance of any city agencies where needed. A total of 60 AREC/RACES operators were in action.

Many minor incidents were reported by patrolling mobiles. K2OGT turned in a fire alarm. K2LDC assisted at the scene of an auto crash. Four members answered an emergency call to Red Cross headquarters to get the generator back in operation when it failed.

As power was restored little by little after midnight, stations were gradually secured and the tense phase of the operation came to an end. Several volunteers were *former* AREC/RACES members. An outstanding job by the Queens AREC group any way you look at it.

Bronx EC WA2QAO (who also covers Yonkers) advises that the Hudson AREC manned the c.d. control center and mobiles were dispatched to aid in auto traffic control. Local police complimented the amateurs on the turnout and obvious readiness of the units; over 20 operators were on standby.

Staten Island was not affected by the blackout, but units there were in operation under RO W2VKF, standing by if needed.

Nassau County, out on Long Island east of the city and very much a part of the Metropolitan Area, was superactive during the blackout. County EC and RO W2FI says AREC nets were in operation by 1800 EST and remained so until after midnight when power started coming back on. Assistance was given to c.d. services and situation reports were submitted to the Red Cross. W2FI expresses pleasurable surprise at the number of amateurs who turned out, considering that regular electric power was off. A total of 139 amateurs reported, with 45 mobile stations and 47 fixed stations in operation on four bands. Both AREC and RACES frequencies, equipment, personnel and facilities were used. The Nassau County *News Day* gave the hams a fine writeup.

A separate detailed report from W2ZAI, Nassau County 10-meter EC, gives some details of the operation and lists 42 amateurs who took part. The amateur circuits were actually used on an emergency basis because all telephone lines were overloaded and the various services could not call each other. "The power blackout," says W2ZAI, "was a wonderful experience, something completely new and something we had never thought could happen."

In upstate New York areas there was also extensive power failure, but not quite so widespread as in the New York City area. We have reports involving Westchester, Schenectady, Ulster, Orange, Dutchess, Livingston, Erie, and Niagara Counties. Generally speaking, amateurs were active all over the state in both AREC and RACES groups (although the latter was never officially activated).

In Dutchess County, SEC W2KGC reports activity by several 75-meter stations and a 2-meter net covering a three-county area including Orange and Ulster.

In Westchester County the AREC group was activated and seven mobiles reported to c.d. headquarters for possible emergency assistance should the need arise. AREC groups were also activated and standing by at Yonkers and Schenectady, ready for action.

The New York State Net of the National Traffic System was in continuous session from 1900 EST, its normal starting time, until the Eastern Area Net was called to order at 2030. Net control for EAN this particular night was our Western N.Y. SEC, W2ZRC. He says he noticed nothing unusual about traffic being reported into the net, that everything ran about as usual with all regions represented. W2ZRC also relates that the state was covered from Buffalo to Schenectady by an AREC network using wide band f.m. tied together by repeaters at Buffalo and Utica. The Buffalo repeater was operated on commercial power, but the Utica repeater was on batteries and enabled contact to be made through to Schenectady (and from there by local contact to Albany if needed). Many amateurs throughout upper New York State were standing by on 2-meter wide-band f.m. (146.94 Mc.), but no communications failure materialized so no real traffic developed. Liaison was in effect throughout the blackout with the New York State Net, a unit of the National Traffic System.

New England

Newly-appointed Conn. SEC W1PRT said the blackout occasioned a very successful "drill" in his own town of Bloomfield, during which the regular control center went out but the alternate control at a local life insurance company automatically and successfully assumed control. Other units in Connecticut were activated at Windsor Locks, West Hartford, Milford, Simsbury and Waterbury.

In Mass., SCM W1BVR advises that Pittsfield, Springfield, and Gardner were active in his section, all working with civil defense under their respective ECs. From Fort Devens we have a report from K1QHP that the amateur station there, K1KBO, was active on 75,6 and 2 meters. Power was lost momentarily but was restored before an emergency power generator could be put into operation.

Eastern Mass. SEC W1AOG tells us that the AREC groups were active in Needham, Townsend, Melrose, and Medford. We also have a report from Malden to the effect that the Malden c.d.-net control station (W1TYM) was in operation beginning at 1820 and continuing until 2130 when power was restored, operating on ten and six meters. Six operators were on hand at the headquarters station and three mobiles went out on patrol. K1AQI, EC and RO for Burlington, Mass., reports that his group was on the air within ten minutes after the blackout started, with eleven mobile units controlled by a base station at police headquarters on six meters. Problems encountered included a house fire, burglar alarms going off, unlocked doors and windows, routine inspection of commercial, industrial and public buildings. Power was restored at 0100.

The last (but not least) report comes from W1NF in Beverly, who says he stood a couple hours watch at the Beverly c.d. station; he says telephones in Beverly were out also because the emergency supply was inadequate to handle the sudden demand.

Reports have also been received from AREC officials and other amateurs in New Jersey, Pennsylvania and Delaware indicating that although these states were not generally affected by the power blackout, their amateurs were for the most part standing by ready to assist stricken areas should the need arise. In this connection, there was some opinion expressed that there could have been a little more standing by and a little less offering to assist in some cases.

In summary, it can be said unequivocally that amateurs were ready and demonstrated in no uncertain terms to all who were in a position to take notice that in the event any serious communications disruptions had occurred (which they very easily might have), there would have been adequate backup in the amateur service to fulfill emergency needs.

> *. . . From reports reaching me, I understand that the performance of the radio amateurs on Cape Cod and the Islands during the recent blackout indicate you men lived up to the finest in the tradition of the radio amateurs . . .*
>
> —JOHN A. VOLPE
> *Governor, Commonwealth of Massachusetts*

In concluding this account, let us quote from an editorial which appeared in the Cape Code *Standard Times* and many newspapers throughout the U.S. following the blackout: "Perhaps the greatest contribution the 'hams' made to the public composure during the blackout was the reassurance of knowing they were in action as they are in every real emergency, and the fact that they kept reliable information flowing. The amateur radio operators deserve an accolade for a job well done."

National Traffic System

The system has now achieved sufficient maturity so that we old timers can start referring to "the old days." In the old days of NTS, we used to worry very little about who or what represented a Section in a Region or a Region in an Area, as long as somehow the traffic got cleared. If someone took it and put it into the next higher echelon, all well and good — that particular Section or Region was represented.

We think it was WØKQD (whatever happened to her,

Dave Knight, W4ZJY, is the TCC Director for the Central Area. He is one of the few managers we have had who resigned his post and then took it again after a lapse of a year. Dave holds a few TCC skeds of his own as well as being a regular CAN NCS.

anyway?) who asked us some embarrassing questions about representation, some time ago — embarrassing, that is, because we didn't have a ready answer, we had to formulate one. The question was, exactly what constitutes 'representation"? If someone brings traffic from a lower net but won't take any, is that lower echelon represented? Or suppose it's the other way around, someone is there to take the traffic, but nobody comes up from the lower echelon? Representation?

As we recall, we decided that in each case this was only half-representation, and that the lower echelon thus received only a half-credit for that particular session. This seemed logical, if complicating, at the time.

Supposing a representative arrives, but so late that he doesn't get all the traffic cleared? Supposing he proves to be an uncompetent operator and the NCS gives him a quick QNX because he is bollixing up the net? Suppose this, suppose that . . . Our footwork has never been fancy enough to answer all such questions, even to ourselves. Life was so much simpler when a station from the lower echelon constituted a representative, *period*.

As we write this, two of our upper-echelon net managers are in debate on the question of representation, which is what brought the matter up in the first place. K1WJD has set down some rules for representation in EAN, effective November 1. At least one of the Region net managers thinks they are inimical to the system. It's an interesting exchange between two highly capable and experienced NTSers, and we're following it with interest. We don't really expect either one to convince the other of anything, but we are enjoying a little brainpicking. We think Bud's ideas are worthy of a little airing herewith; see what kind of a reaction they have on you.

1. *If no official representative* from a Region net is present, the Region net gets no credit for a representative, even if someone takes the traffic.

2. If a TX (transmit only) representative shows up but no RX (receive only) representative shows, the Region gets no credit although the TX station does get credit for QNI as a representative.

3. If a single station is sent up from the Region for both transmitting *and* receiving and is carrying more than 12 messages to transmit, the Region will not be credited with representation.

4. If there is no official representative from the Region but one of the members QNIs to 'help," that station will get credit but the Region will not.

5. Any representative reporting in more than 15 minutes late will not receive any credit, either for himself or his Region.

6. NCS is under no obligation to clear traffic reported into the net more than a half hour late, and in any case will clear first all traffic reported in before that time.

The above rules, made by the Area net manager strictly in accordance with his prerogative to set procedural rules at that level provided they do not contravene CD-24, can be applied at Region as well as Area level, and some of them could even be applied at Section level where Section net participants consist wholly or partially of Local net representatives. We are not at this time specifically recommending them, but if your net seems to need a little tightening up and you feel that your net members would stand still for them, they are worth considering. Organizational "tightness" is a characteristic of NTS, and most of us are a little proud of this.

One other aspect of representation, mentioned in CD-24, perhaps bears repetition. While representation from lower to higher NTS echelons is primarily a responsibility of the lower-echelon net manager, such representation need not *necessarily* be performed by stations from that lower echelon if such stations are for one reason or another not available. In exceptional circumstances, representation could be provided by a station not in the geographical coverage of the lower echelon at all, provided there is general agreement among all concerned.

For example: The Winnemac Section has no station available to report into the Tenth Region Net on a particular night. The Centralia Section finds it has several stations available over its regular representatives to TEN. By agreement between the Winnemac Section Net manager and the Centralia Section Net manager, one or more of the "surplus" Centralia stations may represent Winnemac in the Region net by (1) reporting into the Winnemac Section Net as TEN station, (2) reporting into TEN as Winnemac representative, (3) clearing all traffic for Winnemac on TEN and (4) reporting back into the Winnemac Section Net to distribute this traffic — just as though this station itself were a part of the Winnemac NTS organization. In order to take advantage of this provision, the station must handle this function *only*, for that particular evening — that is, the station may not serve as a *dual* representative for both Winnemac and Centralia, unless they are represented by a single Section-level net.

Confused? See page 8 of CD-24, under "Special Liaison Method." — *W1NJM*.

November reports:

Net	*Sessions*	*Traffic*	*Rate*	*Average*	*Representation (%)*
EAN	30	1555	.996	51.8	90.0
CAN	30	1162	.792	38.7	100
PAN	30	1834	1.315	61.1	100
1RN	53	562	.398	10.6	89.6
2RN	58	613	.711	9.8	96.9
3RN	60	482	.317	8.0	96.7
4RN	54	587	.393	10.9	96.6
RN5	62	969	.393	16.1	91.8
RN6	60	1113	.706	18.6	98.9
RN7	30	635	.546	21.2	76.7[1]
8RN	57	426	.296	7.5	79.9
9RN	30	554	.744	18.5	94.2[1]
TEN	60	584	.410	9.7	81.2
ECN	28	141	.250	5.0	90.4[1]
TWN	29	457	.497	15.8	77.2[1]
Sections[2]	2159	13,505		6.3	
TCC Eastern	120[3]	735			
TCC Central	90[3]	774			
TCC Pacific	120[3]	1187			
Totals	2830	27,875	EAN	9.0	CAN/PAN
Records	2100	24,014	.934	12.6	100

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

[2] Section and Local nets reporting (79): CHNN (Colo.); OSSBN, OSN (Ohio); EPA, WPA, PTTN (Pa.); RIN, RISPN (R. I.); GN, WFPN, QFN, FMTN, TPTN (Fla.); PTN, SGN (Maine); VSBNL, VN, VSN, VSBN, VSSBN (Va.); NCN, SCN (Calif.); MDD, MDDS (Md.-D.C.-Del.); MOTTN, MOSSBN, MON (Mo.); ILN (Ill.); GMN (Vt.); SCSSBN (S. C.); MSPNE, MSN, MJN (Minn.); NJPTN, NJN (N. J.); AENB, AENH, AENM, AENP, AENR, AENT (Ala.); QIN (Ind.); WVAFN (W. Va.); OZK (Ark.); TPN, TN, TSSBN, ETPN (Tenn.); VTNH (Vt.-N. H.); NLI, NYCLIPN, NLS, NYCLIVHF (N. Y. C.-L. I.); NTTN (Texas); LAN (La.); Wolverine (Mich.); NMRRN (N. Mex.); MTN (Man.); NCN, NCNL, NCSSBN, THEN (N. C.); BUN (Utah); CN, CPN (Conn); IMO (Ind.-Mich.-Ohio); CSN (Ariz.); OQN (Ont.-Que.); OFN (Ont.); Iowa 75 (Iowa); KTN, Louisville AREC (Ky.); WSBN, BN (Wis.); OLZ, SSZ (Okla.); GTN (Ga.); EMNN, WIIN (Mass.).

[3] TCC functions not counted as net sessions.

We have another set of new records for Nov. The large increase in Section/Local net reports is helping break the sessions and traffic records, but the average is still low. The solution is to originate more traffic at the basic levels of NTS and put it into the system rather than short-circuit the system for the sake of a faster delivery.

This is the first month that K1WJD is using his new system for representation (see preceding NTS lead) and hopes that this will be the lowest point that representation hits on EAN. CAN seems to have no trouble at all with representation as they continue their 100% per month. There has been a little shuffling of NCS spots on CAN, but W9DYG sez everything else is running smoothly. WB6JUH reports good condx, perfect representation and plenty of traffic made for a good month on PAN. WA2GQZ is hoping to correct some minor difficulties that have arisen on 2RN. K3MVO reports that the long skip took its toll on 3RN, but everyone is in there plugging as hard as they can. K5IBZ kudos Okla., Tenn. and Texas for the nice showing on RN5. As of Nov. 30, RN6 moved to 3655 kc, KL7CGE and K7JHA are maintaining skeds on 40 each day to handle Alaska traffic to and from RN7. W9QLW kudos Ill. and Ind. for 100% representation and wishes other sections would follow their example. WØLGG reports that TEN is just about holding its own with skip problems and a decrease in traffic. The one bright spot is increased representation. WAØJII received a TEN certificate. VE3BZB is going to try running ECN to two sessions per day, at least during Dec., to help with the holiday traffic.

Transcontinental Corps: The hottest news this month is the trials that K6DYX and WA2BLV have been making at establishing a regular Station D/J sked on RTTY. If tests prove to be successful, this will probably become a regular operation. W4ZJY has issued a TCC certificate to W4OGG. Present plans include setting up additional TCC skeds for the Christmas overload. W7DZX is also in the process of setting up additional skeds. Jack is encouraged by the favorable response his recent bulletin brought and is hoping to write another one when the first-of-the-year rush is over.

November report:

Area	*Functions*	*% Successful*	*Traffic*	*Out-of-Net Traffic*
Eastern	120	86.7	1954	735
Central	90	85.6	1633	774
Pacific	120	90.0	2374	1187
Summary	330	87.6	5961	2696

TCC roster: Eastern Area (W3EML, Dir.) — *W1s* BGD CRX EFW EMG NJM, W2SEI, *WA2s* BLV RUE, *WB2s* AEJ HWB, *K2s* SIL/8 UAT, *W3s* EML NEM, *K3s* FHR MVO, *W4s* DVT LND, K4VDL, *W8s* CHT RYP, *K8s* KMQ NJW QKY, *W0s* OHJ HZD. Central Area (W4ZJY, Dir.) — *W4s* OGG ZTY, WA4AVM, W5PPE, WA5CBL, *W9s* CXY DYG JOZ QLW VAY ZYK, WA9BWY, WØIXB/4, *K0s* AEM GSY.

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Net reports:

Net	*Sessions*	*Check-ins*	*Traffic*
North American SSB	26	861	1202
HBN	30	536	1182
7290	42	1382	838
75 Meter Interstate	30	1171	560

Diary of the AREC

The Northern Alberta Radio Club received an urgent call for assistance on July 9 from the Alberta Government Forestry Service, requesting amateur equipment and operators to provide communication in connection with a forest fire raging out of control near Wood Buffalo Park in the northern part of the province. Suitable equipment was rounded up and along with *VE6s* ALJ AKT AIQ AJY MC ZF, was flown to the park. One group had to be taken in by helicopter. Emergency generators supplied power and tents were used to sleep in and also as temporary operating positions. The two groups were separated by miles of blazing forest, but thanks to the communications links, the two fire fighting teams were able to stay in contact with each other at all times. After six days of hard work, the fire was finally brought under control. — *VE6XO, EC Edmonton, Alta.*

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When news of an accident on Sept. 13, involving a school bus in Arlington Heights, Ill., was broadcast by a local radio station, phone lines to the two local hospitals where the victims were taken were jammed with calls from worried parents. K9RNQ activated the AREC net and directed two mobile units to each of the hospitals. Outgoing calls to parents of the injured children were relayed by the mobiles to K9RNQ who delivered the messages by telephone. Other amateurs participating were: W8IZL, *W9s* BEN ERN NYP CWII, *K9s* TRG DLI, *WA9s* GEW NEP. — *W9CWH, EC Arlington Heights, Ill.*

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During the SET on Oct. 9, WA6DEL/mobile happened across a real emergency. A station wagon hauling a trailer full of wood got out of control near Folsom, Calif., and overturned. WA6QGT received the message and called the highway patrol. Fortunately, there were no serious injuries. — *WA6JDT, SCM Sacramento Valley.*

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A joint operation of the Johnson Co., Kans., and Kansas City, Mo., AREC that started out as a routine communication exercise in the form of providing communication for a parade on Oct. 16, ended up as a full blown emergency operation. During the parade, four separate accidents occurred, requiring medical treatment. The amateurs were instrumental in getting the necessary medical people to the right place in a minimum amount of time. Fourteen mobile units were used and 22 amateurs participated. — *KØGOZ, EC Zone 6, Kans.*

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When the possibility of severe storm activity became apparent on Nov. 16, WA8BUL, Seneca Co., Ohio, EC, alerted K8ZMI, and K8DHF who in turn notified the rest of the AREC members. WA8JSL/mobile was dispatched to tour the Attica, Melmore and Bloomville area where damage was expected to be the worst. He contacted the county sheriff's office and was given instructions on what information was needed and from what areas. For some two hours, mobile units provided links to any service that required communication outlets until commercial lines were repaired.

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KØTKN was driving south from Brookings, S. Dak., to Yankton, S. Dak., on Thanksgiving day. About four miles south of Soo Falls, a car in the north bound lane skidded on some ice, crossed the median and jumped into the south bound lane, hitting a car about 500 feet in front of KØTKN. While driving, KØTKN had his transceiver on and was listening to KØTVJ in contact with another station. Before the two cars had stopped, KØTKN broke into the contact and had KØTVJ call for an ambulance, wreckers and the highway patrol. After getting the passengers out of each car and getting them safely into his, KØTKN directed traffic around the wreckage until the first patrol car arrived, seven minutes after the collision. No serious injuries were sustained by any of the victims and KØTKN was able to continue on his way to a turkey dinner after the ambulance arrived. — *KØTKN.*

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When a private plane attempted a landing near the Barre-Montpelier, Vt., airport on Nov. 25, visibility was so poor that the pilot lost his way and crashed. A severe snow storm prevented searchers from locating the downed plane immediately and at the request of the Vermont State Police, the c.d. net was activated and four mobiles were dispatched to the airport where K1PQN and K1WSP had set up a station in the administration building. WA1EQI acted as NCS from his home and K1WNU, who had auxiliary emergency power, acted as alternate NCS. K1RJU and WA1EQI operated mobile and were attached to base operations which was under the direct control of the police. Throughout the operation, mobiles accompanied the search parties as they fanned out to locate the wreckage. When the remains were finally found, a member of the search party gave the information to K1RJU who relayed it to the officials at the airport building. — *K1MPN, SCM Vermont.*

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On Nov. 23, K6RFB was the relief operator at a 1600-kw. hydro plant in the vicinity of Banning, Calif., replacing W6RFX, who was on vacation. When heavy rains washed out the road and telephone lines, RFB broke into RFX's house and got the rig on the air. His first contact was with W6RFX/7, in Yuma, Ariz., and for the next three days RFB used the gear until telephone lines could be restored. This is probably the only reported case of breaking and entering that won't land anyone in jail for a spell. — *W6EWU, ASCM San Diego, Calif.*

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 five 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.

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On the evening of Nov. 26, the Hillsdale area of Mich. was struck by severe weather conditions. Weather information and barometer readings were required and this information was relayed by W9GDS via W5OSD to W8EGR who was in Hillsdale. Fortunately, no severe damage occurred. — *K8GOU, SEC Michigan.*

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The North Central Cobb Co., Ga., AREC held a practice SET on June 27. The simulated emergency was a tornado and flood. Seven amateurs staged emergency situations, maintained liaison between Acworth c.d. officials and AREC headquarters. — *K4YZE, EC Cobb Co., Ga.*

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The annual Newport, R.I., jazz festival scheduled for July 3 thru 6 was expected to be so well attended that local police officials requested AREC members to provide supplementary communication for the regular police operation. W1JFF and W1TXL planned out the operation, involving 14 amateurs and 6 stations. The NCS was set up at police headquarters, and various units were set up at strategic spots, including two beaches. The operation lasted for six hours each night and the amateurs were instrumental in reporting several minor disturbances. — *W1JFF, EC Newport, R.I.*

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On July 9 thru 11, members of the Northern Alberta Radio Club provided communications for the annual White Water Canoe Race. The course was a 180 mile stretch of the North Saskatchewan River, starting from Rocky Mountain House and finishing in Edmonton. Both 75 and 2 meters were utilized by the operators who were set up at various check points along the course of the race. — *VE6XO, EC Edmonton, Alta.*

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The Arrowhead Radio Amateurs Club, Duluth, Minn., provided communications for an exposition held July 31 thru Aug. 8. Mobile units were placed at the sites of various events in case of any trouble, and fixed stations handled routine traffic for the chamber of commerce. A demonstration of amateur radio was also set up. Visitors were able to see amateur radio in action and messages were handled for those requesting the service. — *WAØEDN, EC St. Louis Co., Minn.*

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When the Edmonton to Hilton Antique Car Rally was held, on the weekend of July 31, Northern Alberta Radio Club members were again available to provide the necessary communications to keep officials appraised of the progress of the rally and to call for help if any of the cars broke down. — *VE6XO, EC Edmonton, Alta.*

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On Aug. 3 and 17, Chemung Co., N.Y., AREC members under EC K2DNN, staged a demonstration of amateur radio message handling to a group of boy scouts at Camp Seneca. After a talk on amateur radio, a few of the boys wrote messages that were relayed by the AREC crew to the boy's parents, replies were taken and relayed back. — *K2DNN, EC Chemung Co., N.Y.*

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Forty-five SECs sent reports for October, representing an AREC membership of 17,048. This is an increase of 15 SEC reports and 3,000 AREC members. Let's start the new year (SEC report year, that is) with all SECs or SCMs (where there is no SEC) reporting. Those sections heard from this month are: Ore., E.N.Y., W. Mass., S.C.V., Mar., N.N.J., N.C., Iowa, Nebr., N.Y.C.-L.I., Los A., Alta., Mont., Sask., E. Pa., B.C., Man., Del., Ga., N. Dak., S.F., E. Bay, Orange, Ky., Hawaii, E. Mass., W. Pa., W. Fla., Wyo., Wis., Mich., Ala., E. Fla., Nev., Ohio, Utah, Minn., Mo., Ont., N. Mex., W. Va., S. Tex., Va., S. Dak., Kans.

RACES News

Region 2 RACES of Texas on Nov. 12 assisted the CAP with communications in connection with the Civil Air Patrol's "Operation Ready." Region RO W5VW requested the cooperation of District RACES RO K5LVO, Harris County RO K5HXR and, Houston RO W5VCE. The resulting operation was quite widespread. The exercise began at 0800 CST Nov. 12 and was concluded at 1645 CST Nov 14. Equipment was activated on 75, 6 and 2 meters. Seven different local stations served as NCS. An undetermined number of amateurs were available to assist, but W5VW, who headed up the operation, encouraged all concerned to stay off the air unless needed, and does not have a count. However, "had we been playing for keeps," he said, "there would have been no difficulty."

Strays

The fellow at the right of this photograph is Jim Corbitt, WA4FLM. Jim and his fellow musicians formed a four-piece band that they call the B Sharps and have appeared on the Ted Mack talent show this spring. When not performing, WA4FLM works 80 through 10 meters but he sometimes must stand in line for his gear, as three other members of his family are hams, too! Shown in the photograph (l to r): Tony Thomas, Bobby Lombard, Eugene Lombard, and WA4FLM.

A.C. Power for the Noise Generator

Regulated D.C. for Crystal-Diode Noise Sources

BY JOHN T. CONLEY,* W7ZFB/4

W7ZFB presents a simple way to solve the battery-replacement and varying-voltage problems inherent in conventional battery-powered crystal-diode noise generators. Application of a.c. power and Zener regulation does the trick. If you haven't built a noise generator, this tells you how. If you have, incorporate a confidence-building stable voltage supply.

After using a conventional battery-powered crystal diode noise generator for several months, it occurred to me that a simple zener-regulated a.c. supply would solve the battery-replacement problem and also remove any possibility that my noise measurements were inconsistent because of varying battery voltage. I let this idea age for several months and then experimented. The result is a practical and flexible piece of test equipment which is invaluable to the v.h.f. man. Cost is nominal, whether you start from scratch or just add the power supply to an existing generator.

Circuit

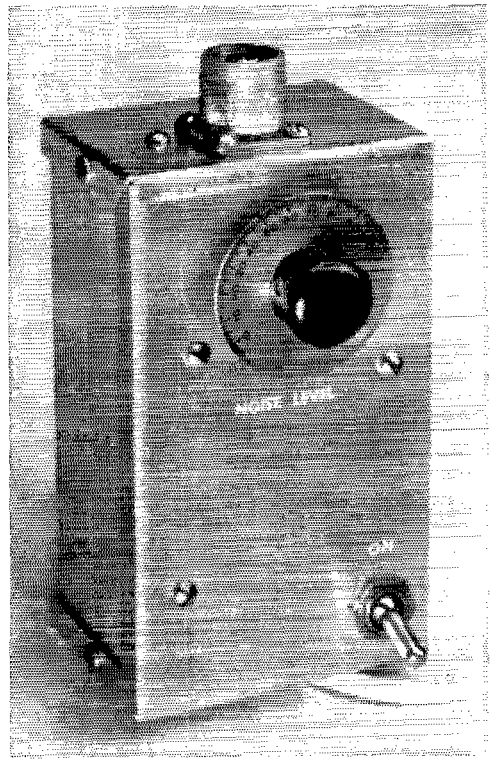
The circuit of the noise generator is shown in Fig. 1. Those who have constructed and used the generator shown in recent editions of the *ARRL Handbook* will immediately recognize the noise-generating part of the circuit and typical construction from the photographs.

Since this portion is conventional and described in the *Handbook*, I will concentrate on the power supply.

A 12.6-volt filament transformer feeds a half-wave rectifier and filter (CR_1-C_1) and produces between -11.0 and -11.5 volts d.c. under load. This voltage, dropped through R_1 and maintained constant at -5.6 volts by the Zener diode CR_2, causes current to flow through the variable-resistance noise-generating circuit $R_2CR_3R_3$.

For consistent comparative noise-figure measurements, this voltage must be held constant. To do this, circuit constants must be set so that the dynamic range and power rating of the zener diode will not be exceeded as R_2 is varied over its range. Component values specified in the parts list were experimentally chosen to meet this goal.

If we establish this condition, then the rest of the operation is relatively simple. Zener diode action is analogous to operation of a gaseous VR tube. Its dynamic resistance changes, as the $R_2CR_3R_3$ path resistance varies, in such a way that the voltage at the junction of R_2 and CR_2 is always constant. As R_2 is increased, more current flows thru the Zener; as R_2 is decreased more current flows thru the noise diode. Zener diode current changes automatically to compensate for changes in R_2.



The diode noise generator and its power supply fit into a small-size Minibox. The dial is on the variable resistor that controls the noise-diode current.

*5A East Magnolia, Satellite Beach, Fla.

Construction

Study of the accompanying photographs will show that construction is simple and does not require special tools. The transformer and power switch S_1 are located as shown in the Minibox (Bud C-3006A). CR_1, C_1, R_1, and CR_2 are wired to conveniently placed terminal strips. Components R_3, C_2 and CR_3 are located at one end of the box as close as possible to the output connector. Short leads for R_3 and C_2 are imperative to insure sufficient output at 144 Mc. In this instance, following *Handbook* instructions and using a grid-cap clip and a contact from a miniature socket to mount the crystal diode works nicely. J_1 can be any good quality v.h.f. connector. I used a nondescript female panel-mounting type N connector for J_1 with appropriate interconnectors, but the specific type is unimportant so long as connection to the receiver or converter is as short as possible and does not introduce much mismatch.

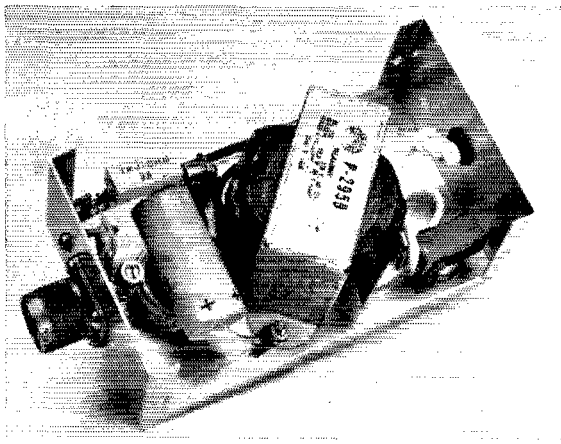
Several comments about parts substitution are in order. Critical components are R_1 and CR_2. If the Zener is changed, R_1 may have to be changed so that maximum current (Zener wattage divided by its voltage rating) through the Zener does not exceed its power rating. This can be checked by metering the current through CR_2 with R_2 disconnected at A-A in Fig. 1. At the same time, R_1 should not be so large that the voltage drop through it reduces the voltage level at the Zener to less than its rated 5.6 volts, with R_2 connected and at minimum resistance.

A c.c.w. log-taper pot should be used at R_2 so that the noise level control will be linear in db., for ease in estimating the magnitude of noise figure improvements. Other tapers can be used, but this may make noise-level adjustment somewhat difficult.

Use any of the diodes listed for CR_3. I found a 1N21C to be the most prolific noise generator, but you may find one of the others best. If you have several, choose the diode which gives maximum output.

R_3 should be 51 ohms if your receiver or converter input impedance is 52 ohms. If it is 75 ohms, use this value.

Finally, from what I can determine, there is no particular advantage to either the positive- or negative-polarity approach. I used the negative approach simply because of the mechanics of mounting the crystal diode. As shown, replacement is easy. If you prefer, though, reverse all diodes and C_1 and the circuit will work equally well. Just be sure to back-bias the Zener and to forward-bias the crystal diode.



Inside view of the noise generator shows the simplicity of construction. The 1N21-type crystal and load resistor are mounted directly to the coax connector. The Zener and power-supply rectifier diodes are the top-hat types on either side of the rectangular-shaped resistor.

Adjustment

Adjustment of the unit is simple. First, check the voltage at the junction of R_2 and CR_2. It shouldn't vary more than 0.1 volt as R_2 is varied. Second, meter the voltage across R_3. This should vary from 0 to about 3 volts as R_2 is varied, if you use 51 ohms for R_3; proportionately less, of course, if you use 75 ohms.

Conclusion

While a battery-powered noise generator is essential for in-place adjustment of antenna-mounted preamps, this unit is more practical for the majority of us who do our work in the shack. Output is good at 2 meters and should be usable above this frequency. The upper limit, of course, is a function of both the generator and the noise figure of the device under test, and is reached when maximum generator output can no longer mask receiver noise. QST

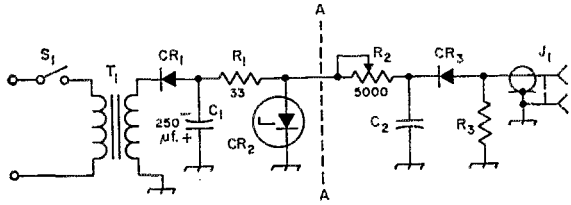
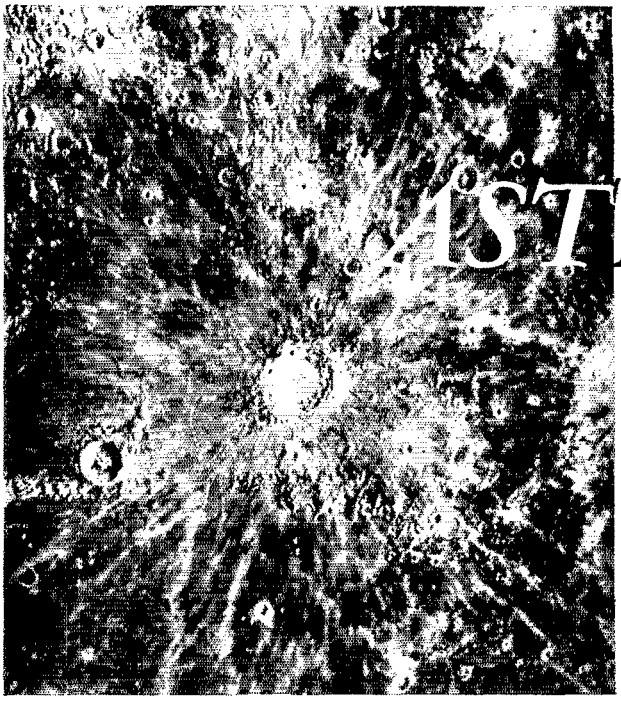


Fig. 1—Circuit of the a.c.-operated noise generator. Resistances are in ohms (K = 1000).

C_1—250 µf., 25 v. (Sprague TVA-1208).
C_2—100 pf., disk ceramic.
CR_1—Silicon rectifier, 400 p.r.v., 500 ma.
CR_2—Zener diode, 5.6 volts, 1 watt; 1N1520 or Barry Electronics No. W40-556 (89¢).
CR_3—1N21 or 1N23 (see text).
J_1—See text.
R_1—33 ohms, 5 watts.
R_2—5000-ohm control, c.c.w. log-taper.
R_3—51 or 75 ohms, ½ watt.
S_1—S.p.s.t. toggle.
T_1—12.6-volt, 2-amp. filament transformer.



ASTRONET

The Space Age Net

BY W. R. CALKINS,* W1KUX/6 and G. A. GUTER, WA6OQU **

An amateur radio communications network, ASTRONET, is providing communications for observatories and astronomers. It is the communications for a moon-observation activity called ARGUS, an operation to observe the lunar surface for phenomena valuable to the research being done by the United States in support of our lunar and planetary exploration programs such as APOLLO.

Although the moon has been studied for years, it remains practically an unknown world. There is a particular facet of our gap in lunar knowledge which should be filled in before we send men to the moon. There *is* something happening on its surface: this something could endanger our lunar astronauts, or this something might help them survive. What is happening? No one can answer this question, mainly because of the difficulty in observing these "lunar transient phenomena." How can we find out about lunar transients? ASTRONET is at least part of the answer, by supplying communications to those astronomers who are studying lunar phenomenon.

In 1958, a Russian astronomer, Nicoli Kozyrev, was making routine light measurements of the crater Alphonsus. He thought he saw something happen. Not believing his eyes, he began clicking the camera which took spectrographic pictures of what he thought was gas spurting out of the central peak of Alphonsus. His interpretation of the data revealed by the camera was that carbon was present in the gas. But he did see something happen there, and he had pictures to prove it.

Reports began to come in that others were seeing things happening on the moon. Amateur and professional astronomers alike reported that the region near the crater Aristarchus glowed with a red coloration "like a ruby" for a short time and then the color returned to normal. The Lowell Observatory observers at Flagstaff, Arizona, reported such an incident in 1963. Several photographs were taken of the red glows. Development of the plates revealed nothing. This was discouraging to say the least because there went the scientific proof of their observation. Reports of transient lunar phenomenon are now not unusual, but a confirmed sighting is a rare one indeed. The ability of the observers is beyond question, but are they seeing things which are actually occurring on the moon, or are there other explanations? Scientists are tough to convince and they have a hat full of other explanations of why transients are seen. Scattered light in the telescope, faulty optics, aberrations, etc. might make an observer think he is seeing something he isn't. Some even question Kozyrev's spectrograms. *However, if two observers from different locations report sighting the same thing simultaneously, it is practically certain that the reports are reliable and thereby confirmed.*

* 811 East Cameron Ave., West Covina, Calif.
** 543 East Lesterwest Way, Glendora, Calif.

Such is the status of lunar transients. Amateur observers are encouraged to spend time looking at the moon. If they think they see a transient, they are requested to note the time and make a written report to a recorder. The recorder goes through the reports to see if two observers report sighting the same thing at the same time. Such programs have produced little or no data on lunar transients.

The authors, interested in lunar transient phenomenon and both amateur radio operators, conceived a lunar observing program on a grand scale with a new twist. A large number of observers would participate. Each observer would be within telephoning (toll-free) distance of an amateur radio operator who would be a member of a net designed especially to rapidly handle traffic between observers. If observers could *rapidly communicate* with each other, sightings might be easily confirmed. The observing program was named ARGUS after the hundred-eyed giant of Greek mythology. The radio net to handle ARGUS traffic was named ASTRONET.

Fifty well-known amateur and professional lunar observers from every section of the United States desired to become a part of the ARGUS-ASTRONET system.

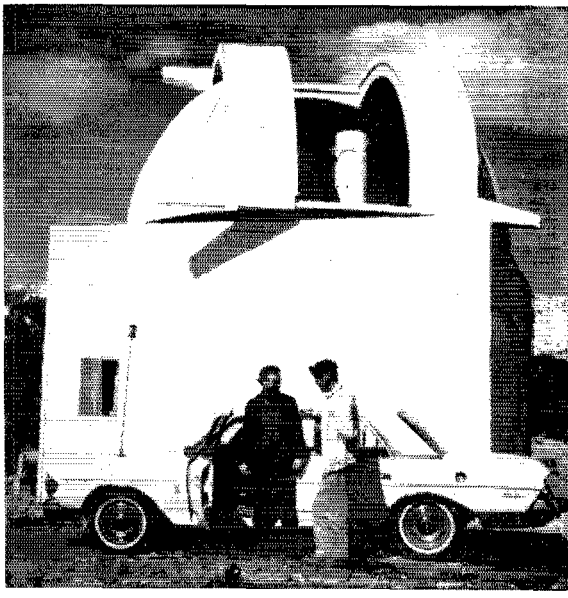
On June 1, 1965 ASTRONET began its operation on 3.885 Mc. using s.s.b. The success which ARGUS–ASTRONET has now enjoyed is history — history for astronomy as well as amateur radio communication. Not only did ARGUS observers come though with sightings of lunar transients, but the radio amateurs came through with communications and traffic-handling techniques which enabled several observers to simultaneously report their sightings of the same phenomenon.

How does ASTRONET operate? ARGUS observers are asked to notify the ARGUS Program Manager once per week, giving the amount of time he spends in observing during the week. These are routine messages which ASTRONET handles between the observers and the program manager. This also provides the basis for routine net operation which takes place nightly 0300 to 0600 GMT except on weekends. Observers are requested to inform an ASTRONET operator if they are at their telescopes during the time of net operation. If they are, this information is given to the ASTRONET control station. ASTRONET control then knows who is observing the moon at any given time between 0300 and 0600 GMT. This information is invaluable when a sighting is made and confirmations are requested.

Routine net operation begins with preamble, roll call, routine traffic handling. Such was the case of the ASTRONET session of August 4, 1965 until at 0403:15 an observer in Monterey Park, California, Larry Bornhurst, phoned Astronet Control Station, WA6UCR, and informed the operator, W. R. Calkins W1KUX/6 that a star-like light was being observed in the unlighted portion of the moon near the crater Aristarchus. Larry, who was using a 10-inch reflector, asked WA6UCR to relay the information to other observers and attempt to make a confirmation of the sighting. WA6UCR knew observers in Phoenix, Arizona and Glendora, California were at their telescopes. By 0408:30, both observers at those locations reported back to ASTRONET control that they also observed a flashing, star-like image in the same crater. One of these observers, Bob Leasure, K7UNK at Phoenix, Arizona, was operating his station by remote control from the eyepiece of his 8-inch reflector telescope. His description of the light phenomenon was recorded on tape by WA6UCR and several other stations standing by on frequency just "reading the mail." Ron Emanuel and Steve Welch had their 8-inch telescope set up for viewing in WA6OQU's front yard, and were in direct communication with ASTRONET. All the observers mentioned were in contact with ASTRONET Control and each reported reoccurrences of the Aristarchus light phenomenon until 0413:12.

The above story has been repeated with different observers and different operators but the same Aristarchus phenomenon seems to appear during the first four or five days of each new moon. This phenomenon is now the subject of study by astronomers. This is due mainly to the fact that ARGUS observers and ASTRONET operators called attention to it and were able to confirm the fact that the phenomenon is real and not imaginary.

Unfortunately, some observatories located on distant mountain peaks do not have telephone communication. This is the case for the telescopes located on Mount Wilson and the Ford Observatory on Mt. Peltier. In these cases the net



Lee Burch, WA6KBO (left), converses with Larry Bornhurst, astronomer and director of the Ford Observatory. Larry recently passed his general class examination and is waiting for his new call.

Larry Bornhurst at the eyepiece of the 18-inch Newtonian telescope while WA6BKO operates his radio equipment on ASTRONET, coordinating observations by others.

manager was able to interest ASTRONET operators with mobile equipment to stand-by near the observatory during ASTRONET sessions. What a natural for mobile operators!

Already many observers and observatories have expressed their desire to join the program. There is a shortage of amateur radio stations to provide the necessary communications for these observers and observatories. The services of amateur radio has been sold to the astronomers who were reluctant to seek such a service by themselves. Any amateur radio operator interested in joining ASTRONET should contact W. R. Calkins, W1KUX/6, ASTRONET Manager, 814 East Cameron Avenue, West Covina, California.

A warning should be given that ASTRONET is not without hazards. Any radio operator slightly interested in astronomy gets even more so. Some operators have already added astronomy as a hobby to become observers. Some observers have also started work on their General Class tickets. The XYL may look upon this extra activity with somewhat less enthusiasm than the OM, hence the hazard is apparent. On the other hand, she may become interested in astronomy and both could become a team in the program. W8QPP/M on an ASTRONET assignment to Mount Wilson was attacked by a deer, giving his VW a dented door! But the story has a happy ending. He received a new transceiver at the next hamfest. Now we ask — who wouldn't take a dented door if a new transceiver was part of the deal?

What could be more challenging or a greater public service than participating in an activity that is of direct assistance to our Space Program.

Communications are needed with the following areas: Las Cruces, N. M.; Inglewood, Calif.; Shreveport, La.; Hudson, Ohio; Palos Verdes, Calif.; Neosho, Mo.; Champaign, Ill.; Lima, Ohio; Fremont, Ohio; Atlanta, Ga.; Decatur, Ga.; Delphos, Ohio; Lisle, Ill.; Eldora, Iowa; Manhattan Beach, Calif.; Los Altos, Calif.; Port Tobacco, Md.; Huntsville, Ala.; Kansas City, Mo.; Alamosa, Colo.; Philadelphia, Pa.; Washington, D. C.; Greenbelt, Md.; Pittsburgh, Pa.; Cambridge, Mass.; La Plata, Md.; Swarthmore, Pa.; Charlottesville, Va.; Nashville, Tenn., and College Park, Md.

ASTRONET operates Monday through Friday nights, 0300-0600 GMT on 3885 kc. and 7240 kc. QST

FAMILY MEMBERSHIP

For families with two or more amateurs, ARRL By-Laws provide that, after one individual has become a Full Member of the League at the regular dues rate ($5 in the U.S.), additional amateur members of that family may join the League for a special dues rate of $1, with all rights and privileges except the receipt of additional copies of *QST*. Our correspondence indicates some misunderstanding of this arrangement. Please note.

1) All participants in the Family Membership plan must be Full Members — i.e., holders of amateur license. Unlicensed persons do not qualify.

2) There must be an immediate family relationship — i.e., husband or wife, brother or sister, father or mother, son or daughter.

3) The rate for the initial membership is the standard $5 ($5.25 in Canada). The rate for additional amateur members of the family is $1 — not $2 as many seem to believe.

4) All Family Memberships must be concurrent — i.e., expire in the same month.

So if you are part of a ham family, slip in an extra dollar for each other ham in your clan next time you renew your League membership.

IMPORTANT NOTICE

Changes of Address

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

February 1941

. . . In his discussion of the Defense Communications Board, K. B. Warner announces the appointment of six widely-known amateurs as regional advisors, as part of the vast gearing up of the national effort, in anticipation of possible dark days ahead.

. . . Byron Goodman, W1JPE (now W1DX) describes a simple but effective 56-Mc. converter having a 3-Mc. output to be fed into a communications receiver.

. . . The advantages of a two-tube superhet over a two-tube regenerative receiver are discussed by George Grammer, W1DF, who describes such a rig. One of the advantages set forth is that the detector works at a fixed low frequency and can therefore be designed for greater stability. The cost is said to be $11.00, 1941 type.

. . . Vernon Chambers, W1JEQ, comes up with a two-stage, three-band rig using the versatile 815 in the final. The rig is rated at 50 watts and one crystal serves all three bands, sort of.

. . . Wilbert L. Thompson describes a simple 5- and 10-meter transmitter suitable for mobile or home use, utilizing an 807 in the final. Lots of rigs were said to be simple then, but, read on —

. . . In an imposing and knowledgeable article on u.h.f.-superhet design, the late Dana Griffin, W2AOE presents Part I of a two-part treatise. Improved performance in audio and video reception over the receiver described by J. B. Sherman, *QST*, June 1940 is the end result. Higher sensitivity is accomplished by improving the i.f. amplifier and by adding a stage of r.f. Even I can follow the wiring diagram!

. . . As an aid to efficiency in handling traffic by voice, Ed Handy, W1BDI gives a number of hints, important among which is to write down exactly what is sent word-for-word. The transmitting operator must not only talk slowly enough but must enunciate clearly.

. . . Thomas J. Kelley, W4CNY describes a wide-range vacuum-tube voltmeter and gives constructional details as well as operational procedure.

. . . Of the 643 operators who copied the 1940 Navy-Day message, 148 will receive acknowledgment from the Navy Department for their success in copying the full transmission without error.

. . . Design of mixer and converter circuits is presented by Curtis R. Hammond, W9PKW, with special regard to the virtues of a number of popular tubes used for this purpose. The article enables the reader to choose the proper tube for the specific job.

. . . John Huntoon, W1LVQ has some worthwhile suggestions on how to improve your "fist" as well as receiving ability. — *W1ANA*

Back Copies and Photographs

Back copies of *QST* referred to in this issue are currently available, unless otherwise indicated, from our Circulation Department. Please send cash or check — 60c for each copy — with your order; we cannot bill small orders nor can we ship c.o.d.

Full size (8 by 10) glossy prints of equipment described in *QST* by staff members (*only*) can be furnished at $1.50 each. Please indicate the *QST* issue, page number, and other necessary identification when ordering, and include full remittance with your order — we do not bill nor ship c.o.d.

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

APT TEST TAPES AND DATA

Through the good offices of H. L. Schwartzberg, W3VQQ, of the RCA Astro-Electronics Division, we have been supplied with ten identical tapes on which test signals and actual satellite-transmitted weather maps are magnetically recorded. These are useful for testing equipment such as that described by K2RNF in November 1965 *QST*, ("Amateur Reception of Weather Satellite Picture Transmissions") until such time as the next weather satellite will be operational and amateurs can make their own recordings. Supplementary information includes written descriptions of each of the twelve complete frames recorded on each tape, and actual facsimile pictures made from the tapes for comparison with pictures that homemade reproducing equipment turns out.

Any good-quality tape recorder capable of handling a 10-kc. audio band and operating at 7.5 i.p.s. can be used with these tapes. If your equipment is in the ready-for-testing stage we can lend you a tape for a limited period of time. Address the Technical Editor, *QST*, for complete information.

Strays

Our Museum Curator, W1ANA, being somewhat of an attic prowler and basement investigator himself, feels sure that there must be a lot of real choice amateur radio material lying around. Right now he would love to have a Paragon RA6 receiver for the ARRL Museum. He's also looking for a CG1144 tube, the predecessor of the UV203.

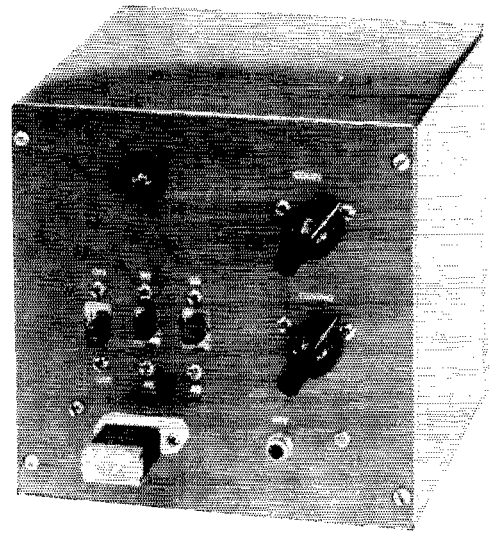
—···—

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

The Mighty Midget

A 10-Watter for 80

and 40 Meters



The Mighty Midget! Building and using this little rig should be a real "fun" project.

BY LEWIS G. McCOY,* W1ICP

Any Novice who builds this little transmitter is eligible to work for a special certificate award. The rules are quite simple: Build the rig, work any 10 different ARRL sections, and send a photograph of the set along with 10 QSL cards (to verify the contacts) to W1ICP at ARRL Headquarters. We'll send you an appropriately worded certificate that you can hang on the shack wall. ARRL sections are listed on page 6 of any issue of QST. *The closing date for this award will be January 1, 1967. How about it, Novices; who'll be first to get the "Mighty Midget Award"?*

THIS article describes the construction of a Novice transmitter for 80 and 40 meters, capable of 10 watts input. Why only 10 watts? There are good reasons why such a rig might interest many beginners — or, for that matter, some old-timers.

For one thing, the transmitter is easily portable, fitting into a 6 × 6 × 6-inch box. Only one tube is used, which helps make the circuit easy to follow and the rig easy to build. Last, and by no means least, there is a certain thrill in making contacts using low power. Many an old-timer will remember the prewar Fred Sutter series of QSL-size transmitters. Hams vied with each other to see who could work farthest with these low-power rigs.

* Technical Staff.

Circuit Details

The tube used in our 10-watter is a dual type, a 6GW8, which combines a triode and pentode in one envelope. The triode section of the tube is used as a grid-plate crystal oscillator and the pentode section as the amplifier. With the power supply shown in Fig. 1, the amplifier is run at approximately 300 volts at 30 ma., fully loaded. The output frequency is the same as that of the crystal; that is, 80-meter crystals are used for 80-meter operation and 40-meter crystals for 40. L_1 and L_2 are r.f. chokes used to resonate the oscillator plate circuit in the 40- and 80-meter bands. When operating on 80 the two chokes are in series, providing an inductance of 93 μh. which, with the associated circuit and tube capacitances, makes a broadly-resonant circuit in the 80-meter band. This eliminates the need for a tuned circuit (tuning with a variable capacitor) in the grid circuit of the amplifier. When S_1 is switched to the 40-meter position, the 0.01-μf. bypass capacitor is moved from the bottom of L_2 to the bottom of L_1, effectively removing L_2 from the circuit. In this case, L_1 is broadly resonant in the 40-meter range.

A pi network is used in the tank circuit of the amplifier. The constants shown in Fig. 1 are for working into 50- to 70-ohm loads. I_1, a No. 47 dial lamp shunted across L_4, is a tune-up and output indicator.

The power supply is a voltage doubler using silicon rectifiers, with two 60-μf. capacitors in series to provide an output capacitance of 30 μf.

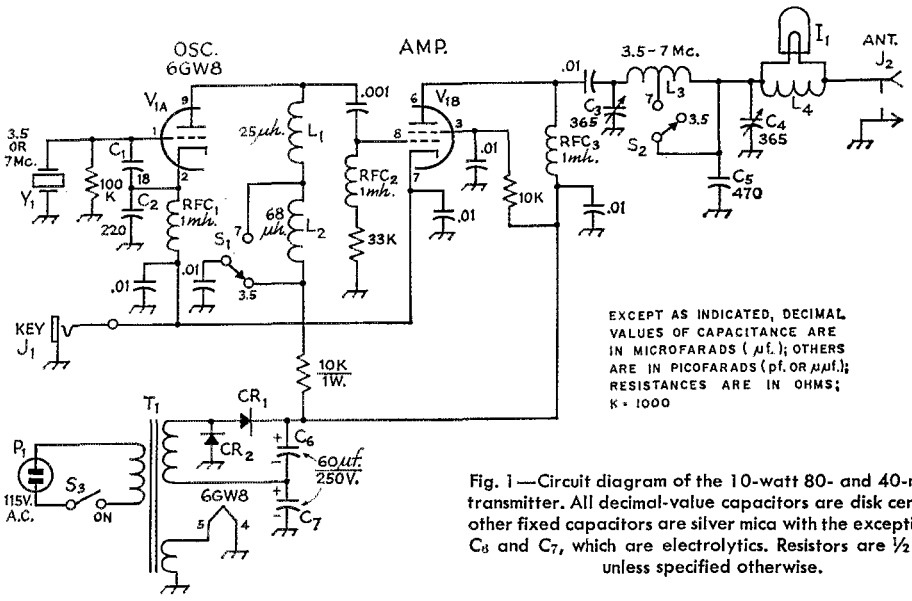


Fig. 1—Circuit diagram of the 10-watt 80- and 40-meter transmitter. All decimal-value capacitors are disk ceramic; other fixed capacitors are silver mica with the exception of C_6 and C_7, which are electrolytics. Resistors are ½-watt unless specified otherwise.

C_1—18-pf. silver mica.
C_2—220-pf. silver mica.
C_3, C_4—365-pf. variable, single-section midget t.r.f. type.
C_5—470-pf. silver mica.
C_6, C_7—60-μf. 250-volt electrolytic.
CR_1, CR_2—Silicon rectifiers, 500 volts p.i.v. minimum, 150 ma. minimum (Barry Electronics 600/750).
I_1—No. 48 or 49 dial lamp, 2 volts, 60 ma.
J_1, J_2—Phono jack.
L_1—25-μh. r.f. choke (Millen 34300-25).
L_2—68-μh. r.f. choke (Millen 34300-68).
L_3—41 turns No. 22 enamel, ⅞-inch diam., close-wound; 40-meter tap 21 turns from C_4 end of coil.
L_4—See text.
S_1, S_2—Single-pole, double-throw slide switch.
S_3—Single-pole, single throw slide switch.
RFC_1, RFC_2, RFC_3—1-mh. r.f. choke (Millen 34300-1000).
T_1—Power transformer, 125 volts, 50 ma.; 6.3 volts, 2 amp. (Knight 61 G 411, Chicago/Stancor PA-8421).
Y_1—3.5- or 7-Mc. crystal.

Although the amplifier is designed to work into 50- to 70-ohm loads, these values may be inconvenient in portable operation. A different approach can be used if the builder wants to use a 65-foot end-fed wire for an antenna. On 80 meters, a 65-foot end-fed wire worked against ground will have an impedance that is well within the tuning range of the pi network shown in Fig. 1. However, the impedance would be around 2000 ohms when this same antenna is end fed on 40 meters. In such a case, it would be practically impossible to load the amplifier fully if the circuit of Fig. 1 is used. By making a very slight change in the pi-network circuit (see Fig. 2) the transmitter can be made to work on either band with a 65-foot end-fed antenna.

Changing the circuit to Fig. 2 consists of rewiring S_2 so that C_5, the fixed 470-pf. capacitor across C_4, is only in the circuit on 80 meters. On 40, none of the turns on L_3 are shorted out — the entire coil is used, just the same as on 80 — but C_5 is removed from the circuit. This permits the pi network to work into a high-impedance load such as our end-fed antenna will provide.

The beauty of such an arrangement is that it simplifies the antenna problem. A 65-foot length of insulated wire and a ball of string make a completely portable antenna. Tie the string to the end of the wire, tie a rock to the end of the string, heave the rock up in a tree, and you have an antenna all ready to go! It should go without saying that it would be easy to take such an antenna down.

Getting the Parts

There are no "special" parts in this transmitter. Nearly all of the components can be found in any of the larger mail-order catalogs.[1] We realize that a beginner just starting out has a problem in finding where to buy parts. Our suggestion is to write various *QST* advertisers and

[1] If you cannot locate the Millen coils and chokes, the Millen Co. informs us that they will sell direct. Write to James Millen Manufacturing Company, Attn. Wade Caywood, W1KRD, Malden 48, Mass.

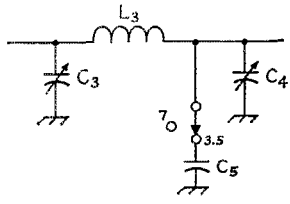
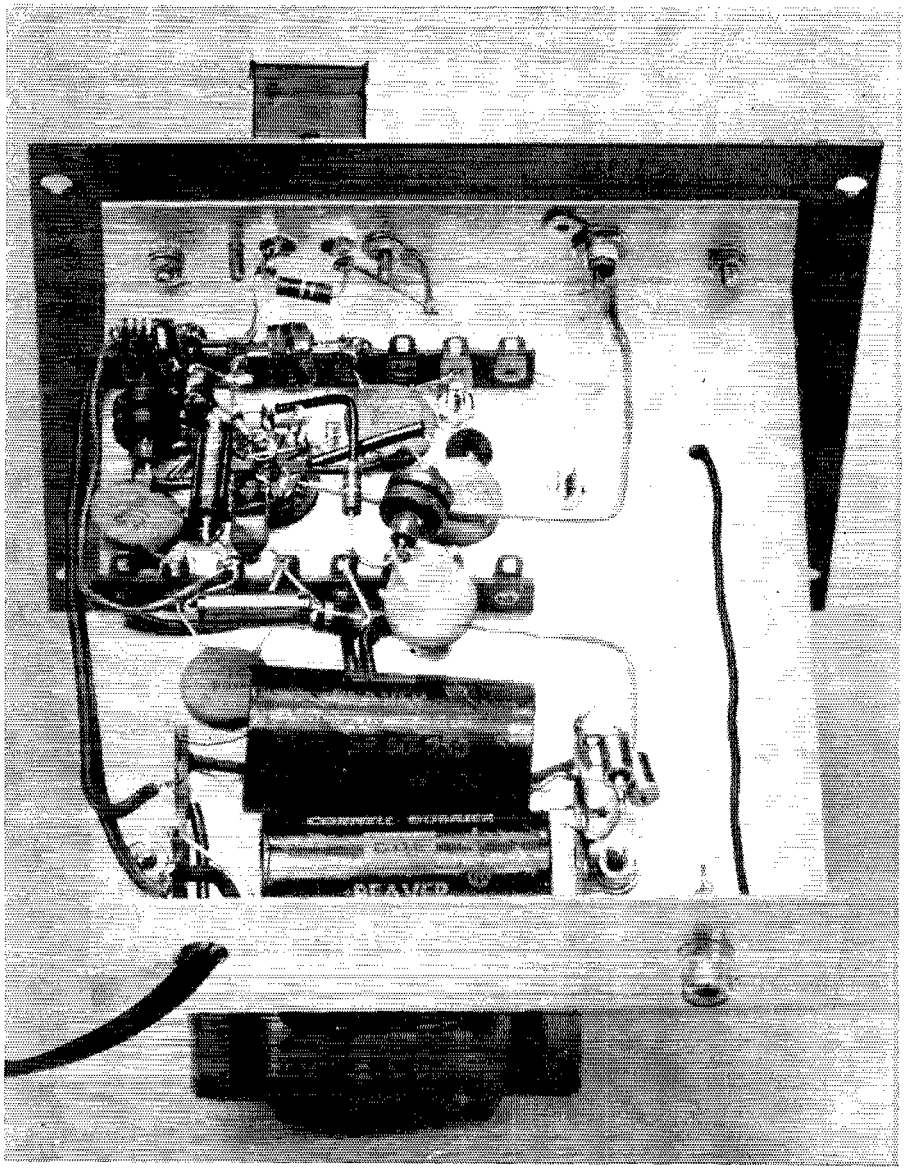


Fig. 2—Tank switching modification for using a 65-foot end-fed antenna.



The two electrolytic capacitors are mounted between two terminal strips at the bottom rear. Note the use of two terminal strips on either side of the tube socket. This arrangement provides plenty of connection points.

obtain their latest catalogs. Of course, if you live in a city that has large supply houses they will usually stock most of the items. We recently had a letter from a beginner who complained about the prices of some tubes we used. However, he had purchased the tubes at a drugstore. Any old-timer in ham radio would throw up his hands in horror at the idea of getting tubes from such a source because the prices *are* considerably higher than those charged by any of the radio mail-order or supply houses.

The amplifier tank-circuit coil, L_3, is wound on a plastic pillbox. These pillboxes have standard dimensions — $\frac{7}{8}$-inch outside diameter and either $1\frac{1}{2}$ or $2\frac{1}{4}$ inches long — and we picked up a half dozen of them at a local drugstore for 30 cents. They make really low-cost coil forms. Either length is suitable for L_3. We drilled a hole in the bottom center of the box and then mounted the box directly to the chassis with a nut and bolt. The coil is wound with No. 22 enamel or Nylclad wire, and if you buy 100 feet of the wire you'll have enough for that 65-foot antenna, too.

Construction Details

Before starting construction, spend a little time studying the top- and bottom-view photographs of the transmitter to get an idea of the layout.

At the left front are the tuning and loading controls. To the right of the loading capacitor is L_4 which is mounted on a tie point. The phono jack on the back is the output connector.

Layout is not critical but should follow the general pattern shown in the photographs. The chassis for the rig is made from a piece of aluminum 7⅞ inches long and 4⅞ inches wide. The aluminum is bent in the form of a U, with a back lip 1½ inches long and a front lip ½ inch long. This leaves a top length of 5⅞ inches, which will fit into the 6-inch deep cabinet. The cabinet, a Bud type AU-1039-HG, has a ½-inch lip around the front and back, so the chassis should be mounted on the front panel with enough clearance for the cabinet lip.

Six terminal strips are mounted either side of the tube socket. This provides plenty of tie points when mounting the various components and leads. You probably won't need all the tie points, but it certainly is better to have more than you need than not enough. The power-supply filter capacitors are mounted between two strips.

L_4 consists of four turns of No. 22 enamel, ½ inch in diameter and about ½ inch long, mounted on a tie strip which in turn is mounted on the front panel. The dial lamp, I_1, is held in place by a ½-inch-diameter rubber grommet mounted in the panel. The leads from the dial lamp to either side of the L_4 coil are soldered directly to the lamp base and metal shell. You could use a dial-lamp socket but this only adds to the cost.

Tune-Up and Adjustment

In order to familiarize yourself with the tune-up of the rig you should have a dummy load. A good one for this purpose is a 6- or 10-watt, 115-volt lamp. The lamp should be connected across the output jack, J_2.

Plug in an 80-meter crystal, leave the key open, and turn on the a.c. power. With S_1 and S_2 in the 80-meter position, close the key and tune C_3 for an indication in the dummy load. We found in our model that C_3 was approximately ⅓ meshed and best loading was with C_4 also about ⅓ meshed. You'll note in tuning up that the brighter I_1 gets, the brighter the dummy load will be. If you are using a 10-watt dummy load don't expect the bulb to get very bright. The output of the little rig is between 5 and 6 watts, so a 10-watt dummy load won't light up a room!

Next, plug in a 40-meter crystal and switch the controls for 40 meters. With our load we found that both controls, C_3 and C_4, were slightly less than ¼ meshed for best output.

If you have a 0–100 milliammeter you can connect it in series with the key leads to measure the cathode current. Keep in mind that you are measuring the cathode currents of both stages. When the amplifier is fully loaded, the total cathode current will be about 40 ma. You can figure that roughly 30 ma. will be plate current for the amplifier.

Amplifier plate voltage when fully loaded is 300 volts, screen voltage 200. Oscillator plate voltage is 200 volts. The grid voltage at Pin 8 of the amplifier will depend on the crystal activity but it should measure about −30 volts, measured at the bottom of RFC_2.

In using the rig on the air, we got one surprise. On the 40-meter Novice band we heard a WN8 calling "CQ QRP" (CQ low power). We figured our mighty little 10-watter would be less than the WN8's so we blasted back. Our face was kinda red when we found the WN8 was only running 2 watts input!

In any event, we are sure you can have a lot of fun both in building and using the rig. Who's going to be first to win the "Mighty Midget Award"? QST

1966 ARRL National Convention

Boston, Massachusetts

April 22-24

BY GENE HASTINGS,* WIVRK

As picturesque old Boston shudders from the seasonal snowfall, the 1966 ARRL National Convention Committee is busy at work compiling a full program for the expected 4000 hams and their families who will attend the new Sheraton-Boston Hotel on April 22, 23 and 24.

The program committee is happy to announce that among the top speakers to be heard at the convention will be Father Daniel Linehan, W1HWK, director of the Weston Observatory at Boston College. "Father Dan" is a familiar figure, having attended several Swampscott hamfests, and is quite active on s.s.b. from his Mercedes when not transmitting from the South Pole or from Africa. The committee members are still busy trying to understand how Father Dan has time to run the observatory, check on seismic disturbances, lecture on radio and television, travel to remote areas to photograph some of his lectures and still be heard on the air several times each week! Quite a fellow.

Emergency and traffic nets will also hold meetings during the convention. Nets wishing to meet should write the Program Committee, 24 Drury Lane, Stoneham, Massachusetts, at once as space is limited and is fast being spoken for. Once the rooms are allocated there can be no additional meetings scheduled.

Jean Peacor, *QST* "YL News and Views" editor, is creating an especially fine program for the YLs attending the convention. One of the features (so we are told) will be a French luncheon in a quaint French restaurant in downtown Boston, complete with wine punch!

FCC examiners will be on hand Sunday, April 24, to supervise General and Extra Class exams. Those planning to take the tests are reminded that FCC charges a $4 exam fee. Test results will be announced Sunday evening.

A highlight of the affair will be the awarding of a DX vacation-for-two to Puerto Rico for seven nights and eight days of glorious fun-in-the-sun! Numbered prize tickets will be available to anyone present at the convention — *no fee will be required.* The drawing will be made from a box into which participants have dropped their stubs. The grand prize will include round-trip jet airfare from New York, accommodations in one of Puerto Rico's newest luxury hotels, breakfasts and dinners, sightseeing trips, et cetera. The trip of a lifetime will be awarded Sunday night, and the winner has the option of vacationing in lovely St. Thomas in place of San Juan if he prefers. Does everyone have his suitcase transceiver and portable antenna ready?

V.h.f. fans will be in their glory at this year's National. A very special program is in the works and will include speakers and demonstrations on the latest v.h.f. experiments. Tapes will be brought where available and the latest news concerning the Oscar IV satellite will be reviewed.

The New England DXCC is also planning an outstanding program which every DX fan should try to attend. Antenna manufacturers will exhibit their latest creations designed to make DXing that much easier.

The Quarter Century Wireless Association will be on hand with a program for its members and others interested in "old time radio."

The mystic ritual of the Royal Order of the Wouff Hong will be enacted at midnight on Saturday.

Saturday night, of course, is the BIG night. Following the prime ribs of beef banquet there will be dancing and a spectacular night club show, followed by dancing again until midnight. This whole program costs but $8.60 "early bird" ($9 at the convention before Saturday noon). Where else could you get food, entertainment and dancing to a five-piece orchestra for this small amount? Your best bet is the early bird package: $8.60 plus $3 registration for a total of $11.60. At the convention the total cost will be $13. Send your check or money order, payable to FEMARA, *now* to the ticket chairmen, John and Bertha McCormick, Berkley Street, RFD 1, Taunton 1, Massachusetts. Be sure to include a stamped self-addressed return envelope.

Complete convention information will appear in March *QST*. QST

Exam co-chairmen, K1AUP (right) and K1LJN review plans for General and Extra Class examinations to be administered Sunday at the convention.

* Convention Co-Chairman.

Correspondence From Members-

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

QST ANNIVERSARY

¶ Your cartoon of an early amateur radio station, on page 10 of December *QST*, brought back a lot of memories. I used some of the same equipment: 1 kw. transmitter, helix, rotary gap, straight key, loose coupler, variometer, galena detector. My call at that time was W2ABZ.

I often wonder what some of the hams of today would think if they could see the stations we had years ago . . . *Claude T. Regan, K2JDU, Hazlet, N.J.*

¶ I got quite a thrill out of the insert which described "A Short Wave Regenerative Receiver," in 1920. I have often thought such articles as the ones on the 1DH transmitter and John Reinartz's receivers would be of interest to hams both new and old. They could be printed as inserts in the future, as the article inserted in the December issue. I sure would enjoy them. — *Ed Preston, W2RIZ, Tully, N. Y.*

¶ I congratulate the League on the December issue. It was, indeed, very fine.

I also believe that the new publication, *The Radio Amateur's V.H.F. Manual*, is truly outstanding. — *Curtiss C. Reed, WA7CKG/NØECE, Sandpoint, Idaho*

¶ I got a big kick out of the articles on 50 years of radio, for I was fiddling with it when tubes were oscillation valves, without bases and my loud speaker was a pair of Baldwin mica diaphragm phones snapped over a horn built with 2 inlets for that purpose. Incidentally, that pair of phones represented 100 hours of work. — *Glenn A. Cables, W.12YNA, Albany, N. Y.*

GREAT LAKES ELECTION

¶ May I use your pages to express my gratitude to the members who supported me in the recent Great Lakes Division election? I am overwhelmed by the result.

It is interesting to note that while the incumbent was re-elected, nearly twice as many members voted against him. There must be a lesson in this some where. — *James W. Voorhees, D.D.S., W8EGR, Hillsdale, Michigan.*

[In a League (or other) election with more than two candidates, it is likely that the victor will poll less than a majority of the votes. E.g., New York Mayor Lindsay received less than half the votes. A vote for one candidate is not necessarily a vote against the others. — EDITOR]

A POPULAR SERIES

¶ I want to express my appreciation of the articles on RTTY by Irv Hoff. I've been messing around with RTTY for quite a while but didn't have the time or energy to organize what I knew. Irv's research on the subject — scholarly is the best word for it — and his clear exposition have been a real help to me. — *Fred V. Gwyer, W9BIU, La Grange, Illinois.*

THE AMATEUR'S CODE

¶ I feel our need for a seventh point of "The Amateur's Code": The Amateur is Courteous.

In the last half year, I have failed the General code test four times, because of insufficient code speed. I depend on the code practice sessions from W1AW, and I wish our fellow hams could show the courtesy to keep their transmitters off W1AW's frequencies at the time of code practice transmissions. I find it's next to impossible to copy through QSB and QRN in Florida, with heterodynes from various transmitters being tuned and checked for signal qualities.

As a high school student, I find my time precious, as I am sure many of us do. Please don't abuse the wonderful service rendered by W1AW by causing unnecessary QRM. — *Ray H. Liles, Jr., WN4VME, Indian Harbour Beach, Florida.*

POWER COMPANY QRN ASSISTANCE

¶ Much has been written about how power companies care little about electrical interference from their lines and how one has to write the president of the power company to get any action. We in Southern California may be more fortunate than other radio amateurs, as the Southern California Edison Company has had the foresight to appoint a representative to handle amateur radio complaints. It is the duty of this representative not only to locate interference problems but to talk before radio clubs and discuss the many interference problems which often have nothing to do with the power company lines. The representative in this area, W. R. Nelson, WA6FQG, being a radio amateur, knows how interference can cause many headaches to the radio amateur and is prepared to track it down.

Recently, I had to call on the services of Mr. Nelson for an interference complaint at my QTH. The problem was not an easy one to locate. The electrical interference made it impossible to work any DX or even locals. Mr. Nelson and another company representative, Gene Buzzard, found their company lines okay, but the interference remained about two weeks. After covering many alleys and streets in the neighborhood, the culprits were discovered: two loose pieces of wire thrown over the power lines several blocks away. They were hardly noticeable from the ground, but when the wind blew them, the noise level in the receiver was beyond reason. Some playful boys had caused all the trouble not only for this station but also for TV set owners in that neighborhood.

It is our intention to show that your power company will cooperate if your complaint is presented in an orderly manner. They like nothing better than good public relations with their customers. Always find out who the man is who takes care of the interference complaints and don't write or call the president; you will get faster service by contacting the right man in the first place. — *Ralph Steinberg, K6GKX, Long Beach, California.*

UP FIVE — QRZ?

¶ Brace yourself, here comes another gripe! I refer to the ever-increasing practice of DX stations working without signing their call-signs for long periods of time. They work station after station, merely sending the call of the station answered and a report. Then "QRZ?" and no call. This they continue until they run out of customers.

One must wait and wait to find out who they are, which causes calling stations to operate illegally in the eyes of FCC and call blind, sending only "DE W9 —." Then they have to ask for the guy's call or play the waiting game until he chooses to reveal his identity. This is usually sent only once at 50 w.p.m. in a mess of QRM!

Too bad we don't still have T.O.M. around to get them with the Wouff Hong! — *C. R. Putnam, W9AKJ, Elkhart, Indiana.*

A CONSTITUENT SPEAKS

¶ Dear Congressman:

I would like to acquaint you with a problem that I, as well as others of my kind, have found to be a stumbling block. Perhaps after listening to it, and the suggested solution included herein, you could introduce a bill of some sort to help us, a stricken minority.

I belong to the 0.1% of our populace who are amateur radio operators, a group dedicated to their Cause. That portion of said group entitled "The Lower Low Income Bracket" holds me as an everlasting member. This is due, mostly, to the fact that Holycrofters, Callings, Heathchit and Hy-Gin receive the better part of my salary and *my uncle* gets the rest.

I propose that an agency be established to help our 0.1% who cannot afford to live like those belonging to "The Upper Upper Income Bracket," but who do anyway. Meticulous thought has brought up the proper designation, "The Federal Aid Program for Anti-Homebrewists."

You'll get my vote. — *Mark Hopkins, WB2JWS, Sparta, N.J.*

NET OR RUMOR MACHINE?

¶ During a crisis such as the recent power failure in the Northeast it is the job of the emergency radio net to help people in trouble, not to try to find out what, where or who is causing the trouble. During the blackout the net operator on duty on the emergency net that I was monitoring was swamped with many unnecessary calls relaying rumors and unfounded reports about the cause of the blackout.

If an emergency net is in operation, it should be used as an emergency net and not as a source of diagnosis for the cause of the trouble. An emergency net, as far as I'm concerned, is not a news medium. It is a service to help people in trouble. — *S. T. Gazda, WB2OXV, Binghamton, N. Y.*

CONTEST COMMENTS

¶ Let me offer my congratulations to ARRL for the 1965 Sweepstakes. This was my first "go" and all I can say is, "What a contest!"

I was first licensed in May, 1964, and since then I have been hamming enthusiastically. The most enjoyable part of amateur radio for me is the challenge of developing my personal operating skills. Naturally a high degree of skill can only be achieved through participation in challenging and stimulating activity, and the SS provided just that — an operating exercise *par excellence*. I believe I learned more during nine hours in the SS than in a year of casual operating. I only wish I could have devoted more time to it.

I am very much in favor of the exchange format and the points bonus for reporting through the NTS. With the experience gained in the SS I feel that one of these nights I can screw up the courage to report into OQN and try my hand at traffic handling.

Once again, my heartiest congratulations to you for promoting activities which develop amateur radio as a skilled service, rather than exploiting it as a hobby. — *R. D. (Rod) Elliott, VE2BUW, Montreal, Quebec.*

¶ I am a radio amateur of long standing and a member of ARRL, have been for a good many years and will continue to be an ARRL member even if we have to mortgage the old homestead, because I think the only way we will keep our amateur bands is through ARRL. Two weekends were taken up with that (no good) SS Contest and another weekend was then taken up with a DX Contest. I can see the Field Day Contest, where emergency equipment is taken out and tested and only one weekend is taken up. What happens when an amateur has a real emergency with some of these worthless contests on? — *K. G. Pond, W7MAE, Phoenix, Arizona.*

¶ At this writing, a well-known "DX Test" is at the peak of its annual frenzy. Criticism of established institutions is always risky, but is it not possible these contests encourage the very operating practices generally frowned upon?

The most casual observation reveals literally hundreds of operators who seem to have declared a moratorium on the principles of courtesy and good common sense. "During contests, we'll throw away the rule books," they seem to say. All is fair in love, war . . . and DX tests! No more listening on frequency; call at any and all times, even if the station wanted is already in contact with someone else. There is a helter-skelter ruthlessness in the zeal to fill page after page of the log book.

This is not to say contests are inherently bad. Fortunately, many fine amateurs *do* adhere to proper operating procedures and ordinary common sense; it is a joy to hear them. Their smoothness and poise stand out conspicuously and when the final tally is made, they will be found at the top of the winners' list. — *Gale Curtright, KØTYO, Kansas City, Missouri.*

¶ I recently participated in the Sweepstakes sponsored by the League. I really enjoyed myself and the experience was wonderful. I am looking forward to the Novice Roundup. — *Steve Morgan, WN8QNR, Kettering, Ohio.*

[The 1966 Novice Roundup gets underway Feb. 5; see p. 50, January *QST* for contest rules. — EDITOR]

PEACEFULLY CRITICAL

¶ Over a period of months I have been reading various articles concerning the new FCC proposals. There has been much said of worth on both sides of the argument but it appears to me, a very new member of the League, that the proposals are sound and fair to all operators.

However, FCC regulations are not the total answer to our problems. Only cooperation of the

majority of the members of the League will correct the constant violation of rules that are designed to govern us so fairly and rightly. Why can't we all work together, policing each other in a manner that is constructive rather than pettily destructive? We have nothing to prove to each other except that we are capable at our hobby and bear only good will toward each other. This attitude that a fellow who becomes a critic is our enemy is childish, and not worthy of men who enjoy such a privilege as ours.

Good work on your part of the proposal and good work on *QST*. — *Harold D. Meyers, WA4ZIC, Warner Robins, Georgia.*

¶ Although I am sure the League knows what is best for amateur radio, we have our right to speak up in favor of or against a situation. But why, when it's against, does it have to be an angry letter like some that have been sent in? If any of the fellows are concerned over a situation let them put it in writing, but in sensible, reasonable and peaceful ways. If this is done the tempers are quelled and settlements come easier. The Almighty has given us the opportunity to live peacefully together on this earth, so why not do so? — *Dennis A. Abdalla, K1YSW, Orono, Maine.*

MORE AMPS IN ARRL'S ANTENNA

¶ I hope you continue to press your campaign for better operating, better techniques and better theory, in spite of all the screaming from irresponsibles. More amps in your antenna! — *W. R. Peyton, Edmonton, Alberta.*

¶ It has been months since I last wrote in to give my blessing. Whole-heartedly do I commend and applaud the Board of Directors' diligent efforts in behalf of radio amateurs in the U.S.A. and throughout the world. Though many do not understand nor value what you endeavor, *many* chaps, like myself, realize the total picture and are solidly but quietly behind you. The dissenters, as usual, make a big fuss and noise, but (thank heaven) are in the minority!

Those true hams, who deserve the name and privileges, measure up to "The Amateur's Code" listed in front of every ARRL *Handbook*. You will notice:

1. They don't scream bloody murder about "their rights"
2. or quit the League (*their* national organization)
3. or turn to false prophets and opportunists
4. or sit on their laurels
5. or become fake martyrs

nor are they represented among those whose bad practices have brought about the disgraceful and unpleasant conditions of our frequencies. Indeed, they have continued exertion toward improving themselves, their stations and other aspects of hamdom within their spheres of influence. They back the ARRL by intelligent and constructive observation and criticism, not by verbal and written tantrums. — *David W. Jensen, W9RMV/7, Helena, Montana.*

¶ I've heard many pros and cons about *QST* and the ARRL and I've tried to think them over with an open mind. In my short amateur radio career I have found *QST* educational, enjoyable and helpful.

— *John Barlow, W.1QJOA, Iowa Falls, Iowa.*

First-Day Covers Still Available

When the Amateur Radio First-Day Covers were processed in Anchorage on December 15, 1964, we gambled and had a few extra unaddressed covers prepared, because orders for the first-day covers were still coming in and we didn't want anyone to be disappointed. We still have some of these left. They are all singles, unaddressed but carrying the amateur radio stamp and the official first-day cancellation, and they will be mailed to you in an envelope. Prices are 35c each, three for a dollar. Send your orders to ARRL Hq., 225 Main Street, Newington, Conn., 06111.

FEEDBACK

W1OOP's speech amplifier in the "Hints and Kinks" section of December *QST* has the emitter resistor of Q_4 mislabeled. The diagram is marked 1500 ohms, when in fact it should be 1.5 ohms.

—···—

The 100-μf. 200-volt electrolytic capacitor in the bias supply of the 500-watt d.c. to d.c. converter (*QST*, Dec. 1965, p. 90) is shown on the schematic diagram with the wrong polarity. The negative lead of the capacitor should be connected to the bias line and the positive lead should be attached to chassis ground. Also, the correct address of G. S. Toroids is: 21236 Walnut St., Lomita, California.

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It should be noted that, due to a clerical error, the names Bruce Anderson, W1VOT, and George Meulendyk, W6THZ, inadvertently appeared in the "Silent Keys" column of the December 1965 issue of *QST*.

—···—

The captions to the photographs on page 81 and 83 in "The World Above 50 Mc." column for January *QST* should be reversed. Our apologies to W1TQZ and W1IGJ.

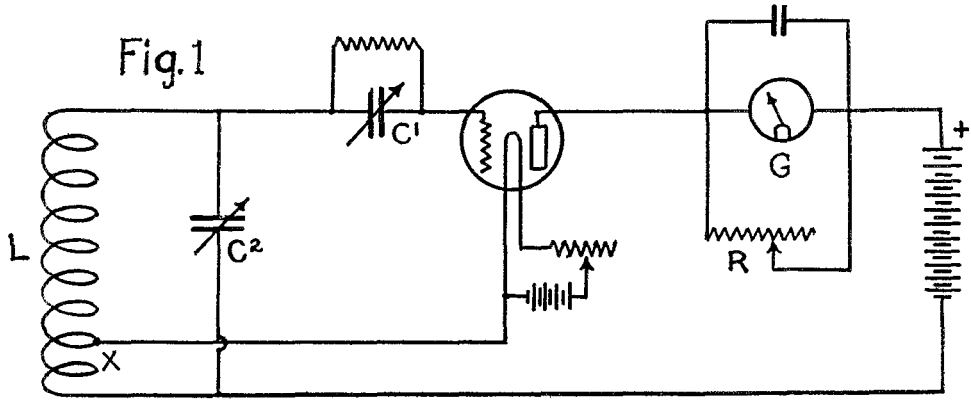
Measurement of Wavelength, Capacity and Inductance With Oscillating Vacuum Tube

By H. E. Rawson

Ever spend a Sunday afternoon in fruitless effort to obtain the natural period of your antenna by the old method of exciting it with a buzzer or spark-coil? Then you will appreciate this. The comparison method of measuring wavelengths and capacities by means of the oscillating VT is a beautiful one, and is now employed altogether in research work. No other method will approach it, not only for accuracy, but for simplicity and ease.—Editor.

MOST of the methods for measuring the constants of oscillatory circuits involve either a rough means of putting the circuit in oscillation, or a determination of resonance by ear, or both. Very frequently the power required to generate these oscillations is so great that inaccuracies from too close coupling materially effect the accuracy of the measurements. Also the point of resonance as determined by the ear is not sharply defined. With the almost universal use of the vacuum tube of today it is a very simple and easy matter for anyone to make these measurements quickly and very accurately. The regular receiving tube has sufficient power for all ordinary purposes, and the apparatus in any amateur station can be used for this purpose,—the only special instrument of any kind required being a sensitive DC milliammeter.

The method briefly outlined below is in wide use by radio engineers in this country, and because of its simplicity and accuracy should appeal to amateurs and be more generally used by them than it has been. The circuit for supplying the power is shown in figure 1. Any air core inductance on which a third tap is obtainable will do for L, provided of course that LC2 is of approximately the correct frequency for the circuit to be measured. Condenser C1 is of importance in making the tube oscillate easily, and is usually provided with a leak of a megohm or two. The tap-off point X is usually at about one fifth the total number of turns; and for best results, especially on short waves, it is advisable to have no dead ends on the coil L. In order to cover a large range of frequencies it is necessary to have a set of these inductances, as with a wavemeter, and these may cover wave lengths from a few meters to thirty thousand or higher if desired. The DC Milliammeter or Galvan-



ometer G, may conveniently be shunted with a variable resistance R so that the current-deflection may be regulated to a suitable value. The Model 301 Weston 1 milli-ampere meter is excellent for this circuit, and inexpensive as well.

When such a circuit is set up and a proper adjustment of grid condenser C1 is made, it will oscillate freely. An observation of G will show a large deflection when when the tube is not oscillating, and very little when it is oscillating. When it is oscillating however, and is loosely coupled to another circuit which is nearly resonant with it, and C2 is varied, a large deflection of G will take place at exact resonance of the two circuits, showing a transfer of energy from the power circuit to the circuit being measured. This point of maximum deflection is extremely sharp, and an extension handle on C2 will usually be necessary to get and hold this point as the capacity of the hand will often effect the reading. It is an easy matter to demonstrate or test the fact that the circuits are in resonance by shorting the condenser in the measured circuit with the tips of the fingers, when G will drop back to its low position showing that the transfer of energy has been stopped.

For measuring the wave length of a receiving set or other similar circuit, the oscillator or power circuit is **loosely** coupled to the circuit to be measured and, with the proper coil at L, an adjustment of C2 is made to produce the kick of resonance at G. When this kick is permanently held and tested by the fingers on the second circuit, the power circuit is no longer touched or disturbed in any way. The measured circuit is removed and an accurately calibrated wavemeter, (without which no successful amateur should be) is **loosely** coupled to the power circuit and is now adjusted until the same sharp deflection at G is obtained. (This may not be as large a deflection as the other, depending on the looseness of coupling, but should be the maximum point of movement of the needle, and should be very sharply defined). The wavelength of the wavemeter is now exactly that of the circuit previously in resonance with the power circuit. A moment's reflection will show the ease, rapidity and accuracy of making this measurement. In the same way the natural period of an antenna may be determined in a few seconds by grounding it with a single small turn in the ground lead, putting the power circuit in resonance **loosely** coupled to this single turn, and then substituting a wavemeter for the antenna circuit. After hours of tedious guess-work with buzzer, detector and phones, it is a revelation to find how simple it is with this method to get the period of an antenna.

For measuring the capacity of a condenser, an inductance is connected to it to make an oscillatory circuit, the power circuit is resonated to it, and then a calibrated variable condenser is substituted for the one being measured and is adjusted to resonance with the power circuit. As the same inductance is used in both cases it is obvious that the capacity of the calibrated condenser as set for resonance is the same as that of the one being measured. Care should be taken to use an inductance with very low distributed capacity. The same procedure is followed for getting the inductance of a coil, provided a calibrated continuously-variable inductance of low distributed capacity is available. It will be noted that no calculations of any kind whatever are required in these measurements so far. If, however, no calibrated variometer is obtainable but a fixed inductance of known value is at hand, this may be used to substitute for the one to be measured, using a variable calibrated condenser to obtain resonance in both cases.

(Continued on page 65)

The history of the vacuum tube as a measuring device is almost as ancient as its history as an amplifier. To prove it we offer here, as part of the anniversary series of "classic" QST articles, two papers that have a certain kinship despite seven years' separation in time. The now familiar grid-dip meter, originally described by W. A. Hoffman in August 1926 QST, was a successor to the earlier "plate-kick" meter discussed by H. E. Rawson in the August 1919 issue.

A Grid-Meter Driver

By W. A. Hoffman*

MEASUREMENTS at radio frequencies depend largely upon some form of radio frequency generator, or driver. A glance through the new issue of Robison's *Manual of Radio Telegraphy and Telephony*, a splendid manual and authority on latest radio practices, shows that out of twenty six measurements described, sixteen require the use of a radio frequency driver.

A driver should be a persistent oscillator at all possible adjustments of the constants making up the radio frequency circuit. If energy of variable strength is to be transferred to other circuits, the variation can be brought about easily by means external to the oscillator. It should only be necessary to connect the proper A-and B-power supply to the driver unit and to make the required adjustment for wavelength or frequency.

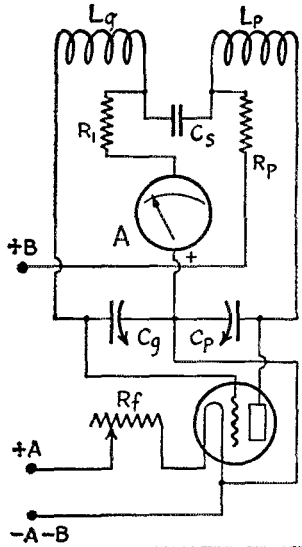


FIG. 1. THE SCHEMATIC CIRCUIT

A 0-15 milliampere meter
Cg-Cp Cardwell double unit condenser, 350-μμfd. each
Cs Dubilier Micadon fixed condenser, 6.000-μμfd.
T Tube, 199, 201-A or 210, depending on power required
Ri Grid leak resistance, 5000 ohms
Rf Filament rheostat
Rp Plate supply resistance, 100 to 500 ohms
Lg and Lp coils on common tube, 3" diameter and 4½ inches long

		Wavelength range
Coil 1	2 turns each section No 16 D.C.C.	12 to 32
Coil 2	5 ditto	25 to 67
Coil 3	13 ditto	54 to 150
Coil 4	33 turns each section No 22 S.C.C.	135 to 370
Coil 5	74 ditto (bank wound)	310 to 800

A driver filling these requirements, and having a range from 12 to 800 meters, has been in use for making all sorts of R. F. measurements at the C. F. Burgess Laboratories for more than a year. Recently this driver has been duplicated in a convenient and compact form. A complete description and photographs of the latest type appears in the following paragraphs.

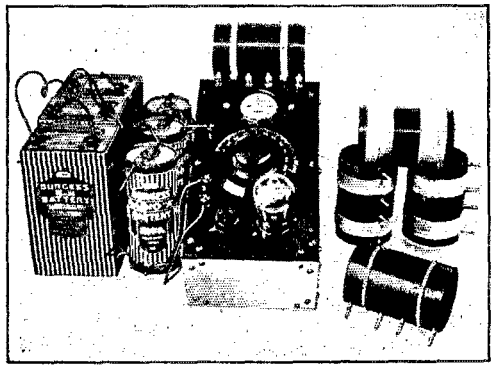


FIG. 2. OSCILLATOR AND ALL COILS

All the parts are mounted on the panel which is a 3/16 inch piece of bakelite 6 x 10 inches. This panel is securely secured to the top of an aluminum case built up on brass angles in the corners and round the top. The case measures 6 x 4½ x 10 inches, outside dimensions. A double unit Cardwell receiving condenser is mounted in the center of the panel. A National Velvet vernier dial gives the necessary slow motion control. At one end of the panel the tube socket and filament rheostat are mounted, while at the other end there are four binding posts for receiving the driver coils, and a 0-15 Jewell milliammeter for registering the tube grid current. Five plug-in coils are wound on 3" bakelite tubing, and are equipped with General Radio 274-P plugs.

The schematic diagram shows the circuit arrangement. Capacity reaction is included between the tube elements in a manner which maintains a one to one ratio for all adjustments. The milliammeter is in series with the grid leak resistance and registers the grid current. A resistance is also provided in the A-battery supply. No R. F. chokes are required at any frequency.

The driver will operate equally well with the 199, 201-A or 210 type tube. It is only necessary to connect the proper filament and plate voltage for operation of the tube desired. The receiving tubes furnish sufficient power for most measurements, using from 45 to 135 volts of B battery. The 210 tube will furnish more power when required for

* C. F. Burgess Laboratories, Madison, Wisconsin.

such measurements as high frequency resistance. Plate voltages as high as 350 or more may be used.

The grid milliammeter is for indication of resonance between the driver and another tuned or resonant circuit. This method of resonance detection makes use

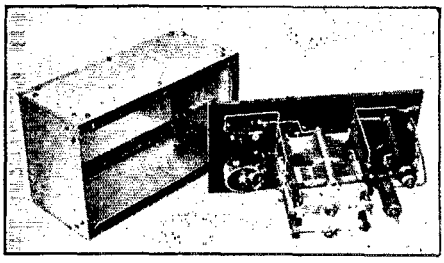


FIG. 3. INSIDE OF OSCILLATOR AND CASE

of the fact that the value of grid current in an oscillating tube circuit drops off sharply at resonance with a coupled circuit. Resonance is indicated by a pronounced dip of the milliammeter. The point of maximum deflection denotes resonance between the driver and the external circuit. The click method may also be used, if desired, by connecting a pair of telephones in series with the positive of the B-battery supply.

Some Applications

One important use for the driver, probably of interest to all amateurs, is the accurate calibration that can be obtained on a wavemeter from standard frequency transmissions. The procedure is as follows:

Tune in the standard frequency signal on a receiver in the usual manner and adjust to zero beat. Set up the driver one or two rooms away from the receiver. This will be loud and can be heard on a loud speaker. Adjust the driver to zero beat with the receiver. Next couple the wavemeter loosely to the driver and find resonance by the dip on the grid milliammeter This setting of the wavemeter will be the setting for the standard frequency being received.

Where direct coupling cannot be made to a coil or circuit under measurement, such as is sometimes found in a cabinet of when the coil to be measured is surrounded by other apparatus, coupling may be obtained by the use of a link circuit. The link may consist of a closed loop of insulated wire having two or three turns at each end, with the intermediate portion formed into a twisted pair. The coil at one end is coupled to the driver while the coil at the other end is coupled to the circuit under measurement. The total length of the link coupling conductor should not exceed one half wavelength. Resonance will be indicated in the same manner as though direct coupling were being used.

"Plate Kick" Meter

(Continued from page 63)

Then $LC = L'C'$

Where L = unknown inductance.
L' = known inductance
C = first value of capacity
C' = second value of capacity

$$\text{and } L = \frac{L'C'}{C}$$

For measuring the effective capacity of an antenna, the natural period is first obtained as outlined above. Then a capacity of known value is inserted in series with the lead-in, and the resultant wavelength measured.

$$\text{Then } C = C' \frac{\lambda^2 - \lambda'^2}{\lambda'^2}$$

Where C = effective capacity of antenna
C' = capacity inserted
λ = natural period of antenna
λ' = second wavelength of antenna

The same method is used for obtaining the inductance of an antenna, inserting a coil of known inductance, when

$$L = L' \frac{\lambda^2}{\lambda'^2 - \lambda^2}$$

Where L = effective coefficient of self-induction of antenna
L' = inductance inserted
λ = natural period of antenna
λ' = second wavelength of antenna

It is wise to use capacities and inductances of values as widely different as possible from those assumed correct for the antenna in question, and highly important to use inductances of very low capacity. If this is not done it will be necessary to compensate for the capacities of the coils in arriving at a correct figure for the true inductance of the antenna. It is also desirable to use two or three capacities and inductances of different values, thereby getting several readings, the mean of which will be more accurate than any single reading.

The above briefly outlined method is capable of many variations to suit the needs of the experimenter and is indispensable in any laboratory or factory where frequent measurements of wavelength, capacity or inductance must be made rapidly and accurately.

Strays

This photograph shows a practical application for a little-used war surplus item. The antenna belongs to WA9DZL, the ground communications section of the Wisconsin Air National Guard at General Mitchell Field, Milwaukee, Wisc. The antenna is mounted on a war surplus boom from a KC-97 mid-air refueling airplane. The beam is 27 feet high and can be raised hydraulically to 47 feet.

A Worked All Nova Scotia award certificate is now offered by the Nova Scotia ARA to any radio amateur who meets the following requirements:

1. Any amateur *outside* of Nova Scotia, New Brunswick, and Prince Edward Island, who submits proof of having established phone or c.w. contacts on any amateur bands, with one amateur operating his home station, and/or portable station in each of the 15 counties of Nova Scotia. Sable Island may be substituted for one county.

or

Any amateur *in* Nova Scotia, New Brunswick, and Prince Edward Island, who submits proof of contacts located in each of any 15 counties of Nova Scotia, or 14 counties, plus Sable Island. In addition, any 10 counties on any band other than the band of those submitted in the first 15 must be worked and proof submitted.

2. All contacts must have been established while operating a fixed or portable station. Contacts between stations operating mobile may not be used.

3. The amateur seeking the award must have established all his contacts while operating from his home station, or within an area having a radius of no more than 10 miles from the regular home station. He may, however, use contacts established with other stations operating portable anywhere in a county.

4. Contacts must have been made after June 1, 1960.

5. Applications, accompanied by the 15 or 25 QSLs and 15-cents return postage, must be submitted to the Nova Scotia ARA, P.O. Box 663, Halifax, Nova Scotia, Canada.

The Orlando Hamfest last April had to vacate its hall on short notice to allow for a banquet honoring Astronaut John Young. Among the VIPs present was Vice President Hubert Humphrey, who popped in on the hamfest crowd to express his appreciation. W4BKC and W4NGR rigged up a p.a. system with a Gonset II and a loud speaker borrowed from the swap table. Orlando Amateur Radio Club prexy K4KRG behind the Veep, later presented him a certificate as an honorary club member, which Mr. Humphrey promised to flash at Barry Goldwater, K7UGA, the next time they met.

The Santa Barbara (California) Amateur Radio Club sponsored a booth at a recent hobby and sports show and it turned out to be the hit of the whole show. Headed by President WA6THG, a committee set up the exhibit which featured the broad spectrum of ham activities.

A world map illustrated with QSL cards from a variety of countries bespoke the cause of international friendship via ham radio. An oscilloscope transformed the public's voice into visible waves and created a great deal of interest, especially among the children. Some 1920 radio gear loaned by W6GH, brought back memories to many of the older visitors to the booth. Shown in the photograph are WB6JQL and one of the show "Queens," operating a station set up in the booth. *(Photo by WA6NQS)*

I.A.R.U. News

INTERNATIONAL AMATEUR RADIO UNION

FINNISH AMATEUR LICENSING

In Finland, the licensing authority for amateur radio is the Administration of Posts and Telegraphs. All licensed radio amateurs *must* belong to the Suomen Radio-amatooriliitto r.y. (SRAL), the national society. If a Finnish amateur's SRAL membership expires, his license is withdrawn automatically. Since the SRAL has been authorized to control its members' amateur radio activities, the Society may take fast action when notified that anyone has broken the rules.

Three classes of amateur license are available to individuals or registered club groups which belong to SRAL. Novice Class applicants must send and receive code at 40 characters per minute (8 w.p.m.); General Class, 60 characters (12 w.p.m.). Technician Class applicants must pass a written examination, but need not take any code test.

Novice Class licensees are authorized maximum power of 15 watts (10 watts plate dissipation), crystal controlled, c.w. only, on 3.510-3.545, 7.020-7.050 and 21.060-21.150 Mc; types A1, A2, A3, F1 and F3 emission may be used throughout the 144-146 Mc. band. General Class licensees may use a maximum 200 watts (75 watts plate dissipation) as follows: 3.500-3.600 Mc., c.w. only; 3.600-3.800, phone only; 7.000-7.050, c.w. only; 7.050-7.100, c.w. and phone; 14.000-14.100, c.w. only; 14.100-14.110, c.w. and RTTY; 14.110-14.350, c.w. and phone; 21.000-21.150, c.w. only; 21.150-21.450, c.w. and phone; 28.000-28.200, c.w. only; 28.200-29.700, c.w. and phone; 144-146 Mc., c.w. and phone; and most modes on 430-440 Mc. and higher frequency bands available in Region I. In addition, with special permission from the Administration of Posts and Telegraphs, Finnish amateurs may operate on

DX OPERATING NOTES

(**Bold face** indicates changes since the most recent *QST* listing.)

United States Reciprocal Operating Agreements currently exist *only* with: Australia, Belgium, Bolivia, Canada, Colombia, Costa Rica, Dominican Republic, Ecuador, Luxembourg, 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, Greenland (XP calls only), Haiti, Honduras, Israel, Liberia, Mexico, Nicaragua, Panama, Paraguay, Peru, and Venezuela. Permissible prefixes are: CE CM CO CP EL HC HH HI HK HP HR OA PY TI VE VO XE XP YN YS YV ZP and 4X. CANADIAN radio amateurs may handle these relatively unimportant third-party messages with amateurs in Bolivia, Chile, Costa Rica, El Salvador, Honduras, Mexico, Peru, U. S., and Venezuela. Permissible prefixes are: CE CP HR K OA TI W XE YS and YV.

DX Restrictions

United States amateur licensees are warned that international communications are limited by the following notifications of foreign countries made to the International Telecommunications Union under the provisions in Article 41 of the Geneva (1959) conference.

Cambodia, Indonesia (including West[1] New Guinea), Thailand and Viet Nam 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 the U.S. and Vietnamese administrations and is authorized to handle third-party messages with U.S. amateurs.

OH2A, the Headquarters station of SRAL in Helsinki.

1.820–1.845 and 1.915–1.955 Mc., c.w. and phone, with 10 watts input. Technician Class licensees have full privileges on the 144 Mc. and higher Finnish amateur bands.

The license fee (to the Posts and Telegraphs Administration) is the equivalent of $3.50 U.S.; General and Technician Class licenses are renewable every five years, without re-examination if renewed before current licenses expire. The Novice Class license is valid for three years and cannot be renewed. The required SRAL membership costs $1.50 for initial registration plus $6.00 annually, the latter including a subscription to *Radioamatoori*, the SRAL monthly magazine.

Licenses usually are granted to foreign amateurs, for a maximum of one year at a time, only when a reciprocal agreement exists, although there have been a few exceptions. No mobile licenses have been given to foreigners.

There are approximately 2000 members of SRAL, of which some 1800 are licensed amateurs. Requests for more information may be sent to Osmo Wiio, OH2TK, President, or John Velamo, OH2YV, Secretary, SRAL, P.O. Box 10306, Helsinki 10, Finland.

NEW IARU MEMBER — NIGERIA

The Nigerian Amateur Radio Society received the unanimous approval of the member-societies participating in last year's balloting, and the Union therefore is pleased to welcome its 66th member.

The NARS has a total of 43 members, 21 of whom are licensed radio amateurs. Headquarters address is P. O. Box 2873, Lagos and the officers include 5N2RFB, President; 5N2KOB, Secretary and Treasurer; and 5N2AAF, QSL Manager. QSL Bureau address is P. O. Box 1044, Zaria. There is no age limit for license applicants, who must pay an application fee equivalent to $14 U.S. and must pass a written examination and 12 w.p.m. code test. Licenses are renewable annually for $14 and permit a power input of up to 50 watts on only the 3.5 to 28 Mc. Region 1 amateur frequency bands. Mobile operation may be conducted with special permission. Licenses are normally available only to Nigerian citizens or British Commonwealth subjects, although there have been occasional rare exceptions.

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Voting is currently in progress on applications from Czechoslovakia and Nicaragua; results should be available in midyear. Headquarters welcomes applications from any society in a country not presently represented.

U. S. — UNITED KINGDOM RECIPROCITY

A reciprocal operating agreement went into effect between the United Kingdom and the United States on November 26. The U.K. had previously signed agreements with Austria, Luxembourg and the Netherlands. Those interested in more information should contact the Radio Society of Great Britain, 28 Little Russell Street, London W.C. 1, England. The other U.S. agreements are listed elsewhere in this department.

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All mail for the Bahamas Amateur Radio Society should now be sent to P. O. Box 913, Nassau, Bahamas.

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The address for the Swiss society has been changed to: Union Schweiz Kurwellen-Amateure, CH-6233 Bueron, Switzerland.

RECIPROCAL OPERATING RULES FOR HK

We have information on operation in Colombia, through the courtesy of William Elasmar B., HK3RQ, president of the *Liga Colombiana de Radio-Aficionados* (LCRA).

The application for operating permission must be presented in Spanish, 60 days prior to the date on which operation is expected to begin, and must be accompanied by the following documents:

a) A photocopy of the original license.
b) Number and expiration date of a valid passport.
c) Police Certificate, issued by Colombian authorities.
d) A letter from the respective consulate asking for application permission.
e) Three photographs, passport size.
f) Four sheets of "official paper," to be attached to the application.

HK3RQ advises that although the meaning of "official paper" may not be clear, this refers to a special kind of paper available there for one peso per sheet; this is the type which Colombian amateurs must use in connection with any applications submitted to their government. Anyone interested in applying for operating permission should contact LCRA, by mail, to Box 584, Bogota, or by visit to Dr. Elasmar at Carrera 8 No 13-83 in Bogota. QST

Results Fifth Annual RTTY World-Wide Sweepstakes

THE fifth annual World-wide SS contest this year showed an upward trend in participation and the top-ten scores are up over last year's top-ten group.

The listing to follow shows the total score for each station.

SCORES

TOP TEN

I1AHN	65,200	G3MWI	45,410
SM6CSC	56,400	ON4BX	43,600
I1ORS	46,866	DJ6ZBA	43,060
K8MYF	46,448	WA4LWE	42,816
I1RIF	46,200	W2RUI	37,760

Soapbox

"Propagation was nothing special but not bad. All in all, I enjoyed the game once again!" — *I1RIF*

"It's funny — by the end of the contests you are sick of it — a week later you are looking forward to the next one!" — *W8CQ*

"Standard of operation was much better but band conditions were bad from here." — *ZS6UR*

"Do you give a lowest score award? Hi!" — *W9CTX*

"It was a 'cosy' contest and I'm waiting for next year's go-sign where I hope to run a better station." — *OZ7OF*

"A very good contest, lots of DX but missed Asia again this year." — *W8FWG*

"Enjoyed the contest. Looking forward to the next one!" — *KH6ANR*

"I made a special point to be on the air and put Holland in some of the logs. Thank you for a fine contest." — *PA0FB*

"My first try at a world wide RTTY contest. Sure had fun." — *W9HJV*

"I learned a lot this time and will be back for the next one with an armload of improvements. I would like to thank all the fine guys who carried me through this one!" — *VE2HL*

"Enjoyed the contest very much. It is better than the SS one or c.w. and guess I have found my utopia in ham radio —, RTTY!" — *K8RFU*

"After preparing for six months — I had the bad luck to burn the plate transformer on my transmitter on the morning of the 17th!" — *XE1YJ*

"It was good fun and being a new RTTY operator I have gained some valuable experience in operating in contest fashion!" — *G3LDI*

"Had a terrific time but am a little disappointed over conditions, they sure fooled my calculations which goes to show you can't trust computers!" — *K1W6DS*

"The age here is 15 and I slept through school on Monday!" — *WA8POU*

"Had a jolly good time and although I will not be in the top ten at least I gave out a few points. Hi!" — G2HIO

"Loads of fun!! The spirit and the flesh were willing but — blew a filament transformer Friday night, the wind blew down my 10/80 inverted V on Saturday, high-power troubles on Sunday — Murphy's law!" — *WA6WGL*

"Everyone was very courteous and this was my first chance at some RTTY DX." — *K7MNZ*

"It was quite a thrill this time because there was activity on the bands almost all around the clock!" — *SM6CSC*

"Got a big kick out of the SS and am amazed at the number of stations with this capability!" — *K2YEQ*

"Band conditions were excellent — will be looking forward to the next one . . ." — *W4GJY*

"Sorry so many fellows don't like the scoring. I think it is fine. I have fun and enjoy it no matter how you score." — *K8MYF*

"Enjoyed the contest tremendously and hope to compete again next year." — K5OLU

"This was my first time on RTTY and I sure enjoyed it . . ." — *K3WUW*

SCORES

W1GKJ	24,896	K8RFU	12,948
W1BDI	3,296	W8OMY	1,220
K1IAG	3,080	W9BCY	27,284
W1BZT	2,128	K9QNV	8,052
W1AW	192	W9HXW	7,364
W2RUI	37,760	W9HJV	5,448
W2LNP	13,544	W9CTX	1,760
WB2AHB	7,928	W0RX	6,262
WA2KIZ	4,858	W0FQW	5,866
W2FAN	3,400	DJ6ZBA	43,060
K2YEQ	1,310	F2FO	11,410
W2UJS	1,064	F3PI	6,400
W3KDF	30,324	G3MWI	45,410
W3PYW	26,304	G2HIO	17,830
WA4LWE	42,816	G3LDI	6,830
W4AIS	24,934	GM3IQL/A	7,750
K4CG	15,920	HB9P	8,040
W4CQI	14,150	I1AHN	65,200
W4GJY	8,240	I1ORS	46,866
K4DVM	992	I1RIF	46,200
W4AWY	890	I1KG	19,040
K5OLU	19,840	I1LCF	5,300
WA6WGL	17,920	KA2RJ	10
W6EV	12,194	KH6ANR	2,694
W6CG	10,708	KP4AQL	7,240
W6LVQ	6,440	KW6DS	20,410
W6WLI	2,960	ON4BX	43,600
W6MTJ	2,094	ON4HW	18,320
W6IWQ	1,202	OZ7OF	1,320
W6OWP	804	PA0FB	7,800
W7ESN	29,236	SM6CSC	56,400
K7MNZ	9,840	VO1DZ	2,042
W7CBY	3,180	VE2HL	14,080
W7LI	1,344	VE3IR	20,522
W7HFH	570	VE3GK	8,370
K8MYF	46,448	XE1YJ	2,572
W8CQ	35,460	ZL1WB	3,140
WA8POU	31,200	ZS6UR	20,240
W8FWG	18,876	4M5A	16,048

Indiana — The 13th Annual Banquet of the Lake County Amateur Radio Club, Inc. will be held at Teibel's Restaurant, U.S. 30 and 41, at 6:30 P.M. February 12. Tickets are $4.00 from W9EGQ, 385 Johnson St., Gary, Ind. 46402.

New Jersey – The East Coast VHF Society Hamfest will be held February 6 in Saddle Brook.

Ohio — The Toledo Mobile Radio Association announces that their annual Auction will be held at the Lucas County Recreation Center, Maumee, Ohio, on Sunday, February 13. For further information, contact K8LFI, 5030 Janet Avenue, Sylvania, Ohio 43560.

Oklahoma — The Lawton-Fort Sill Amateur Radio Club will hold its annual Founder's Day Hamfest Sunday February 13 at the National Guard Armory, Lawton, Oklahoma. Pre-registration fee is $3.50 which includes the noon meal. A pre-Hamfest get-together will be held Saturday night at Underwoods Cafeteria. Registration and information from W5FKL, Lawton-Fort Sill ARC, P.O. Box 892, Lawton, Oklahoma 73501.

Texas — The Houston Amateur Radio Club Old Timers Night will be held February 18. Soupy Groves will be guest speaker and an old spark transmitter will be set up so the young squirts can get a look at it!

Hints and Kinks For the Experimenter

USING 8-MC. CRYSTALS WITH THE SR-42 AND SR-46

BECAUSE an overtone oscillator is used in the Hallicrafters SR-42 and SR-46 transceivers, 8-Mc. fundamental crystals will not perform satisfactorily in these units. The transmitter output frequency will not be an exact multiple of the crystal frequency because of the oscillator's overtone mode. Futhermore, most 8-Mc. crystals do not permit the oscillator to deliver sufficient power output to properly excite the next stage in the Hallicrafters units. The manufacturer recommends the use of 24- to 25-Mc. overtone crystals. Although TVI reduction is the purpose behind this scheme, the 24-Mc. crystals are somewhat more expensive than the 8-Mc. war-surplus species. Many v.h.f. operators have an existing supply of 8-Mc. "rocks" and would like to be able to use them.

A practical solution to this problem can be achieved by the use of an outboard oscillator assembly connected to the transceiver's power supply through the v.f.o. accessory socket at the rear of the transceiver chassis. The 24-Mc. output of the outboard unit is fed to the transceiver through the v.f.o. socket. The outboard oscillator, a grid-plate type, triples in the plate circuit,

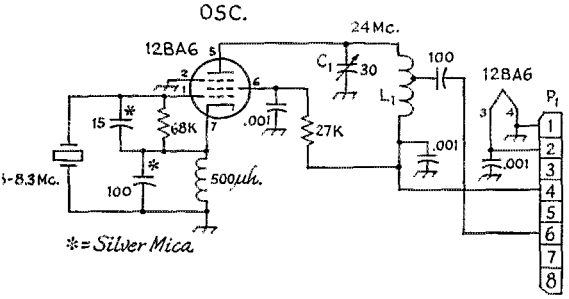


Fig. 1—W1CER's oscillator for the SR-42 and SR-46. Except as noted, capacitors are ceramic and resistors are ½-watt composition.

C_1—30-pf. variable (Hammarlund MAC-30).

L_1—14 turns No. 18, ½-inch diam., 8 turns/inch tapped at 8½ turns from the bottom end (B&W Miniductor 3002).

P_1—Octal plug.

producing r.f. output energy in the 24- to 25-Mc. range. Because of the accessory socket wiring, "spotting" is made possible with the outboard unit in the usual manner.

The outboard oscillator was constructed on a 2¼ x 2¼ x 4-inch Minibox. No TVI troubles have been experienced while operating with 8-Mc. crystals. — *W1CER*

AUDIO LIMITER FOR C.W.

A SIMPLE audio limiter making use of the threshold voltage of silicon diodes can easily be contained in an extension jack such as the Switchcraft type 830. Fig. 2 shows such an assembly, which is also provided with a short length of 2-conductor cable (single conductor with shield in this case) and a phone plug. The whole business serves as a phone-cord extension that can quickly be taken out of the circuit when desired.

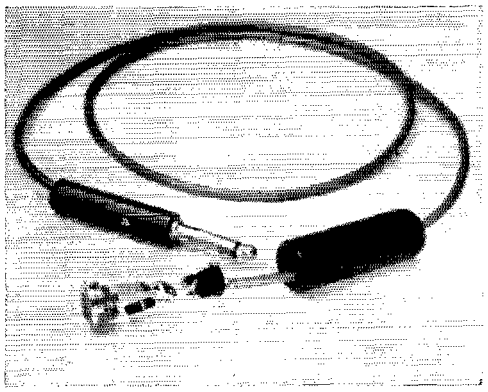


Fig. 2—C.w. limiter built in an extension jack, using the circuit of Fig. 2. The two diodes and R_1 are clustered at the right-hand end. R_2 is soldered to the jack-spring contact at the left.

The limiter circuit used is shown in Fig. 3. P_1 goes into the phone jack on the receiver, which usually is connected to a tap on the audio output transformer. As this is a relatively low-impedance audio source, R_1 is used to raise the impedance and thereby give the diodes something they can short-circuit effectively when the threshold level is reached. The value shown, 3300 ohms, represents a reasonable balance between good clipping and reduction in headphone signal strength. R_2 is not actually essential, but 1000 ohms resulted in a signal level satisfactory to the writer when using headphones having a nominal impedance of 500 ohms. It can be omitted if a higher level is

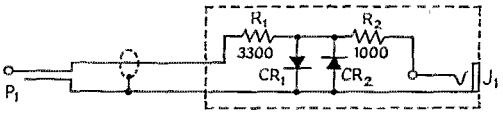


Fig. 3—Circuit of the diode limiter. J_1 is an extension jack (Switchcraft type 830) and P_1 is any suitable type of headphone plug. Other components are discussed in the text.

wanted. Any physically-small silicon diodes having a p.i.v. rating of 50 volts or so can be used.

A disadvantage of this type of circuit is that the maximum level is fixed by the characteristics of the diodes, which clip at about 1 volt peak-to-peak. This is good, but not ear-shattering, headphone volume in phones of 500 ohms impedance or higher. The fixed level is far outweighed by the advantage of battery-less operation. — *W1DF*

TRANSISTOR OSCILLATOR

A SIMPLE transistor oscillator for use with FT-243 and HC6/U surplus crystals is shown in Fig. 4A. The advantage of this circuit is that no tuned circuits are required. It may be used as an oscillator for a transmitter, local oscillator for a converter, or a low-level signal source. The improved circuit in Fig. 4B uses an additional transistor and diode to provide bias stabilization for the oscillator stage for applications where very stable operation is required. — A. *Rohrbacher, DJ2NN*, in DL-QTC. (RCA SK3006 and SK3004 transistors are shown in Fig. 4 in place of the AF127 and OC71 used by DJ2NN. The European transistors are not available here. — *Ed.*)

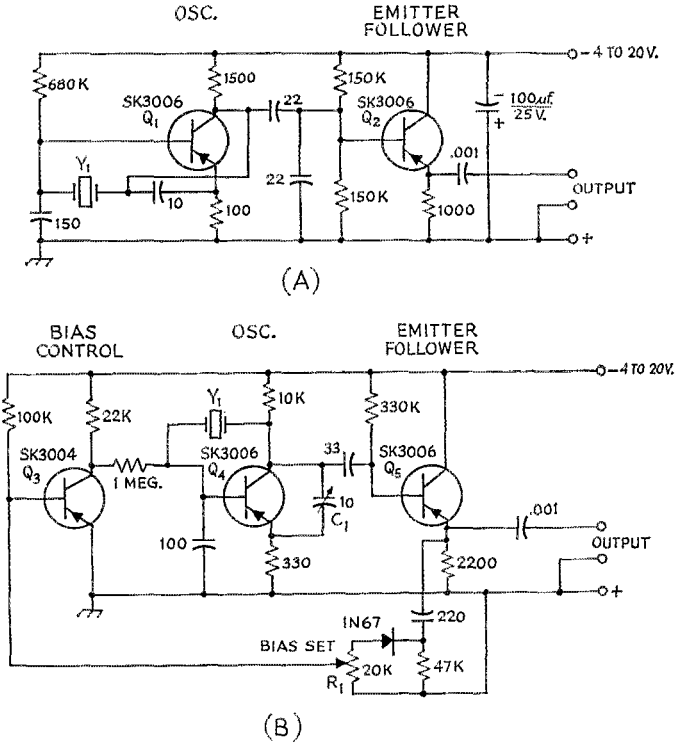


Fig. 4—(A) Diagram of the transistor oscillator for surplus crystals. (B) Another configuration providing high stability by regulating the oscillator's bias. Resistors are ½-watt composition; fixed capacitors are ceramic except those with marked polarities, which are electrolytic.

C1—10-pf. ceramic trimmer.
R1—20,000-ohm linear-taper control.
Y1—FT-243 or similar crystal requiring 26-pf. load capacitance.

SIMPLE LINEAR SWEEP FOR OSCILLOSCOPE

WHEN one changes from a.m. to single sideband, he can no longer use the familiar trapezoid oscilloscope pattern for monitoring his transmissions. If the scope includes a sawtooth

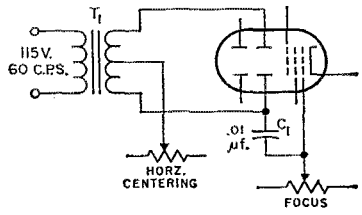


Fig. 5—A linear time base for an oscilloscope can be obtained from the "center" portion of a sine wave. Coupling the a.c. to the grid gives "intensity modulation" that blanks the retrace.

C1—Ceramic capacitor of adequate voltage rating.
T1—250- to 350-volt center-tapped secondary. If voltage is too high, use dropping resistor in primary side.

horizontal sweep oscillator there is no problem, of course, but there is an easy conversion for a scope with no oscillator.

A 60-cycle transformer with a center-tapped winding is required. An old 250- to 350-v.c.t. transformer will do. The exact value can't be specified because the horizontal deflection sensitivity varies with different types of tubes. The voltage should merely be sufficient to deflect the spot well off the screen on either side. You now have a substantially linear sweep but it is as bright on retrace as on left to right. To blank it in one direction, it is only necessary to couple the a.c. to the No. 1 grid of the scope. The circuit is shown in Fig. 5.

It will be found that the spot cannot be focused as sharply as before, and you will have to settle for a wider trace. However, it is still quite adequate for monitoring a linear amplifier's output. — *W1DX*

TUNING CAPACITOR HEAT SINK

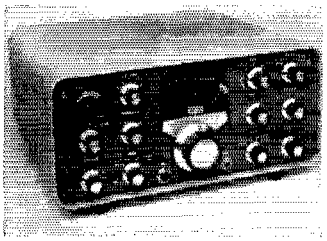
THE collector lead and case of an r.f. transistor are often internally bonded together. A local ham, Carlot Monser, uses the collector tuning capacitor as a heat sink in a transistor oscillator. The transistor's case and collector lead are clamped to the tuning capacitor. — *Liz Deck, K6MTQ*

SILVER POLISH IN THE HAMSHACK

ONE item that I have found to be quite useful in the hamshack is my wife's silver polish. I have used this polish to clean switch contacts, key contacts, silver-plated tank circuits, the TV set's channel turret contacts, and even the automobile distributor points. — *Arthur S. Gillespie, Jr., W4VON*

The Heath SB-110

6-meter Transceiver

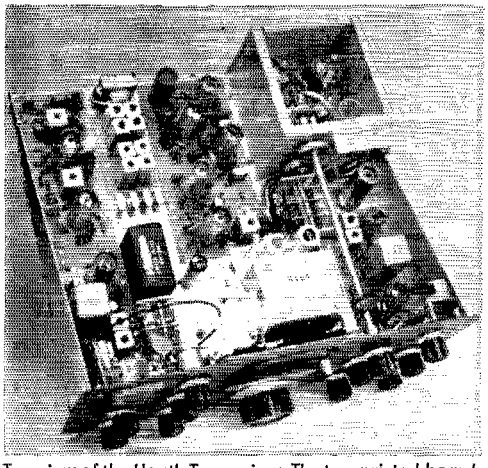


THE Heath SB-110 is a complete 6-meter sideband station with many of the "trimmings" that make operating simple and convenient. The Heath engineers have shoehorned 25 tube functions into the same case that is used for the rest of their SB line. The construction and alignment of such a unit is no easy job, but the finished product has about all the operating features one could ask for on the 6-meter band. However, the building job probably should only be attempted by those with previous kit-building experience.

Receiving

The receiver section of the SB-110 is shown in the top part of the block diagram, Fig. 1. A neutralized 6DS4 nuvistor is used as the r.f. amplifier, and it provides enough sensitivity so that you can always "hear your antenna." A second 6DS4 functions as the first mixer with injection from V_7, an overtone oscillator using crystals in the 41-to-43-Mc. range. Four crystals are provided with the SB-110 which will allow operation between 49.7 and 52.1 Mc. Other crystals may be purchased if operation between 52 and 54 Mc. is desired.

The output of the first mixer is fed through an 8.4-8.9-Mc. bandpass filter to the grid of the second mixer, V_{3A}. The oscillator injection for the second mixer is from a 5-5.5-Mc. linear-tuning oscillator. This linear master oscillator (l.m.o.) is furnished pre-aligned with the kit; the constructor only has to mount it and connect the dial. The output of the second mixer is passed through a 3935-kc. center frequency, 2.1-kc. bandwidth crystal filter, and amplified by two i.f. stages.



Top view of the Heath Transceiver. The two printed boards at the left are the receiver front end and i.f. amplifier. The final amplifier is located in the shielded compartment at the right.

The last i.f. stage is transformer coupled to the product detector; the oscillator injection for the detector is provided by the carrier crystal oscillator, V_8. A 2N2712 transistor and a 6EB8 amplify the audio from the detector, providing up to 1 watt output for an 8-ohm speaker. A headphone jack is also provided for those who like to use "cans." The headphone volume can be adjusted with a control inside the SB-110 so that it is at the same relative level as the speaker. Thus, when you plug in the headphones, the volume isn't ear-splitting as it might have been with the audio gain set to speaker level.

A 100-kc. crystal calibrator is provided for checking the dial calibration of the l.m.o. The adjustment of this crystal oscillator is critical at best. A 5-c.p.s. error at 100 kc. will put the crystal marker 2.5 kc. off at 50 Mc., but since the dial calibration can be accurate within 400 c.p.s., the setting of the calibrator capacitor must be "on the nose."

If you have neighbors that also operate 6 meters, you will appreciate the strong-signal handling capability of the SB-110's receiver section. Part of the reason that the receiver works well on very strong signals is because a.g.c. voltage is applied to the r.f. amplifier, as well as the i.f. stages. Anyone who has a nuvistor converter/communications receiver combination on 6 meters that has trouble with strong signals would do well to take a hint from Heath and change the r.f. amplifier to a 6DS4 and apply some of the receiver's a.g.c. to its grid.

Transmitting

The SB-110 uses separate crystal oscillators as the carrier generators for upper sideband, lower sideband, and c.w. The emission selector switch puts plate voltage on the proper oscillator for each mode and also shifts the l.m.o. frequency so that the dial reading remains the same regardless of which oscillator is used. The pentode section of a 6EA8, V_{10A}, amplifies the audio voltage from the microphone, and the triode section

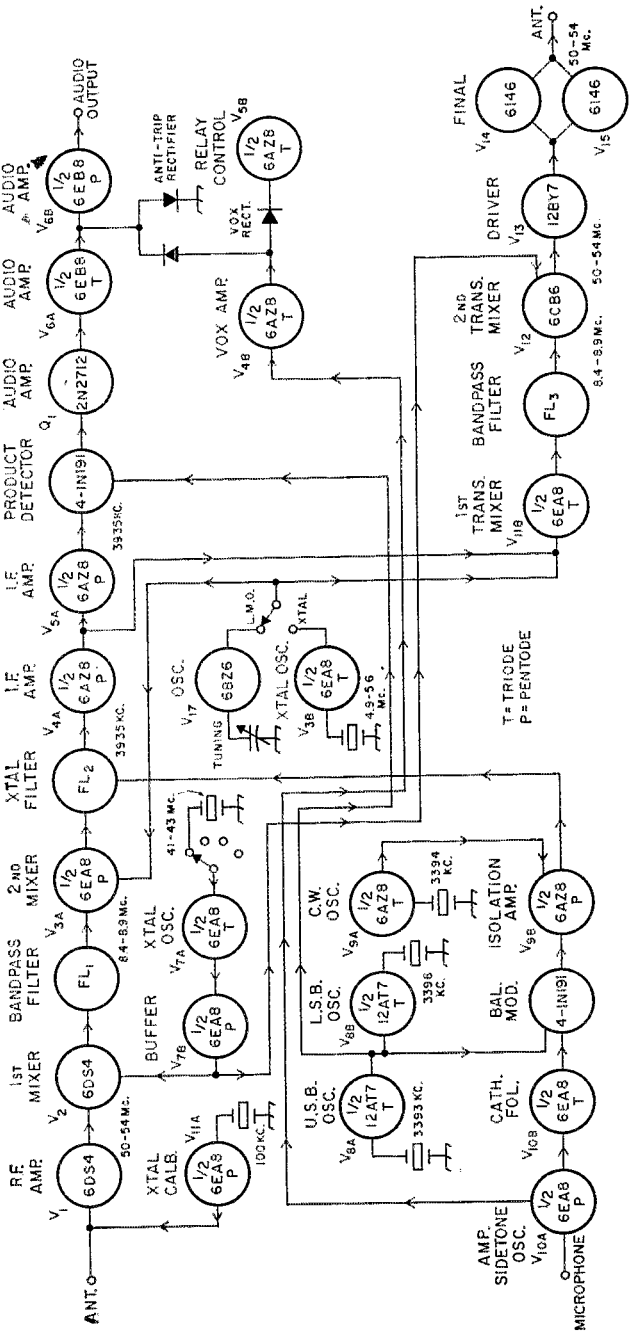


Fig. 1 — Block diagram of the SB-110.

of the same tube functions as a cathode follower to provide low-impedance feed for the diode-ring balanced modulator. An isolation amplifier, V_{9B}, is transformer-coupled to the output of the balanced modulator. When c.w. emission is selected, the output of the c.w. crystal oscillator, V_{9A}, is fed to the grid of the isolation amplifier. Also, when the c.w. mode is used, the emission switch applies a bias voltage through a control to the grid of the isolation amplifier. Adjustment of this control will vary the level of drive to the final amplifier. Contest operators who have to get down to 100 watts input to get a power multiplier will find this feature handy. The output of the isolation amplifier is passed through the 2.1-kc. crystal filter and amplified by the first i.f. amplifier, V_{4A}.

The rest of the mixing scheme is the same as described for the receiver, except in reverse. The first transmitter mixer heterodynes the s.s.b. or c.w. signal with the output of the l.m.o. to produce a frequency between 8.4 and 8.9 Mc. Output from the overtone oscillator is mixed in V_{12} with the 8-Mc. signal, converting it to 50 Mc. The 6-meter signal is then amplified by a 12BY7 driver and two 6146s. Nominal power input is 150 watts on c.w. and 180 watts p.e.p. on sideband.

A grid-current-actuated a.l.c. system is used to prevent overdriving the final tubes. A dual-time-constant filter is used on the output of the a.l.c. rectifier. A.l.c. voltage with a fast time constant is applied to the grid of the first i.f. amplifier, V_{4A}, while voltage with a slower time constant is connected to the grid of the isolation amplifier, V_{9B}. Up to 10 db. of a.l.c. control is available in the sideband mode.

On c.w., the two transmitter mixers are grid-block keyed. The emission-selector switch connects a phase-shift network between the grid and plate of the microphone amplifier, V_{10A}, so that this tube oscillates at about 1000 c.p.s. See Fig. 2. This 1000-c.p.s. signal is coupled to the VOX amplifier, V_{4B}. The grid of this stage also receives blocking bias except when the key is down, thus the VOX relay will be actuated by the 1000 c.p.s. tone when the key is depressed. At normal keying speeds, the VOX DELAY control can be set so that the VOX relay holds in until there is a pause in sending. Some of the 1000 c.p.s. tone is coupled to the receiver audio amplifier, V_{6B}, to provide sidetone monitoring.

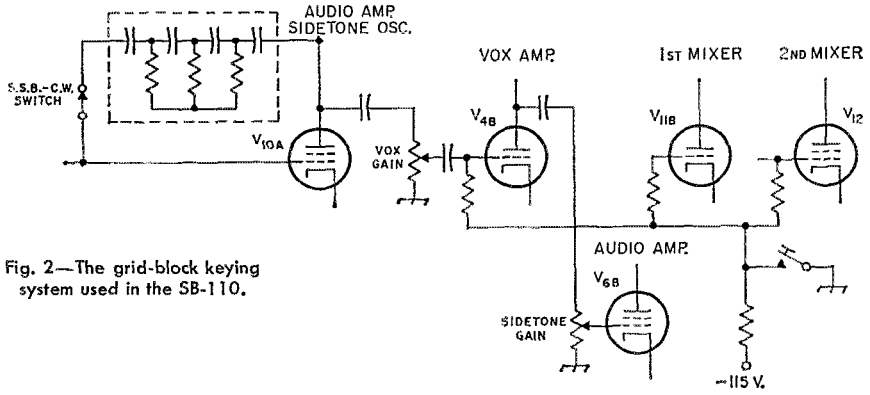
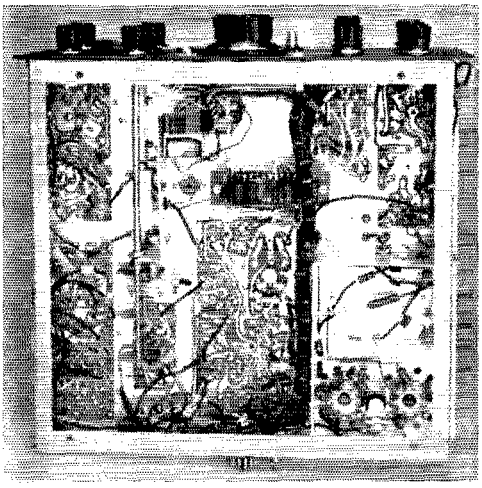


Fig. 2—The grid-block keying system used in the SB-110.

One feature in this rig will really appeal to the v.h.f. man. A front-panel switch will change the SB-110's transmitter to crystal control or allow crystal control of both the transmitter and receiver. A crystal between 4.9 and 5.5 Mc. is required; the instruction book has formulas for determining the proper crystal for any desired 6-meter frequency. MARS requires crystal control of transmitters on all their v.h.f. frequencies, so the 110 has not been "designed out" of this service.

Other features of the SB-110 include a spare jack on the rear panel (for use with a 2-meter transverter Heath has in the works), provision for push-to-talk operation, input for a.l.c. voltage from a linear amplifier, and a connection for activating an external antenna relay.

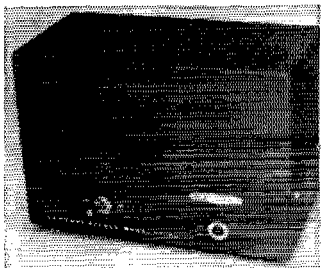
A large fold-out diagram is included with the instruction manual. This easy-to-read schematic has every lead labeled with its color code. With a diagram like this, a fellow can actually take a crack at repairing his own transceiver.



The major task in assembling the SB-110 is to interconnect the printed boards. This is done with two preassembled cables that can be seen running from top to bottom at the center of the unit.

Heathkit SB-110 Transceiver

Height: 6⅝ inches.
Width: 11⅞ inches.
Depth: 13⅜ inches.
Weight: 17 pounds.
Power Requirements: 700 v.d.c., 250 ma.; 250 v.d.c., 100 ma.; -115 v.d.c., 10 ma.; and 12.6 v.a.c. or d.c., 4.1 amps.
Price Class: $300
Manufacturer: Heath Company, Benton Harbor, Michigan



HP-23 A.C. Power Supply

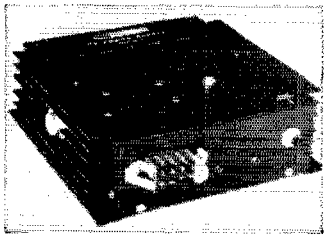
The a.c. power supply that runs the SB-110 is a multipurpose unit — it will also power Heath's new SB-100 transceiver and the "Single-Banders." In fact, a builder would be hard pressed to put together a similiar supply without spending more for the parts than he would for the HP-23.

The high-voltage output is 820 volts with no load, dropping to about 700 volts with a 250-ma. load. The effective output capacitance is about 60 μf., which keeps the ripple less than 1 per cent at full rated current output. Medium-voltage output is 250 or 300 volts (tap selected) at up to 150 ma. The medium-voltage ripple is less than 0.05 per cent.

A fixed bias of −130 volts no load or a variable bias of −40 to −80 volts at 1 ma. maximum is available. The transformer filament winding will provide 6.3 volts at 11 amps., or 12.6 volts at 5.5 amps.

Heathkit HP-23 Power Supply

Height: 6¼ inches.
Width: 9 inches.
Depth: 4¾ inches.
Weight: 16 pounds.
Power Requirements: 120 volts a.c., 50–60 c.p.s., 3.5 amps. max.
Price Class: $40
Manufacturer: Heath Company, Benton Harbor, Michigan.



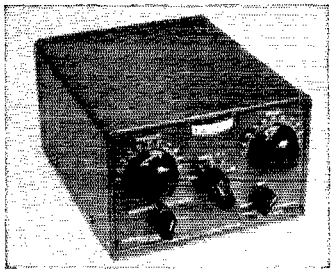
HP-13 Mobile Power Supply

The output voltages and currents of the HP-13 are similiar to the HP-23, as both supplies are designed to run the same transceivers. For full rated output voltages, the automobile must supply at least 13 volts.

Two transistors are used at a switching frequency of about 1500 c.p.s. The transistors are mounted on opposite sides of the case on a simply-designed heat sink — three pieces of channel of different widths bolted together and to the side of the supply case. The transistor is mounted in the center of this assembly. Anyone who can bend aluminum into a channel can make an excellent heat sink by the same method. — *W1KLK*

Heathkit HP-13 Mobile Power Supply

Height: 2½ inches.
Width: 7¾ inches.
Depth: 7¼ inches.
Weight: 7 pounds.
Power Requirements: 12–14 volts d.c. (negative ground), 25 amps. peak.
Price Class: $60
Manufacturer: Heath Company, Benton Harbor, Michigan.

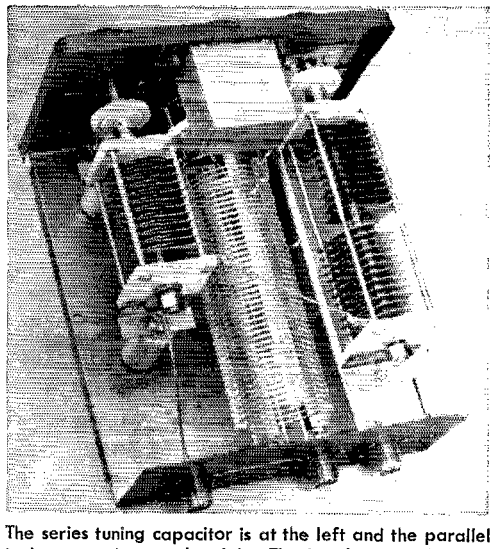


Millen Transmatch Junior

AMATEURS who have found themselves limited by the 50-ohm-only output impedance of their transmitters or transceivers now have a manufacturer coming to their rescue. As many a ham has found out the hard way, few antenna installations ever approach the ideal. Height above ground, nearby objects, and the droop or sag in the wires all affect the impedance of an antenna. Any antenna is a pure resistance only at its resonant frequency. Hang on an odd length of coax and it is anyone's guess what the impedance at the transmitter end of the coax might be! The simple solution to this problem is to use a coax-to-coax transmatch, such as the Millen Transmatch Junior. This unit is built specifically to match the impedance at the end of the coax from a multiband beam or dipole or a mobile antenna to 50 ohms.

The Millen Transmatch Junior is a variable L network and a Monimatch-type reflectometer in one box, similar to a unit described by McCoy some years ago.[1] It has a nominal power rating of 300 watts p.e.p. The Junior will match unbalanced loads as low as 5 ohms and up to several hundred ohms. The actual range of impedances

[1] McCoy, "The 50-Ohmer Transmatch," *QST*, July, 1961.



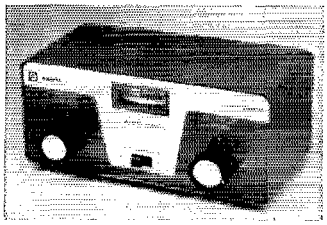
The series tuning capacitor is at the left and the parallel tuning capacitor at the right. The bandswitch is located underneath the shield for the edgewise meter. The Monimatch is located in the shielded box at the right, under the dual-section capacitor.

will vary slightly between bands; graphs in the instruction book detail the exact impedance range that can be matched on any one band.

The Transmatch Junior is compact; the case dimensions are only 6¾ × 4½ × 8½ inches. Two 3/16-inch holes are provided in the bottom plate of the unit for mobile mounting. The neat, clean layout and construction used by Millen will make any builder envious. The Monimatch circuit and its meter are completely shielded to prevent radiation from the matching section from upsetting the accuracy of the s.w.r. readings. The matching circuit consists of a single inductor with switch-selected taps for 80 through 10 meters, a dual-section parallel tuning capacitor, and a single-section series tuning capacitor. A link in the matching network samples the r.f. in the transmatch with the output available at rear of the unit for a modulation monitor or oscilloscope.

For those who use high power Millen also makes the Transmatch, which will handle up to 2 kw. peak and is otherwise similar to the Junior. The price class of the Junior (Model 92201) is $70; and the Transmatch (Model 92200) is $130. Manufacturer is James Millen Company, 150 Exchange Street, Malden, Mass. 02148 — *W1KLK*

Knight C-577 Compressor



THE purpose of a compressor (also called an *audio peak limiter* in the broadcast business) is to reduce the peaks of voice modulation, allowing a higher average level of audio to be used. The use of compression with an a.m. transmitter will allow greater power in the sidebands without exceeding 100 per cent modulation. Speech compression will permit s.s.b. transmitters to operate at higher average power levels before "flat topping" occurs. Compression is not something for nothing, as it will raise the level of any background noises and introduce some distortion of the audio. To be of real value, it must be used intelligently by the operator.

The Knight compressor uses an innovation this writer has not seen before; the peak limiting is accomplished by reducing the collector voltage of the first audio amplifier. Fig. 1 is a simplified diagram of the C-577. Q_1 is the gain-controlled stage. The compression level is set with control R_1. The second audio stage, Q_2, amplifies the audio signal which is then filtered by C_2–R_3. The output level to the transmitter is controlled by R_4.

When the peak audio voltage exceeds the bias provided for Q_3 by CR_1, Q_3 conducts. The current flow through Q_3 increases the voltage drop in R_2, reducing the voltage on the collector of Q_1 and changing its operating point. Time constant for the circuit is provided by C_1, CR_2, and R_5. The diode provides a fast attack by discharging C_1, and the resistor allows a slow decay of the compressing action by slowing C_1's recharge time. Obviously, the limitation of this circuit is that when the input to Q_1 goes up, its collector voltage goes down, lowering the dynamic range of the stage. Excessive input will cause severe distortion of the audio by Q_1. The operator must realize the limitations of the unit and not try to make it do too much compressing.

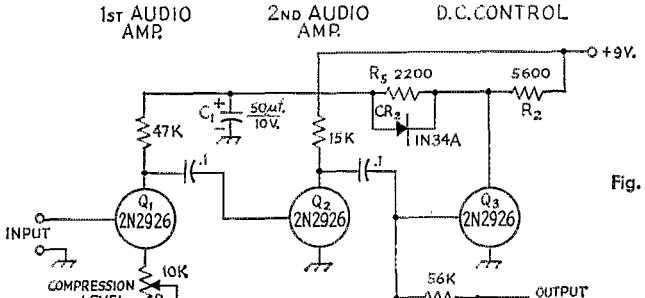
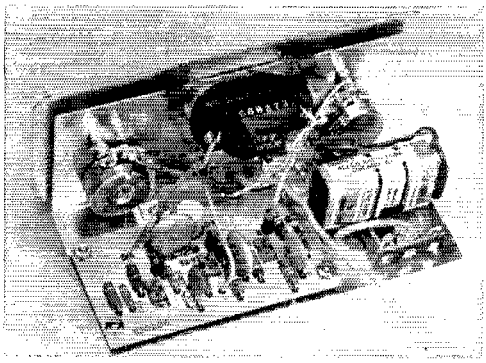


Fig. 1—Simplified circuit diagram of the Knight C-577 Compressor.



The three amplifier stages are constructed on the printed board. Transistor sockets are used for easy removal of a transistor in case of difficulty. The terminal strip at the lower right is the microphone connection.

The C-577 takes about three hours to assemble. The instruction manual is very precise and detailed about the construction of the unit and its use, but contains no information about how it works. Power is obtained from an internal battery; the current drain is only about 1 ma. The ON-OFF switch provides a "straight-through" connection for the microphone when compression is not desired.

The amount of compression taking place in the unit is indicated by a meter which reads the collector current of Q_1 and Q_3. The COMPRESSION control is set for a peak meter reading about half way into the compression part of the meter scale (marked in red). The OUTPUT LEVEL control is then adjusted to the same level that a microphone would normally provide to the transmitter. — *W1KLK*

Knight C-577 Compressor
Height: 2⅞ inches.
Width: 6¼ inches.
Depth: 3 inches.
Weight: 1 pound.
Power Requirements: 9 volts at 1 ma.
Price Class: $20.
Manufacturer: Allied Radio Corporation, 100 N. Western Ave., Chicago, Ill. 60680.

Strays

On April 5, 1965, at about 8:05 P.M., an audience participation program called "Open Forum," with television and radio interference as its theme, was broadcast for its first hearing on radio station WGAR in Cleveland, Ohio, under the auspices of Sidney Andorn, a local television and radio commentator in the Cleveland area.

Eugene M. Symms, K8AXC, a local attorney and Vice President of the South East ARC, conceived the idea because of a widely publicized tirade delivered by a local Councilman on the floor of the Cleveland City Council against a local radio ham who was interfering with the Councilman's television viewing.

The local papers and television stations gave the Councilman's speech wide coverage and attempts by K8AXC and Ralph Trefney, W8ZGX, Chairman and Co-Chairman respectively of the TVI committee, to prevail upon the papers and City Council to allow equal time and space to answer the Councilman's charges, were denied.

Mr. Andorn, after meeting with K8AXC, agreed to use his program as a forum for airing television and radio interference complaints.

The genuine interest of the public in the area regarding television and radio interference was evidenced by the hundreds of varied questions phoned into the program during the hour run. The program proved of such interest that Mr. Andorn scheduled it for a second run on May 13, and once again the response was so overwhelming that a third program was scheduled for June 29.

The panel of experts on this program included K8AXC, as a representative of the hams from the South East ARC of Cleveland, W8TGX, an Engineer with New-Tronics Co. of Cleveland, William Downer, Senior Engineer with the Cleveland Illuminating Co., and W8LYD, Field Engineer with the Ohio Bell Telephone Co.

It was surprising to note that of all the interference complaints aired by the public during the three programs heard on the air, less than 1 per cent involved amateur-radio interference, which indicated that local hams are doing an excellent job in keeping their signals clean.

South East Amateur Radio Club should be commended for its active work in public relations in the Cleveland area.

Incidentally, the Councilman who caused the original furor was defeated for re-election in the Cleveland October primaries. Shown in the photograph (front row l to r): W8TGX and William Downer, (rear l to r): W8LYD, K8AXC, and Sidney Andorn.

F-O-R-E

BY JOHN G. TROSTER,* W6ISQ

YEAH Charlie, real nice Christmas. Tie and stuff, and then Marge got me this big thick book called *Transitter Electronics*."

"That's tran*zis-zis-zis*tor."

"Tranzisziszistor?"

"One zis."

"Zis. Naturally, I thought it would be one a them real hard technical books like I'm always studying. But I read the first few chapters of this one and I think the fella who wrote it got his ideas from *Outer Space Comics* or a kids TV cartoon. Now wish she'd of got me a new set of golf clubs."

"Why, that's supposed to be a real good book. What's wrong with it?"

"Well, I'll give ya the general idea of what he's sayin', and tell me what you think. He starts off with the usual picture of a adom . . . you know, a coupla alectrons making like John Glenn around the proter . . . errr . . . neule . . . ahhh . . . nucleus, yeah, the big dot in the center. And the next picture has about 25 or 30 alectrons in all different layers."

"They call them orbits."

"I never seen a picture with so many alectrons in so many morbits. But live and learn, eh? Anyway, he says a transitter is like a half a diode . . . or maybe it was a semi-diode. So begin with one a them. First, they get a special rock called geranium . . . funny name for a rock. I always thought it was a . . . oh well. Now it turns out that a adom of this rock only has four John Glenns in the outside layer . . . sorry, morbit . . . but the geranium would rather have eight alectrons out there if it could scrounge 'em up somewhere. Soooo, they "dope" . . . that's technical for "paint", I think . . . they dope the geranium with arsenic . . . and I guess it don't hurt a thing! Well now, they use a arsenic adom because it has *five* alectrons in it's outside morbit which it would glady share with the geranium adom. I dunno how they found that out, but anyway, it seems that four of these arsenic alectrons leap over into the outside germanium morbit right alongside the other four alectrons already there. Then all eight a them just cruise around without much to do . . . except hang on. Haw. But that left-over extra alectron from the arsenic adom doesn't have any morbit to pop into, so it just wanders around and about on it's own. What you think so far, Charlie?"

"Good . . . that's just about the way ger*man*ium works. And they call them *or*bits."

"That's what I said . . . morbits. Then next, they get another piece of geranium, but this time they dope it with . . . a . . . goron . . . errr . . . doron . . . ahhh . . . poron?? I dunno . . . anyway, they paint it with this special stuff that's only got *three* alectrons in its outside morbit to swap. So's now, when these three alectrons jump into the outside morbit of the geranium adom, there's still one vacant hole left empty out there. And here's where the trouble starts, 'cause the book says this empty *hole* starts zippin' around. Understand?? The *hole's* chasin' around! Now ya see what I mean about this book and old TV cartoons?"

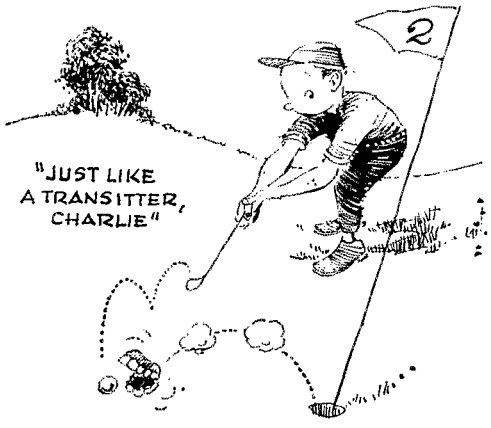
"Sure, but that's just about right . . . in a general sort of way."

"That's okay, huh? Seein' them holes zig-zag-ziggin' around don't grab ya, huh Charlie? Oboyoboyoboyoboy. Anyway, next thing is to make the semi-diode or whatever it was. So they stick these two different painted geraniums together an' swwwissshhhhh . . . all the left-over extra alectrons on one side and all the *holes* on the other side both lunge out at each other. Yeah! I can just see 'em. 'Specially them *holes* peepin' across the border."

"That's right . . . or close."

"That's right, you say??? I been three sunspot cycles just getting to where I could see alectrons playin' John Glenn . . . and now this . . . Hmmmmmmmm. But, I'll proceed with this fairy tale. So now, they hang a battery across these geranium bits and it's like 'Hiiiiyyyoooooooo Siiiiiiiivveerrrrrrr' . . . they all go nuts 'cause they have to start carrying the current from the battery. All the extra alectrons quit wanderin' around and line up and carry the current on their side. And on the other side, guess what? It's them *holes* again. Hear that? He says it's the

* 45 Laurel Ave., Atherton, Calif.



holes that's all lined up and draggin' the current! Chhheeeessshh, Charlie. This part is from *Outer Space Comics*."

"Eeeeeeasy . . . eeasy, now. It's all an optical illusion. Look, you play golf, right? Okay, make believe a diode, or a transistor, works something like a golf game. You play the first hole . . . drive, chip, putt . . ."

"With me it's drive, splash, drive again, chip, blast, swear, blast, putt, putt, swear putt . . . and that ain't no optical dillusion."

"Well, when the ball/electron . . . rolls toward the cup/hole . . . it's like an electron looking for a hole to drop into in the outside morbit . . . ahhh, orbit. Okay? But here, it can work the other way too. The hole/cup is looking for an electron/ball, that it can jump out and grab."

"Yeah, I'm beginning to see . . ."

"Now, after ball drops in cup, you pick ball out of cup/hole. Hole now empty and ready to grab next electron/ball that comes near. You walk away from cup/hole with ball/electron. But to that ball/electron which you are carrying to the next tee, it *could look* like the empty cup/hole that you just left is moving backwards down the fairway, *away* from you. Next 17 holes the same. Haw. You get the point of all this?"

"Yeah . . . that's it . . . eureka . . . I got it. You solved my problem."

"Good. Now that you see how electrons and holes can move around, you know all the fundamentals of diodes and transistors."

"Naw, I'm a vacuum tube man myself. But finally . . . finally I figured out how come I'm such a lousy golfer!"

"Maybe you don't hit the electron . . . ahh . . . ball so well?"

"Charlie, ma friend, I've been playing the wrong way. I've gotta start playin' the course backwards so's I can get the cups to sprint down the fairway and grab the ball." QST

NEW BOOKS

F M Schematic Digest, A Collection of Motorola Schematics, edited by Sherman M. Wolf, and published by Two-Way Radio Engineers, Inc., 1100 Tremont St., Roxbury 20, Mass. 92 pages, 11 by 17½ inches, loose-leaf binding, paper cover. Price, $3.95.

The book contains pictures, crystal-frequency information, antenna and power-supply data, alignment instruction, block diagrams, schematics, and miscellaneous circuit information for Motorola f.m. gear manufactured in the 1950s.

Equipment covered is for three bands: 30 to 50 Mc., 150 to 172 Mc., and 450 Mc. Each of these is readily converted to fixed-frequency service in the adjacent amateur band.

— *W1HDQ*

Ionospheric Radio Propagation, by Kenneth Davies, for the National Bureau of Standards. Available from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. 470 pages, 6¼ by 9½ inches, illustrated, cloth cover. Price, $2.75 in U.S.A., postpaid; foreign, add 25 per cent for mailing cost. Foreign remittances should be in U. S. exchange.

The earlier book carrying this title — we hesitate to call it a "previous edition" because the two are little alike either in appearance or content — was a standard reference on ionospheric propagation. But it was published in 1948, and much has been discovered in the intervening 17 years, particularly during the IGY and IQSY programs. Thus we have an essentially new book — covering the concepts that have survived from the earlier period, to be sure, but also treating many new topics that have since established their importance in the field. Over-all, there is more emphasis on theoretical aspects and less on the practical in this new volume, although practical matters are not entirely bypassed.

The reader will find the two opening chapters — No. 1 on geophysics and the sun and No. 2 on wave theory — pretty rough going unless he has some acquaintanceship with physics and higher mathematics. Chapter 3, on the characteristics of the ionosphere and the methods for determining them, is likewise liberally sprinkled with mathematical formulas, but can be read with some profit by an amateur lacking theoretical background.

A great deal of useful information — particularly interesting for those who have wondered about some of the uncertainties of long-distance communication at high frequencies — can be extracted from Chapters 4, 5 and 6. Chapter 4, entitled "Oblique Propagation," describes the *mechanisms by which waves travel through the ionosphere*. Chapter 5, "Signal Strength," discusses the factors that enter into the energy loss from transmitter to receiver, and Chapter 6, "Ionospheric Disturbances," goes into magnetic storms, auroral effects, and the like.

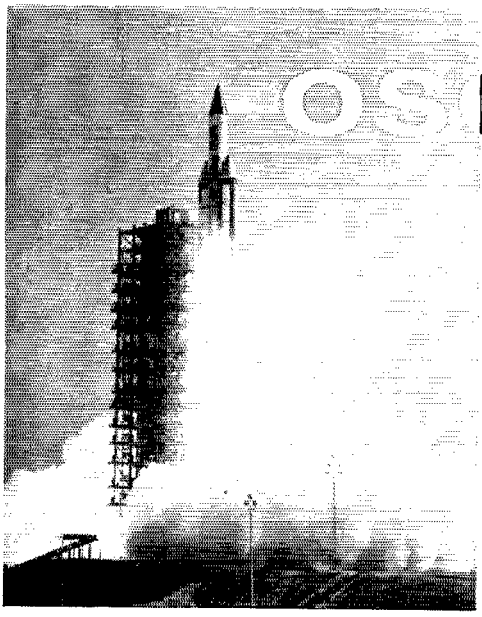
The always-live subject of propagation *predictions is* treated in Chapter 7. Several methods are described, including the long-established control-point method which, one gathers, survives because as a practical matter it works even if there is little theoretical justification for it. Examples of the use of prediction material are given, extended to take into account absorption, a factor not generally considered in amateur-made predictions.

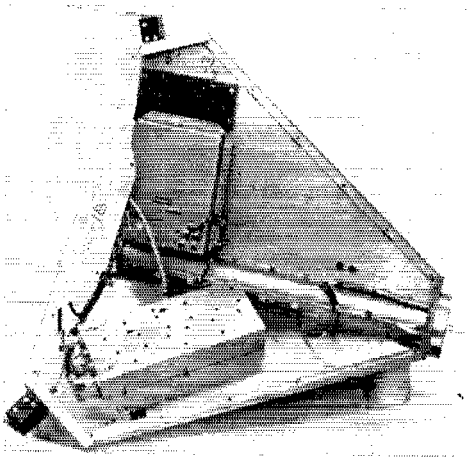
Chapters 8 and 9 take up some special features of ionospheric propagation at v.h.f. (scatter, meteor reflections, equatorial propagation) and at v.l.f. and l.f., 3 to 300 kc. The entire spectrum through which ionospheric effects are known to occur is thus covered.

Each chapter is followed by a bibliography of published material referenced in the text, and we can well agree with the publisher's resume that the book "should be a valuable reference source for research workers and communications engineers who already have some background knowledge *of ionospheric radio propagation.*" A great many amateurs certainly have a *practical* background, and there is much they can learn from this book if they are willing to concentrate. Because of its essentially mathematical nature, the book cannot be read the way one would read a popular account of the ionosphere, but the *information one wants* is there, either in plain words or in graphs.

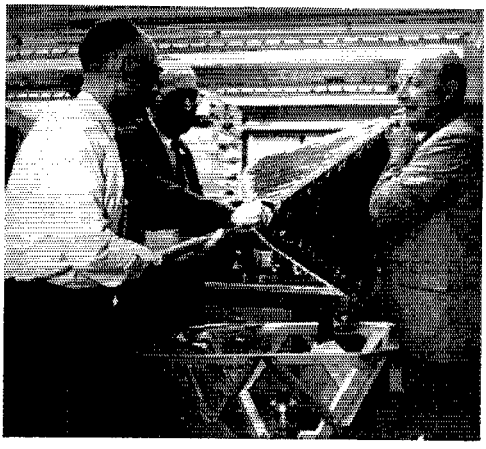
On the other hand, if your interest in the ionosphere stops at wanting to know whether you can work Shangri La at 0348 tomorrow morning, your book money might better be spent on a crystal ball. If there is one thing that stands out clearly, it is that the seemingly unlimited ways by which a signal can travel from here to there, and the wonderful or awful things that can happen to it from minute to minute, make any such "close-up" predictions extremely unreliable. So far the only sure way of getting the rare ones is to be Johnny-on-the-spot when they come through. — *W1DF*

OSCAR IV



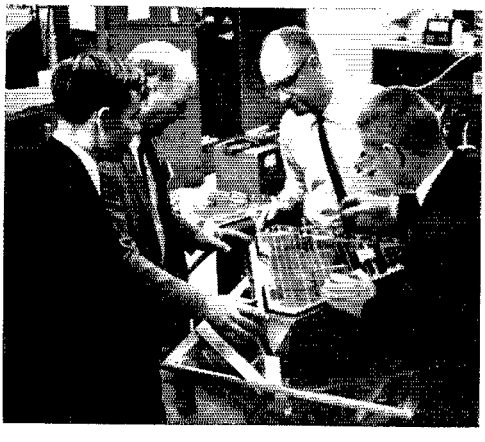


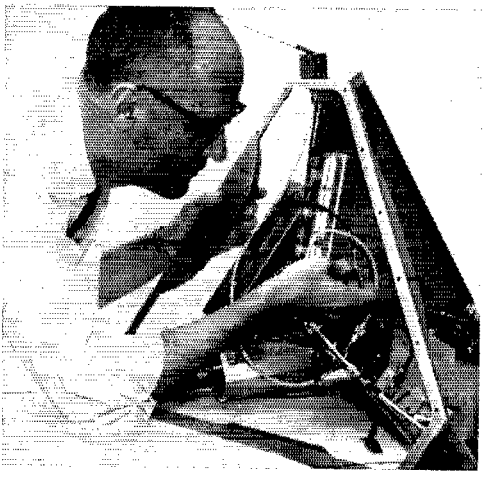
A portion of the internal structure of the Oscar IV satellite. The long narrow box in the foreground is the 432-Mc. transmitter. Above the transmitter is the command decoder. Immediately above the decoder is a small terminal board which contains the isolation diode matrix necessary for integration of the four solar power panels of the satellite.



Herb Gleed, W6ZPX checks the electrical assembly of the satellite.

«Final assembly of the satellite by (l. to r.) W6ZPX, K6MSQ and Dave Moore. The launch and spin-up mechanism is the spring in the center of the launch cradle shown at the bottom center of the photograph.





«Members of the Radio Amateur Club of TRW Systems make final adjustments to the satellite package. Shown (l. to r.) K6MWR, Dave Moore, W6ZPX and W6RTG.

The World Above 50 Mc.

CONDUCTED BY SAM HARRIS,* W1FZJ

Oscar IV is up and working — not up where it was supposed to be, nor working quite the way its builders hoped for, but it is far from being a total loss.

The fourth amateur satellite was carried aloft on a Titan III-C rocket from Cape Kennedy the morning of December 21. As its name implies, this is a three-stage device. First the launch vehicle is sent into a 100-mile-high "parking orbit," then at the proper time the second stage pushes it up to an apogee of approximately 18,000 nautical miles. The third stage is supposed to make the orbit circular, and line it up with the equator. At this great height the satellites are ejected, and they seem then to stand nearly still with respect to the earth. Oscar IV's orbit was to have been semisynchronous, with an easterly drift of about 30 degrees per day, at a uniform height.

Apparently the third stage failed to ignite, but the payload was ejected on schedule. Oscar IV is now in an elliptical orbit (along with three other packages ejected at about the same time) with an apogee of about 18,200 nautical miles and a perigee of 105, inclined 26 degrees with respect to the Equator. The orbital period is just under 10 hours, and its ellipse is estimated to have a maximum-to-minimum axis ratio of roughly 3 to 2.

The package was produced by the TRW (Thompson-Ramo-Wooldridge) Radio Club, of Redondo Beach, California, under the direction of John Chambers, W6NLZ, more than 20 workers contributing their efforts. Some of them are identified in the accompanying pictures. Oscar IV is a translator with a 10-kc. passband, receiving signals between 144.095 and 144.105 Mc. and repeating them in a 10-kc. band centered on approximately 431.938 Mc. There is a beacon at 431.928 Mc. The apparent beacon frequency may vary by several kilocycles, because of Doppler effect. This is most noticeable when the satellite is near perigee, when its speed with respect to earth is greatest.

The satellites were ejected at the proper time, about 2030 GMT Dec. 21., as the rocket crossed the equator near the west coast of South America. This south-north crossing was the apogee of Orbit 0. Very shortly thereafter the first QSO through the translator was recorded by W6YK, Camarillo, Cal., and W4AWS, Orlando, Fla. Other contacts, through Dec. 27, are as follows: DL9AR — DL9DB, Orbit 2; W6GDO — K6HCP, Orbit 5; W6GDO — K5WXZ, Orbit 10; WA2WEB — K2MWA/2, Orbit 12.

The beacon is reported to be running more less constantly, with erratic keying, and signals coming through the translator may be broken up more often than planned. Apparently the beacon keying is affected by signals coming through the translator. The beacon-translator sequence outlined in December *QST*, page 41, is not being carried out. Several observers express the opinion that operators attempting to work through the translator may be missing calls or answers because they do not listen long enough after making a transmission to take care of unpredictable breaks resulting from erratic operation of the satellite. It is strongly recommended that only c.w. be used for work through Oscar IV, because of the narrow passband. Operators using voice are asked to avoid the frequencies immediately adjacent to 144.1 Mc., when the satellite is within range, in order to provide maximum opportunity for work through it by those wishing to attempt such communication.

Mrs. Kathleen Licari of TRW shows the completed Oscar IV satellite.

*P.O. Box 1738, Arecibo, Puerto Rico 09613.

Both beacon and translator signals are being heard over much of the earth, and Oscar IV represents an opportunity for near worldwide v.h.f. communication, once we learn more about it and adapt our stations and operating practices to its thus-far somewhat capricious ways. Orbital data are being refined as more observations are accumulated, and the latest available information is transmitted nightly by W1AW. At this writing, W6EE, the Oscar Headquarters amateur station, is operating regularly on 14.235 Mc., collecting reports and answering questions relating to the satellite.

Detailed written reports are requested. They should be sent direct to Project Oscar, Foothill College, Los Altos, Cal.

— *E. P. T.*

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Oscar IV's launch coincided with a change in QTH at W1FZJ/KP4. It took the combined efforts of half of the Rhododendron Swamp V.H.F. Society group to get the 420-Mc. listening equipment back in operation. We were gratified to hear WA2WEB through the translator on the 24th of December. Many partial calls were heard such as 5WZ?, W5AJ?, 2WE?, G3?, etc. On the morning of December 26, W4WNH was heard calling CQ from 1310 GMT to 1340 GMT on orbit number 12. Shelby's signals were the first solid ones received in Puerto Rico. Our transmitter efforts were still in progress and we didn't start to hear our own signals coming back from Oscar IV until almost an hour later. During the eight hours when Oscar IV was within our range we heard many signals coming through the translator but none was identifiable. Apparently not enough stations are able to track the satellite through apogee, and as a result many potentially useful hours are lost. The frequency information on page 41 of December *QST* is accurate enough to allow finding both the beacon and signals, as their frequencies are Doppler shifted by as much as 8 kc. Some searching is in order.

Two well-known, hard-working VHFers relaxing at Syracuse. On left is Rae, VE3BPR, on right is Bill, K1IIE.

Observations to date indicate that it is not necessarily true that the translator does not work while the beacon is in operation. Also the beacon has been noted jumping frequency to the high side of the signal channel where it puts out a steady c.w. carrier. Considerable frequency shift has been noted on both the beacon and translated signals as the solar cells change their aspect with respect to the sun. This shift can be counteracted by shifting your 432 Mc. converter l.o. at the same rate as the satellite rotation. Unfortunately it is only a partial cure as the frequency shift is not always the same amount and is accompanied by considerable QSB. The signal can however be kept in a 1-kc. passband with a little effort.

You need a 15-db. gain antenna with at least a 10-db. noise figure converter to hear the beacon. We are able to track from just after perigee through apogee and back to just before perigee, using a 15-db. antenna, a 3-db. noise figure converter and a 4-kc. bandwidth receiver. Beacon signals vary from 5 to 45 db. over the receiver noise. Our best efforts to date have yielded 8 hours and 32 minutes of continuous beacon reception.

144 Mc. and Up

1296-Mc. activity keeps forging slowly ahead all over the country and Jim, WA4GHK, has sent us a bit of news from the Palm Bay, Florida area. During a six-week period, skeds kept between WA4GHK and K4NTD (75 miles) paid off with only one negative sked. A QSO between the boys on November 20 lasted for more than an hour with S9 signals both ways. Power output at K4NTD is 3 watts and at WA4GHK it is 2 watts. First 1296-Mc. contact with WA4BYR was on November 28. Lou hopes to have his 32-element collinear above the tree tops soon and this should make a big difference with the three watts he runs. All frequencies in this area are between 1296.080 and 1296.1 Mc. K6UMV writes that he, WA6ZIJ and WB6GFD all have six-foot dishes which they hope to have on 1296 Mc. soon.

WA2IPC and WB2KQL have been working with 432-Mc. walkie talkies and having begged, borrowed (?) and built the equipment, took their transceivers to Bald Mountain in New York and Mount Greylock in Massachusetts to try 'em out. Six meters was used to establish communications and they then went on to a 50% contact on 432 Mc. The Greylock end was hindered by low-battery voltage but the results were encouraging enough that the boys intend to try it again soon. In Pennsylvania, K3CFA writes that his 432-Mc. converter for tracking Oscar IV is almost completed. At present writing we hope it has been finished since Joel wrote the report 'cause Oscar IV is UP. W4MVB sez that cool weather reduces the signal strength on 432 Mc. with signals returning to normal after a cold front has passed. Jesse continues to hear signals in the 200-mile range nightly. He's using a 32-element collinear at 55 feet for 432 Mc. and a 16-element collinear at 40 feet for 144 Mc. We learn that at El Paso, WA5GDZ has recently acquired an eight-foot dish complete with AZ and EL mount. It's a little skimpy on dimensions for use on 432 but Jim intends to add another eight feet. On 432 Mc., WB6BOW is using a Parks converter with transistor

Henry Cross, W1OOP, accepts trophy for W1MHL at the big Syracuse "DO".

input and has just finished a 32-element expanded collinear which will go up about 65 feet very soon. Rodger sez he has completed a 2C39 tripler and has a 2C39 amplifier half built so it looks like it won't be long 'til he's on the air. Rog is intending to duplicate this set up for 1296 Mc. and is pushing right along. He also wants to correct the impression that most of the two-meter activity in California is via the two repeaters. WB6GHB reports taking his aircraft receiver atop Mt. Pinos to get weather information from VOR and VORTAC stations. Bill sez that some of these stations transmit the weather reports at 15 and 45 minutes past the hour from 108.2 to 117.9 Mc., and the reports are of interest to hams because the propagation of their signals is about like that on two meters. In Nevada W7TVF has quite a building campaign under way. Bill is presently constructing antennas for 432, 220, 144 and 50 Mc., converters for 220, 144 and 50 Mc., and a transmitter for 432 Mc. (using a 7377 oscillator and 5894 amplifier) plus converter for that band also. K8TUT at Cincinnati is also in the throes of building with rig and antenna started for 432. In Michigan, K8WXO sez that 432.9-Mc. WBFM is getting more active all the time with 433.0 activity (WBFM) starting to pick up throughout the county. W8WNX is building a new control panel for his station and gathering parts and information for a new 432-Mc. r.f. stage. Sez he'll probably use solid state instead of the old dependable 417A. W8FAZ writes that after struggling for many months to get going on 432 Mc., with no good results, he discovered that the balanced to unbalanced transformer on the 432-Mc. antenna proved to be the culprit. Either it created a direct short or an infinite impedance at the point-of-feed so that no signal could come through the cable to the converter. Switching to 300-ohm line temporarily uncovered the trouble. "Suddenly everything broke loose and signals began to come through." Hope that from here on in your luck is all good, Joe.

"Thought I'd let you know that Missouri will soon be represented on 432-Mc. moonbounce." So sez WAØHHM. Steve sez that he started planning the project in May of this year and hopes to be on the air by Christmas. It is gratifying to know that the young fellows (15 years old) are interested in this phase of v.h.f. work and realize that it does take a great deal of planning and effort. The transmitter will have a 144-Mc. s.s.b. exciter, whose signal will be tripled by a varactor tripler. This will excite a kw. linear using a pair of 4CX350As. Receiver will consist of a parametric amplifier, a converter using three 8058s (r.f. amp.) and a 7587 as the mixer. A modifier Swan 400 will be used as the i.f. He is also building band-monitor scopes, signal-monitor scopes and automatic antenna tracking equipment. The antenna will be a homebuilt 20-foot parabolic dish on polar mount. Steve would like plenty of skeds and correspondence from other moonbouncers. Looks like he really means it and we wish you all the luck in the world Steve.

K7ICW writes us that a test sked run with K6IBY on 220 Mc. to test antenna, converter and transmitter on November 21, turned out negative with no signals heard at either end. "K6IBY says he is going to change over to horizontal polarization on 220 Mc. to agree with WØEYE, K5TQP, K7NII and K7ICW along with a few of the boys from northern California who operate 220-Mc. DX. From now on all 220-Mc. DX in the west will be horizontally polarized (unless somebody decides differently)."

As everyone who is interested knew long ago, the Leonids Meteor Shower in November paid off fantastically well for those with skeds on 144 Mc. Among the many working meteor skeds was K2HLA at Cutchogue, New York on the eastern tip of Long Island and a hundred miles east of New York City. A sked with W4WNH brought Dick's two-meter total to 18 states worked. Antenna at Cutchogue is a 32-element colinear up 50 feet and fed with 100 feet of ⅞-inch aluminum foam coax. The Geminids shower during December didn't pay off at all for Dick. He had skeds with W4VHH (short bursts, no QSO), W5JWL (nothing heard at all), and K5WXZ (nothing heard at all). However he did report a contact between W1MEH in Connecticut and W5UGO in Oklahoma.

From Greenville, Pennsylvania, W3LNA writes that after ninetten years he is still active as ever on two meters. Larry has an 85-watt s.s.b. rig and 85-watt a.m. rig (both homebrew) and is using a 16-element colinear 80-feet high. WA2PMW sez that his shower sked with W4WNH was a flop but skeds with K4ZWN and K9HLS paid off with two new states for Lou. K3OBU writes that on his sked with W4AWS during the Leonids the c.w. signals became so strong that they switched to s.s.b. and chatted for a while with signals over S9 on both ends. K4GL writes that it will be sometime before he makes any of the states-worked boxes. Jack (ex W8PT) sez that he can work Georgia, Alabama, North and South Carolina at any time from his new QTH at Pickens, South Carolina. Activity is far different in South Carolina than in Michigan. "Instead of QRM only an occasional station is heard and all between 144.00 and 144.200." W5UGO in Oklahoma has been a very busy fella lately. On October 22 he worked W7JRG for the first Oklahoma to Montana on 144 Mc.; on October 31 he worked W4VHH in South Carolina for a new state on both ends; on November 15 he made it with K7NII in Arizona for a new state for both stations. And then came November 16! Contacts with W7MFP (Utah), W1AZK (New Hampshire), and K7ICW (Nevada) were first contacts on 144 Mc. between those states and contact with WA2FGK was a new state for both stations. This brought Larry's total to 25 states on 144 Mc. He sez: "Noticed some tropo to the northeast and this may have been the problem on skeds with W8s. Signals just couldn't get through to the meteors. This probably aided the signals with W1AZK which were about 20 to 30 db. above

the noise. We were even using first names and passing 'GM', etc. Guess I must have heard 20 to 25 states that morning." Congratulations, Larry! Your hard work certainly paid off during the Leonids. K5WXZ brought his states up to 29 with contacts with Montana, West Virginia, New Jersey, Nevada and South Carolina during the Leonids. Al's contact with WA2FGK came after a CQ from Al. "A number of stations were sending RS2 at 40-words per minute for what seemed like hours with no I.D.", sez he. A couple of the outstanding signals heard for long periods of time at his QTH in Texas were K4IXC and W6WSQ. In New Mexico, K5TQP got a new state when he worked K7ZIR in Oregon during the Leonids. Fred sez: "Stations were easy to find by simply tuning around the lower couple hundred kc., many bursts several minutes in duration. Never heard anything like it on two meters!" From California, WN6QWE reports that during the week of November 14 to 20., conditions were poor to fair on 144 Mc. with the band being noisy. From Costa Mesa, K6HMS writes that he can now run c.w., s.s.b., a.m., and f.s.k. (wide or narrow) on 144 Mc. but will concentrate on c.w. during the showers. Skip needs skeds in Idaho, Wyoming, Oklahoma, Kansas, Nebraska and South Dakota so any of you fellas who want California get in touch with him. K7NII had contacts with Oklahoma, Illinois, Missouri, Louisiana, Washington, Oregon, Mississippi and Minnesota during the November shower bringing his total up to 18 states worked. Tom sez he made five contacts over 1200 miles and two of these were s.s.b.

From Horton, Michigan, K8TCA has three suggestions for improving and promoting operation on 144 Mc. First he suggests that a transmitting station should give location and frequency of a DX station with which he is in QSO each time he signs over to the DX station. That the carrier should be modulated more nearly to 100%; and that net frequencies should be kept clear of interfering signals during net periods. K8AQA at Saginaw noted a few extended ground wave openings on two meters during the month of November with a fairly good opening on the 19th when stations were heard at distances of 200 to 450 miles. Six new states were worked by W9WDD during the Leonids bringing his total up to thirty-three states on 144 Mc. Charley sez all his contacts were s.s.b. which works fabulously well on meteors. WA9BYF tells us that six meters seems to have gone dead on the southwest side of Chicago with all activity going to two-meter f.m. A final meteor report from WØENC tells us that Bob is now up to thirty-two states on two meters having worked Nevada and Oregon during the November showers. We call that pretty good for South Dakota!

A new group has been organized in the St. Louis area operating at 145.150 during the daylight hours. They are calling themselves the "Sick, Lazy and Limpid" network but are standing ready for any emergency that might develop during the daylight hours when others are at work. New members are welcome.

50 Mc.

From Brandon, Manitoba, VE4RE writes of an opening on November 21 when he heard and worked stations in Kentucky, Ohio, Missouri, West Virginia, Illinois, Georgia, Tennessee and Indiana. Sez he: "Definite upsurge in the amount of s.s.b. activity. Fourteen out of fifteen contacts were two-way s.s.b. contacts." K1MTJ in Maine caught the same opening but sez it was slight and to Ø—land only. W2IYR tells us that CO2DL has passed along the information that nets in Cuba use the following frequencies: 50.4, 52.5, 50.36, and 51.76 Mc. He (CO2DL) is also interested in DX skeds. K3ZGI reports hearing VP7DD during an opening on December 1. At Brownsville, Pennsylvania, K3FNG sez that no skip was observed during November but groundwave conditions were excellent during the month. K3AUD is looking for skeds on six-meter RTTY and is also interested in forming a net on 50-Mc. RTTY. W4FP and WA4QLZ both report an opening into Florida on November 20. John was hearing stations in 1, 2 and 3 lands while Tom copied 'em in 8 and 9 lands. Tom sez he worked W8SUF and WA9CMF after his CQ on 50.8 Mc. and W8EPS and WAØIPS on 51.5 Mc. after a CQ on that frequency. In North Carolina WA4FJM also caught the opening of the 21st when he heard a 5 and a Spanish speaking station from the south. Jim Rule, K4KYL in Tennessee noted the same

2-METER STANDINGS

W1REZ	32	8	1300	K5WXZ	29	8	1225
W1AZK	29	8	1384	K5TQP	26	7	1250
W1JSM	27	8	1330	W5UQO	25	7	1384
W1AJR	25	7	1130	W5UKQ	25	8	1150
W1KCS	24	7	1150	W5SWV	20	5	960
W1AIEH	24	6	1000	W5ML	17	6	700
W1MMN	22	8	1200	W5KFU	15	5	1360
W1HDQ	22	6	1020	W5WAX	11	5	735
W1AFO	19	6	920	W5BEP	9	3	1000
K1CRQ	19	6	800	W5EDZ	8	5	1375
K1AFR	17	6	675	W5YYO	7	4	1330
W2CXY	37	8	1360	W6WSQ	15	5	1390
W2ORI	37	8	1320	W6NLZ	12	5	2540
W2BLV	36	8	1020	K6HMS	10	5	1240
K2GQI	35	8	1365	W6DNG	9	5	5250
K2LMG	32	9	1710	W6AJF	6	3	800
W2AZL	29	8	1050	WB6KAP	5	3	1300
W7PUA/2	26	8	1150	W6MMU	3	2	950
K2CEH	25	8	1200				
W2AMJ	25	5	960	K7NII	18	5	1275
W2ALR	21	8	1100	K7ICW	12	4	1246
WA2PZE	21	7	1200	W7LHL	10	4	1170
W2LWI	21	7	1050				
WA2FGK	22	7	1340	W8PT	41	9	1260
W2ESX	21	6	750	W8KAY	39	9	1210
W2UTH	20	7	880	W8IFX	39	8	1225
WA2EMA	19	6	1010	W8SDJ	37	8	1220
WA2PZE	18	6	750	W8YIO	35	8	1250
K2HLA	18	5	1005	K8AXU	34	9	1275
WA2LTM	17	7	730	W8LOF	34	8	1060
WA2YXS	17	6	720	W8MVF	33	9	1155
K2OEI	16	6	1010	W8NOH	3	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				
W3RUE	33	8	1100	W9WOK	42	9	1170
W3GKP	31	8	1180	K9UIF	41	9	1150
W3TDF	30	8	1125	K9AAJ	36	9	1200
W3BYF	30	8	1125	W9AAG	35	9	1050
W3LST	22	6	800	W9GAB	34	9	1075
W3LNA	21	7	720	W9WDD	33	9	1300
K3OBU	20	7	930	K9SGD	33	9	1100
W3MFT	19	6	600	W9OIL	32	8	1090
K3CFA	17	6	600	W9PBP	28	8	820
W3HHC	16	6	550	W9OJI	27	9	910
				W9IFA	27	6	1000
W4HJQ	39	9	1150	W9CUX	24	7	1000
W4HHK	38	9	1280				
W4WNH	35	9	1350	WØBFB	43	9	1350
W4ZXI	34	8	954	WØLFE	33	9	1040
W4MKJ	34	8	1140	WØENC	28	7	1250
W4MNT	31	8	1225	WØDQY	27	8	1100
K4QIF	31	8	1000	WØMOX	23	6	1150
K4IXC	29	8	1255	WØIDY	22	8	1050
W4FJ	27	8	1050	WØIC	22	7	1360
W4RFR	24	9	820	KØTTF	21	6	940
W4TLV	23	7	1000	WØJAS	19	7	1130
W4AWS	22	7	1225	KØCER	17	6	1225
W4RMU	21	7	1080				
W4OLK	20	6	720	VE1CL	8	5	800
K4YYJ	20	6	720	VE3DIR	37	9	1300
K4MHS	20	5	800	VE3AIB	29	8	1340
W4LNG	19	7	1080	VE3BPR	21	7	950
K4VWH	18	6	590	VE3BQN	23	7	1180
				VE3AQG	18	8	1300
W5RCI	39	9	1280	VE3HW	17	7	1350
W5AJG	33	9	1360	VE6HO	1	1	915
W5FYZ	33	9	1275	KH6UK	2	2	2540
W5JWL	33	7	1150	OH1NL	1	1	5250
W5DFU	29	9	1300				

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

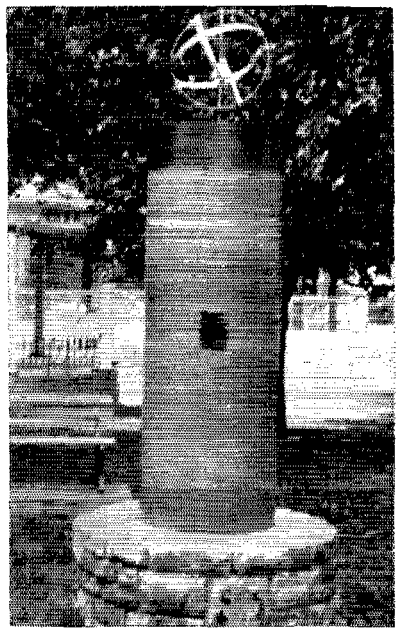
220- and 420-Mc STANDINGS

220 Mc			
W1BU	14	5	600
W1HDQ	12	5	450
W1AJR	12	4	480
K1JIX	11	4	615
K2CBA	16	7	660
W2AOC	15	5	530
W2SEU	12	5	450
K2DZM	12	5	400
K2AXQ	9	3	240
K2ISA	11	4	300
K2ITP	10	5	265
K2ITQ	11	5	265
K2JWT	6	3	244
K2KIB	12	4	300
W2LWI	12	4	400
K2UUR	6	3	210
WA2BAH	6	3	200
W3FEY	11	5	350
W3RUE	10	5	480
W3LCC	10	5	300
K3IUV	10	3	310
W3JYL	8	4	295
W3JZI	4	3	250
W4TLC	5	1	315
K4QIF	4	2	485
W5AJG	3	2	1050
K7ICW	4	2	250
W7AGO	2	1	160
K8AXU	11	5	1050
W8PT	11	5	660
W9JCS	6	2	340
VE3BPR	3	3	300
420 Mc.			
W1BU	13	3	390
W1AJR	12	4	410
W1UHE	10	4	430
W1HDQ	10	3	250
W1OOP	11	3	390
W1QWJ	10	3	230
K1JIX	9	3	230
WA2DTZ	6	3	200
K2DZM	10	4	390
K2CBA	9	7	220
WB2EGZ	9	4	260
W7PUA/2	7	4	500
WA2EUS	7	3	130
K2GGA	4	4	383
WA2HQE	8	4	280
K2HQL	8	4	250
W2OTA	10	4	300
K2UUR	9	3	280
W2VCG	9	4	280
K2ACQ	8	5	525
W2YPM	6	3	300
WA2TOV	5	3	140
W3RUE	10	5	470
W3MMV	10	5	410
K3CLK	9	4	
W3FEY	8	4	296
K3IUV	8	3	310
W3SZD	5	4	300
W3UJG	4	2	350
W4HHK	9	4	550
W4TLV	6	2	500
WA4BYR	6	2	420
W4GOO	6	2	415
W4RFR	5	2	665
W4TLV	4	2	500
K4QIF	4	1	280
W5RCI	16	5	725
W5SWV	7	3	525
W5AJG	7	3	1010
W5HTZ	5	3	440
W5ML	5	1	350
W5UKQ	3	2	500
W6GDO	2	2	385
W6FZA	1	1	280
K6GTG	1	1	180
W8PT	11	7	600
W8YIO	11	6	560
W8TYY	9	5	580
W8IFX	8	5	470
W8JLQ	6	3	275
W8RQL	6	3	270
K8AXU	5	3	660
W8UST	3		25
W9OJI	6	3	330
K9AAJ	9	5	425
K9UIF	9	5	390
W9GAB	9	4	608
W9AAG	8	4	525
WA9HUV	7	4	450
WA9NKT	7	3	310
W9OJI	6	3	330
WØIDY	9	5	560
KØITF	3	2	158
VE3AIR	5	4	450
VE3BQN	5	4	447
VE3BPR	4	4	600

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

opening to Texas and Louisiana but Jim also caught a couple on the 22nd and 27th. Opening on the 22nd was to Wisconsin, Minnesota, North Dakota, Nebraska and VE4 land while the one of the 27th was to Texas. K5HGM sez: "Please send me some more skip!" On his first out of town work, Bill made 24 contacts in eight states during a four hour period (Oct. 27). He is using an Olson 15-watt transceiver with an 8-element beam at 50 feet and to his knowledge he and one other are the only 50 Mc. operators within a hundred miles (Midland, Texas). K7ICW sez: "Tropospheric and ionospheric signals tapered off as compared to October but m.s. peaked on the 7th and 14th of November. Double hop was noted to the Long Island, New York area briefly on November 21 and later some single hop to Nebraska. Had a partial QSO with WA2VRM, the first double hop in November noted here in years. Tropo signals from Southern California have been so weak as to be unusable except for c.w. Iono/meteor scatter with backscatter characteristics has been noted on signals from the San Francisco Bay area. Strong and consistant signals noted from WØEYE over a 650-mile path." Thanks, Al. As usual very interesting and to the point. W8CVQ, W8MBH and K8AQA in Michigan all noted the November 21 opening on 50 Mc. Walt (W8CVQ) sez that very strong signals were heard from Kansas, Nebraska, Colorado and Texas. Reg goes along with this noting a number of ø's working 8s and 9s plus an occasional 3- and 5-land station. WA8CTC sez that scattered skip openings into Florida, Georgia, Alabama and the Carolinas were noted throughout the month of November Kettering, Ohio, W8GGE worked K7ICW, WA6HXW and WA6AKM on October 26 on 50.1 Mc. s.s.b. On October 30, Minnesota was banging through for Ron and November 21 brought forth Wisconsin, Minnesota, South Dakota and Nebraska, Colorado, Iowa, Missouri, Illinois, Kansas and Iowa. Kansas and Nebraska were heard working 2's on December 2 but Ron was unable to raise 'em. WA9JWL reports six meters open to almost all of Ø land on November 21 for a period of six hours. As usual, WØPFP was not to be left out and on the 21st worked Maryland, Ohio, Michigan, Washington D.C., Pennsylvania, Massachusetts and New Jersey. On the 25th Jim worked K3IXQ in Maryland on scatter and on December 1 the band was open to Texas and Louisiana for about an hour. All operation was on s.s.b. at Jim's QTH. At Lincoln, Nebraska, WØBMN sez that the opening of the 21st was the best he's ever heard. He worked 4s and 8s but also heard 1s, 2s and 3s. WB2UCS calls our attention to an error in the December column when we mentioned Highland Park, New York. It should have been Highland Park, New Jersey. Our apologies. Wayne. QST

Strays



This is the official West Virginia Centennial time-capsule marker that was dedicated October 1963, at Berkeley Springs, West Virginia. The time capsule contains historical and treasured documents along with personal messages including a message from W8JM, SCM of West Virginia to the SCM of West Virginia in the year 2063, the year that the capsule will be opened. The letter from W8JM describes the general amateur radio picture in 1963.

YL news and views

CONDUCTED BY JEAN PEACOR,* K1IJV

Full-Time Coordinator

WHEN it comes to job hunting, some unusual opportunities can be found in the Help Wanted — Male or Female listings, but ads for positions available of this type are not too plentiful. How lucky YLs of the amateur radio world are that the many jobs pertaining to our chosen field are open to all. You have but to show the necessary interest, have certain capabilities, and any number of appointments are open to both sexes. That YLs respond to the challenge of responsibility is proven by the increased numbers who are becoming SCMs, PAMs, etc.

Mollie, K3FYS (center) discusses a radiogram with K4YSN (right) while OM Morris looks on.

An outstanding example has been provided by the work that has been done by Mollie Silverstein, K3FYS, who is Emergency Coordinator for the County of Philadelphia. Mollie's OM, Morris, is not a ham, but shares her enthusiasm when it comes to the different aspects connected with her EC duties and rarely misses a meeting of the AREC. They have a married son in the Air Force who has his amateur license.

What does an enthusiastic EC do on vacation? In Mollie's case, it provided a fine way for her to learn more about the ways of other ECs. On a recent trip to Florida, she and Morris had the pleasure of meeting Andy Clark, W4IYT, (and OM of Betty, W4GGQ) who is Section Emergency Coordinator for Eastern Florida and well known for his fine work in this regard. To compare notes in connection with work in the ARPSC can result in many new ideas. This they did, and when Mollie and Morris reluctantly left Florida and headed home, it was with a wealth of new knowledge. Knowing how frequently radio amateurs in Florida have been called upon to react to emergency situations, much was learned from their practical experience.

In addition to this extra-curricular activity, Mollie has introduced many children at the Shriner's Hospital in Philadelphia to amateur radio. Her close work in this regard through code classes and assistance has resulted in the addition of some new Novices to our ranks. One girl received her General Class license and when she was recently discharged, planned to take the Extra Class exam.

More recently, Mollie has also had the pleasure of seeing the residents of a home for incurable patients receive their ticket through the devotion of K3WEU and W3ELI. The Ingles House now has a radio station and those who have received licenses will assist others in obtaining theirs. Many members of the ARPSC have assisted in this project; Mollie taught some c.w. classes; W3ELI gave examinations; K3VBA and WA3CND also assisted; but, in particular, K3WEU was on hand every Tuesday night as a teacher for the last year.

What next? Already plans are underway to conduct similar courses at the Eastern Pennsylvania State Hospital, an evaluation center and hospital for emotionally disturbed children. This same group of radio amateurs have been contacted by one of the hospital's directors who works very closely with the children. They are

K3FYS and K3NSN found some very eager pupils attended their code classes conducted at Shriner's Hospital.

* YL Editor, *QST*. Please send all news notes to K1IJV's home address: 139 Cooley St., Springfield, Mass.

all set to go with teachers available for both c.w. and theory. A radio club is to be set up at the hospital and another fine project will be underway.

Mollie is a full-time employee of Wm. Hodges & Co. and all these projects are how her spare time is spent. Rather than this exemplifying the duties of an EC, it could better be stated that here is an XYL who is a Full-Time Co-ordinator!

WA6WZB and WB6IEK, twin sisters, are active on 6 meters where both use Comm. IV with ground planes 50 feet high and 4- and 5-element beams.

Al and Ruth Gieske

Fairytales do come true! The Gieskes of Electra, Texas feel that the happiness resulting from their chance meeting a few years ago has proven that statement to them. Their many friends agree.

Al Gieske was W3SG in Lisbon, Maryland and Ruth has been W5IZL, located in Electra, Texas, for about thirty-seven years. Fifteen years ago, Ruth was operating her 10-meter mobile rig one day when she had her first QSO with Al. The next few years produced many more QSOs between them which became quite frequent.

With Ruth's promise of a cake to celebrate his birthday, Al accepted her invitation to visit Electra in 1960. (Actually, the cake turned out to be an apple pie with a candle, since Ruth believes that her pies are better than her cakes!) Soon after this meeting, plans were made, and in August of 1960 Ruth and Al were married in Lisbon, Maryland. A few months later they returned to Electra which is now their permanent home. Al received the new call of W5WS.

Al and Ruth are on the air almost every day operating near 14,204 kc. Ruth has two c.w. skeds a week with her son, W5FYZ, on 7110 kc. They have kept these skeds consistently for more than thirty years. Her daughter-in-law, Bonnie, is W5TEB. You'll also hear Al and Ruth on 10, 15 and 75 meters where they operate both c.w. and phone.

Ruth and Al have enjoyed helping others become hams, as they well know that much happiness can be the result. And so, this is how a ten-meter band opening enhanced the lives of two fine people.

Band openings can produce some heartwarming stories, and you know, ten meters bears watching — it's opening again!

Howdy Days Results
Sept. 21, 22, 23

First place — VE3BII and K4RNS — tie — 94

All others by score: K5YIB, 71; WA8FSX, 28; W6DXI, 26; K6KCI, 20; WA8ARJ, 20; W1ZEN; 19; K8VCB, 15; WA6UBU, 12. "This is unfortunately, it! If our top winners were able to work 94 YLs, where are the logs? Does the Howdy Days contest go the same route as the YL/VHF contest? Do we discard one more contest sponsored by YLRL? Even though the small response made the log checking easier, I was very disappointed. Where is everyone? Come out of the woodwork and join in the fun!"

— *Kayla, WØIJJL*

Open Letter to YLRL Members and ALL YLs

"As President of YLRL for 1966, I would like to ask a question. What do YOU, as a member, want from YLRL? You elected me, and you elected our Board of Directors, now it is up to you to tell us what you want us to do. I will welcome any letters which will give suggestions and/or constructive criticism. We receive many complaints, but few suggest remedies to our problems.

This is your organization. So, please, gals, let us know what you expect from us in 1966. I can't promise an immediate answer to all correspondence, but each letter will have my attention and action at the earliest possible moment.

Goals for 1966 include:

(1) Upgrading of *Harmonics* magazine. The Jan.-Feb. issue will reflect the first change and each issue through the year will be improved as we organize and get things moving.

(2) Putting YLRL on a working budget, so each officer and chairman will have a realistic but flexible budget.

(3) A concerted effort to increase membership, hopefully leading to a reduction of dues to the former level.

(4) Increasing publicity and activities so YLRL will become an effective voice in amateur radio. There are many other goals, but these four take priority.

If you are a former member of YLRL, and have dropped out, please tell us why. We are planning a YLRL Forum at the National ARRL Convention

The Gieskes, Al, W5WS, and Ruth, W5IZL, as well as their parakeet, Cookie, (see mike) hope amateur radio brings as much happiness to others as it has to them.

The Ontario Trilliums! This newly formed first Canadian YL Club had a successful annual fall meeting. YLs serving the group as officers who attended are: front row (l. to r.) VE3EZI, VE3DGG, VE3EUV, and VE3BII, President; back row (l. to r.) VE3FRN, VE3CLP, VE3FUR, VE3BBO, VE3ASZ.

in Boston next April. What subjects would you like to see brought up for discussion?

We need your help to make YLRL grow. I will look forward to lots of mail in the near future. Thanks and 33," — *Kayla Bloom, WØIII, President — YLRL, 175 So. Jasmine St., Denver, Colorado 80222.*

Calling All Twins

How many twins are licensed amateur radio operators? Twin sisters Jean McElrea, WB6IEK, and Joan Feiler, WA6WZB, have asked this question and hope to receive many answers.

Whether you are licensed OM or YL twins matters not. Jean and Joan think it would be fun to see how many there are. Possibly a twins' club or net or annual outing could result. Write to: Jean McElrea, WB6IEK, 6357 Emil Ave., City of Commerce, Calif. 90022.

YL Club News

YLRL announces the appointment of K8PXX, Tony Chapman, Park, Plain City, Ohio as the new Receiving Treasurer for 1966. Tony succeeds K1OLM, Joyce Garlick. Dues in the amount of $3.00, for regular membership, are payable on March 1 for a full year membership.

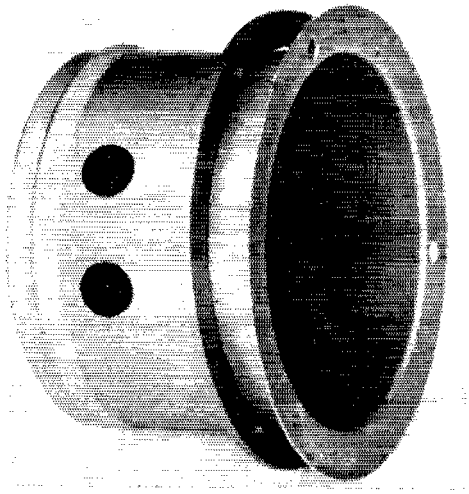
Coming Events

The 15th annual Midwest YL Convention — May 13, 14 and 15 — at Rosemont, Illinois. See January column for details.

The 17th annual YL/OM Contest — phone Feb. 19–20, and c.w. Mar. 5–6. See complete rules in January column. QST

Arizona mothers found that their home sponsored classes during school vacation had great appeal. Some taught cooking, others sewing, and K7TLP, Sisley Barnes, is shown teaching a group of girls code at her QTH in Phoenix, Ariz. Sisley can be found operating either a.m. or c.w. on 15 and 20 meters quite often.

• *New Apparatus*



New Meter Shield

A transmitter is not really shielded against harmonic leakage if meters are simply mounted on the panel, no matter how well the other apertures and joints may be sealed off. The form-fitting meter shield shown in the accompanying photograph will prevent such leakage, provided the leads to the meter are properly filtered. A meter shield is also a good gadget for protecting the meter from r.f. fields, which may be pretty strong in the vicinity of a final-amplifier tank coil.

The shield pictured is a Millen type 80012, made to fit the standard 2½-inch instrument. The drawn aluminum case has a tight-fitting back cap held on by friction, and the assembly is provided with a brass ring drilled and threaded to take the screws for a round meter case. Although not specifically designed for the square-front meters, which have four mounting bolts, the shield and ring can easily be modified to fit. The manufacturer is James Millen Manufacturing Co., Inc., Malden, Mass. 02148. The cost is approximately two dollars. QST

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

Whom:

The rare new one was first observed getting out like mad in the ET, FL8, ST or SU vicinity, according to botanical historians. Then around 850 A.D. a 4W1 in the goat business, shook by the queer antics of his flock, munched some himself, enjoyed an exhilaration, and the HZ grapevine took over.

The Yemen held this tidbit in tight net control until determined PAØs hollered break-break-*break* in the late 1600s. Its marked physiological action in dispelling drowsiness soon made it exceedingly popular throughout Europe. One hi-fi bug named Bach even dedicated a cantata to its soul-stirring qualities. Literary Gs embraced it in London coffee house gabfests emceed by one Sam Johnson, an A-1 operator. W/Ks in Boston, New York and Philly thirstily adopted it by 1700. They really lapped it up.

In 1723, 'tis recorded, a young FM7 in the service went home to F-land on furlough, swiped a plant from the Paris royal gardens and brought it back to the West Indies. He had to split his meager shipboard water ration with the pampered thing but it paid off. Soon the PY crowd, along with the HKs, YSs, TGs, *et al.*, were making themselves world famous for its production.

Few radio amateurs would dare tackle a DX contest without fortification by ample quantities of this stuff. Let us therefore dedicate February's warm-up week ends of the 1966 ARRL DX Competition to DR OM Kaldi, the 4W1 goat boy whose discovery of coffee long ago now makes boiling our midnight DX oil — mm-mm, *ah!* — so productive and palatable.

Good huntin' — and gulpin' — lads!

— • • • —

All this yak about eyeball QSOs inspires K3VCH to point out to us that there really *is* such a communications mode. Tom quotes from p. 190 of Frank A. Geldard's *Fundamentals of Psychology* (John Wiley & Sons, New York and London):

> . . . A former army officer of one of the communistic states reports that, as one of the "commando" bag of tricks he was required to learn, he had to acquire the skill of communication with his eyelids. A barely perceptible flick of the right lid was a dash, one of the left a dot, in International Morse Code. By acquiring fine independent control of the two eyelids he could "tap out" messages in complete silence when the occasion demanded.

Just the thing across a crowded room on some noisy enchanted evening, eh? Tic clicks or bloodshot peepers might rate you OO citations, however, and some dumb dame with no c.w. education might blast you right in your bloody blinkers. Then, we suppose, she would be a bloomin' blinkin' blighter. [I'll add that to our lid file, Boss. — *Jeeves*]

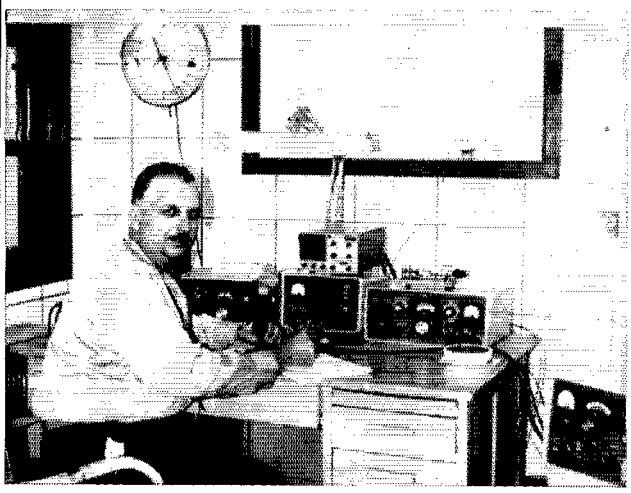
What:

We'll let the bands speak for themselves this month in the annual ARRL DX shebang. Next "How's" our Bandwagon team will include (20 c.w.) Ws 1AYK 1BGD 1CNU 1ECH 3HNK 6KHS 7VRO 8TRN 8YGR 8ZCQ 9CAQ, Ks 2UPD 3FKU 5DZE 7TNW 8BCK 8HLR ØJPL, WAs 1CYT 2LDX 4YDR 5HS 6JDT 6TGH 7ASM 7BOA 7BOB 8LVT 8MAT 9BGK 9IBT, WBs 2CON 2NLH 6KIL 6MEQ, R. Johnson; (20 phone) Ws 1ECH 1RST 3HNK 8YGR 8ZCQ, Ks 1BPJ 1QGC 3FOP 3SWW/KG6 ØJPL, WAs 4SRS 5HS 6TGH 7ASM 8MAT 9BGK; WB2s CON MJD; (15 c.w.) Ws 4DXF 8YGR 9CVZ, K8YSO, WAs 2LDX 5EID 6JDT 7BOA 7BOB 9BGK 9IBT, WB6MEQ, WNs 3DYT 8QJK, VE2ANK; (15 phone) Ws 3HNK 8YGR, WAs 6JDT 8MAT 9BGK 9IBT ØLWC, WB2OLN, VE2ANK; (40 c.w.) Ws 1CRX 1VAH 2APH 3HNK 4OMW 9NN, Ks 3FKU 8HLR ØJPL, WAs 2LDX 4UMX 5EID 9IBT, WBs 2NLH 6MEQ, WN4BGL; (40 phone) W1BVP, KØJPL; (80 c.w.) KØJPL, WAs 4UMX ØIIJ; (75 phone) VE3FUX, KØJPL, Mr. Kilroy; and (160 c.w.) W1BB. So far, despite erratic nighttime conditions, it's been a decently happy DX new year up and down the line.

Where:

ASIA — It's a great DX life if you don't weaken. W1AYK writes, "After seven years and nine months I finally received, on the same day, two QSLs from YK1AT worked 'way back in '58. The cards arrived through the fine efforts of OKs 1XM and 2QR, both of whom had been trying to get in touch with ex-YK1AT for the past eighteen months." OK2QR affirms this success, stating, "Those who have not yet received YK1AT QSLs for 1958 QSOs can reapply via me. I will QSP all applications to Bohous, ex-YK1AT, who will verify and send confirmations." International Reply Coupons are requisite . . . . . "QSLs for all YA1AW contacts made after November 1, 1965, will be handled *promptly through me,*" announces K5GOT. "Self-addressed stamped envelopes and Greenwich Mean Time are musts." . . . . . On that same date K9DKU assumed Stateside QSL managership for 4X4VG . . . . . K1ALL's activity as HS1s CW and S is on record at W1BVP.

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



KA5ZS "commutes" between Japan and Vietnam these troubled days. Zane, a Marine lt.-col., previously worked DX as KB6BP, KW6DH, W6YKL/HL9, W9UZW and XEØUWL. He now holds additional calls W6UWL and KH6AWJ, and expects to remain in the 3W8 vicinity till July.

W/K QSOs with HSstations are still banned by ITU/FCC/-DOT agreement but W1BVP may be of some assistance, perhaps, to less restricted souls . . . . . HM-9AR is HM1AB's portable call. W7VRO does QSL work for both labels . . . . . VERON's *DXpress* understands that W2GHK & Co. completed 4X5VB QSLing by December after which 4X1DK pasteboards came under fire.

AFRICA — TY3ATB's QSL aide, VE2ANK, can help confirm all Jack's QSOs except those resulting from W4BPD's visit last year. The latter's contacts are QSLd through W2GHK's Hammarlund crew. VE2ANK requests the usual s.a.s.e. and GMT courtesy . . . . . G2IO notifies, "Copies of ZD7RII's log are mailed to me, his QSL manager, but mails are few and far between from St. Helena. All requests for confirmations will be answered immediately I receive details." . . . . . "My QSL was returned by the Dakar bureau with indications that 6W8DF is a silent key," advises K8YSO . . . . . "As of December 1, 1965, I am QSL manager for George, ZD7IP, U.S.A. contacts only," confirms K2HVN, specifying s.a.s.e. . . . . Patience, OMs — CR3KD tells W1BGD of ARRL Hq. not to expect his QSL before July . . . . . More negative accent: "Having received no logs from CR7IZ since December, 1964, I have decided to be his QSL manager no longer." That from K3HQJ who can only suggest the *Callbook* address.

OCEANIA — VERON's DXpress relays W4ECI's comment on QSLing for W9WNV/K7LMU operations: "We ask all the DX boys to be patient. We're doing all we can to get the cards out as fast as possible. It should be realized that there are many thousands to cope with. We will QSL everyone as fast as we can do so."

EUROPE — ZB2AO writes, "The best way to QSL me is to mail cards with two IRCs each and I will reply by air. Otherwise my QSLing is handled through the RSGB bureau. After six months at Gibraltar I've received only 400 cards in response to a thousand sent out, so I now QSL only on receipt. Cards for any ZB2 can be sent through ZB2A, our QSL clearinghouse." . . . . . WB6MEQ reports 100-per-cent QSL response from the UB5 gang, at least from the first few worked . . . . . W2CG protests, "In the last few years numerous requests have been sent to me with QSLs for forwarding to HV1s CL CN, LA1BC/p, etc. I would appreciate a note in *QST* to the effect that I regret I do not handle and have no contact for such QSL service." You rare ones employing W2CTN's generous QSL facilities should send Jack's call more carefully . . . . . SVØWL (KØKFY) questions the legitimacy of the SV1WW pictured in last July's "How's", pointing out that the calls of Greek nationals so far go only from SV1AA through BK. We've seen WB2FMK's QSL from SV1WW, however, plus the latter's statement that authorities changed his call from SV1AL to SV1WW in December, 1963. Can't blame SVØWL for being leery, for he states, "This area is full of pirates. One of them has been using my call for about three years now, and I have a thick stack of QSLs and s.w.l. cards to prove it. Lately someone has been putting it out that SVØWL (me) is QSL manager for one ZA1AD. 'Tain't so — must be friend 'Jimmy' again. We even have pirates on the broadcast band around here!" . . . . . "All QSLs for M1N go direct to W6JFJ," instructs the latter. "An attempt will be made to QSL 100 per cent either via established QSL bureaus or via QTH listings in DX columns. Otherwise I must wait for QSLs to obtain QTHs. At present I'm working in the Paris area and will not return to California until March. QSLs will be sent at that time."

SOUTH AMERICA — Everybody's having fun with another fresh prefix, 9Y4 for Trinidad & Tobago. The suffixes on such calls appear familiar, so apparently you can count on, say, 9Y4VP being ex-VP4VP with QTH remaining the same. Say, where do we go from 9Z9? ØA1? . . . . . LU4DMG desires IRCs and s.a.e. from those seeking his services in dispensing QSLs for South Shetlands and South Orkneys LUs 1ZA 1ZC 2ZA 2ZC 3ZA and 3ZC.

HEREABOUTS — Quite a few "QSLers of the Month" this month, all praised for particularly prompt pasteboard production by "How's" contributors Ws 1CSP 1ZLX 7QPK 8YGR 9OMM, K8BCK, WAs 2LDX 4UMX 5EID 7BOA 7BOB 8MAT 9BGK 9IBT, WBs 2NLH 6MEQ, and monitor W. Kilroy: BY4SK, CN8AW, CO-2DL/CO4, CR7IZ, DM2BDD, EAs 4CR 6BD, EP2AS, ET3USA, FL8RA, FO8BI, Gs 3OZP 6RJ, GC2FMV, GD3FXN, GI3OQR, GMs 2HCZ 3AWW 3CHX, HA2ME, HKs 3ASK 3RQ 4JC, HCSA, K6QYK/VO2, KC6SZ, KG6s IF SZ, KV4AA, LAs 1K 4QJ/p, LJ2T, LU9ACZ, LX1PO, MP4TBO, ON5ZO, OX5CF, OY1X, PY2BZD/ø, TG8CJ, TJ1AC, UA2AO, UB5KJE, UM8AP, UW9DP, VE3CVL/SU, VK3ALL, VPs 2AR 2GAZ 2KJ 6PJ 9EU, VQ9HB, VRs 2BZ 4CR 4ED, VS9MP, VU2s GW JA, XE1JJD, YA1AN, YNs 1JLA 3KN, YO8CF, YS1RFE, ZB2AL, ZD7IP, ZE4JS, ZL3VB, ZP3AL, ZSs 6JK 8K, 5A5TJ, 5H3JR, 5W1AZ, 6O6BW, 6Y5BB, 9G1FQ, 9M4s JY MT, 9Q5PA and 9Y4VT, as well as QSL helpers Ws 2CTN 2GHK & team, 3HNK 4ECI 4HKJ 4SSU 6RGG, Ks 3UIY 7UCH 9BPO, WAs 2EFN 4STL 8CXY 8GUA and DJ4OP. Any surprisingly swift QSLers *you* want applauded here? . . . . . *Alp!* W3URE hunts QSL hints on TT8AL of '63; W8FRM ditto re XW8BF; K8BCK likewise about tardy KW6EF. TA1IR, VPs 2LH 4LC; K8VRF is frustrated by HA1VE, VO1BA, VP5RH; WA8MAJ yearns for a PX1AG postcard; WA9BGK is bugged by balky CE9AB, F8ITU, KC4USB; WØCVZ, WAØIIJ and others are curious about 7G1A confirmations. Suggestions, anyone? . . . . . Ks 7BHJ 8HLR, WAs 8LAN and 9IBT volunteer their services as QSL tenders for overseas ops in need of such assistance, and the rarer the better . . . . .

UA3BK of Moscow works his share of c.w. DX near 14,030 kc. Felix gets on most often around 1400 GMT. (Photo via K8SSY)

W4OMW says that s.a.s.e. is much appreciated with each VP5BH application. All QSL agents rate this courtesy, as a matter of fact, unless otherwise specified . . . . . WA4-UMX reports that W3INH came back home from autumn contest work at VP9EU with a first-class QSL task. Got right on it, too . . . . . Be advised that each of the following postal suggestions is necessarily neither official, complete nor accurate. . . .

CEØAC, Box 5050, Easter Island
CR3KD (via REF)
CR7IZ (see preceding text)
EA9IC (via URE)
EL2D, A. Vinicombe, Box 98, Monrovia, Liberia
EP2AX (via K4OEI)
ex-FO8BI (to F2HM)
HS1s CW, S (via W1BVP; see preceding text)
K1ALL/KL7 (via W1BVP)
K4CKP/KH6, T. Hibbard, 213 Tenth St., Hickam AFB, Hawaii
K4JFA/KS4, R. Fausett, P.O. Box 1148, Miami 48, Fla.

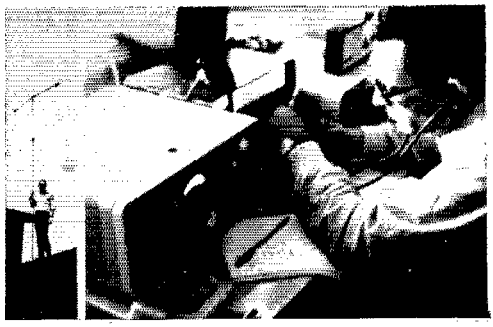
KR6JZ (via W2CTN)
KV4CI (via W2CTN)
KX6SZ/Ebon, *Fasme* Foundation, P.O. Box 2025, Castro Valley, Calif.
ex-KZ5TD (to W2ZHN or via ISWL)
LU1-2-3ZA, LU1-2-3ZC (via LU4DMG)
M1N (to W6JFJ)
MP4BFH, R. Francis, P.O. Box 14, Manama, Bahrein, Persian Gulf
OA5AO (via K4OEI)
OK1XM, F. Vencl, P.O. Box 69, Praha 1, Czechoslovakia
OK2QR, R. Staigl, Napajedla, okr. Gottwaldov, Czechoslovakia
PJ2ME (via W2CTN)
ex-SV0WBB, L. Dugan, WA8IMC/5, Rte. 1, Box 115A, New Boston, Texas, 75557
TN8AF (via REF)
TY3ATB, J. Boucher (VE2ATB), P.O. Box 370, Cotonou, Dahomey (or via VE2ANK; see preceding text)
TZ5H, c/o Hammarlund DXpedition, Box 7388, GPO, New York, N.Y., 10001
UA1KED, c/o E. Krenkel, RAEM, Chapligstr. 1a, Moscow, U.S.S.R.
UB5KJE, Khmelnitsky Radio Club, Khmelnitsky, Ukrainian S.S.R., U.S.S.R.
VE1AED/SU, W. Frost, Base P.O. 5049, Beirut, Lebanon
VP2AA, Public Works Dept., Antigua, B.W.I.
VP5BH/mm (via W4OMW)
VQ8BFA (via G8KS)
VQ8BJ, J. Lagesse, Cere St., Curepipe Rd., Mauritius
VR2EW (via W4ECI)
VR4GR, A. Carter, Box 49, Honiara, Solomon Islands
VR5AB (via W4ECI)
VS9OC, L/Cpl. J. Smart, AFS Det., RAF Masirah, BFPO 69, London, England
W9WNV/ZM7 (via W4ECI)
W0YKD/KS4, A. Radosevich, P.O. Box 1148, Miami 38, Fla.
XE5L (to W2SAW)
XT0H, c/o Hammarlund DXpedition, Box 7388, GPO, New York, N.Y., 10001
YA1AW (via K5GOT)
ex-YK1AT (via OK2QR)
ZD7IP (W/Ks via K2HVN)
ZD7RH (via G2IO)
ZS8G, P.O. Box 379, Maseru, Basutoland
4W1SS (via RSGB)
4X4VG (via K9DKU)
5A3TX (via W3HNK)
5T7H, c/o Hammarlund DXpedition, Box 7388, GPO, New York, N.Y., 10001
7Q7BN, P.O. Box 51, Blantyre, Malawi
7X2PY (via ARA)
9Y4s DS VT VU (see preceding text)

The preceding rundown results from the collected notes of **Ws** 1BGD 1CNU 1CRX 1ECH 1WPO 1ZJE 2APH 7AYC 7VRO 7WLL 8YGR 9NN, **Ks** 3SWW/KG6 8BCK 8VRF 8YSO 0JPL, **WAs** 4UMX 5EID 6GLD 7BOA 7BOB 8OUM 9BGK 9IBT, **WBs** 2NLH 6MEQ, **VE2ANK** and W. Kilroy, plus excerpts from DARC's *DX-MB* (DLs 3RK 9PF), DX Club of Puerto Rico *DXer* (KP4RK), Far East Auxiliary Radio League *News* (KA2LL), Florida DX Club *DX Report* (W4LVV), International Short Wave League *Monitor* (12 Gladwell Rd., London, N.8, England), 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.), Ontario DX Association *Long Skip* (VE3FXR), Puerto Rico Amateur Radio Club *Ground Wave* (KP4DV), VERON's *DXpress* (PA0s FX LOU TO VDV WWP) and West Gulf DX Club *Bulletin* (W5IGJ). Got some grub for this tub, OM?

Whence:

AFRICA — "I've been licensed since mid-November," informs VQ8BJ of Mauritius. "I use a Ranger I, CR-150 and RA-1 receivers, and the antenna is a homespun ground-plane. I watch for the U.S.A. on 14,040-14,060 kc. nearly every night at 1600-1900 GMT." . . . . . VE2ANK says TY3ATB (VE2ATB) runs a 32S-1, 75S-3B and TA-33 jr. in Dahomey . . . . . G2IO's friend ZD7RH (G3FNF) is equipped with a KW-2000 shnifferzender and an assortment of aerials including a TA-33, G5RV design and Joystick . . . . . EA9IC (EA7JQ) tore up large chunks of 14 Mc. from Infni in December with a TR-33 and vertical. Colleague EA3OT intends to try his luck in Rio de Oro soon . . . . . VP3CW may sign ZD3C for a while with the U.N. in Gambia . . . . . W4BPD triumphantly checked into New York City in December after closing his 1965 multicountry tour with XT2H, 5T7H and TZ5H eruptions. Now how about a *Gemini* job, Gus?

ASIA — "YA1AW will be in Kandahar for about ten more months," states K5GOT. "He's on single-sideband with a Swan 350 and G4ZU-style antenna." . . . . .

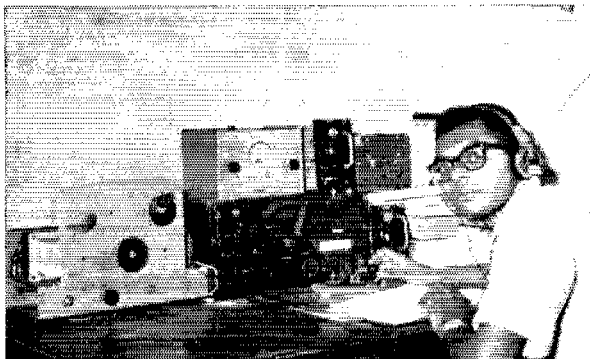


IT1TAI gets around southern Europe with portable DX gear. Here's Dom signing IS1TAI on a recent jaunt to to Sardinia. (Photos via W4VPD)

"KA5DG is now QRT, so the only active KA5s are KH, club station MC, RC and myself," writes KA5ZS (W6UWL), who spends much time in Vietnam. "KA5RC expected to go to Saigon around the first of January. As of now Vietnam's government still nixes amateur operation." . . . . . On the good news side, W1BB has it that KA2JA and possibly other Yanks in Japan now are authorized 200 watts on 1910 kc. Might be a real jam-up on that notch . . . . . JAs 1AP 1BK 1CFD 1CO 1HGY 1BX 1YL and 6AV helped entertain W6KZL on his recent business visit to Japan. "Talked to the whole L.A. gang from JA1BK," Glen tells W1WPO. "Sure was a kick to hear those Sixes from the other end for a change." . . . . . "JAs must have the best DX locations in the world," figures WB6MEQ. "They roll in here almost any hour of the day and all hours of the night on several bands. Thirty- or 40-watt JAs seem to get through when UA0s, KR6s and HMs with more power do not." The Caribbean area seems to be the toughest region for JAs to work. They really flip when FG7 FM7 FY7 HI and VP customers are around . . . . . W7VRO finds that HM1AB likes to sign HM9AB from Jeju isle on occasion, 15 and 20 . . . . . 4X4VG's homebuilt 60-watt c.w. outfit keeps QSL manager K9DKU hoppin'. Moshe likes a daily 1400-1700 GMT session on 14 or 21 Mc. and also works s.s.b. from his club station . . . . . K1ALL will be signing HS1s CW and S for another year, according to W1BVP. Art hopes Thailand will release itself from International Telecommunications Union banned-country status before QRT time . . . . . 8J1RL may shut down at Showa base this month . . . . . VU2s AK and NR are said to be cooking up a goodie.

OCEANIA — FO8BI knocked off for France and F2HM before Christmas, observes W7AYC. "The DX frat loses a good 7-Mc. Tahiti contact." WB6MEQ agrees: "FO8BI was a very active multibander who seemed to like working W/Ks. FO8AA's new half kw., on the other hand,

VU2LWZ of Bombay, bearing the three-letter "Z"-ending suffix of India's novice class, started out with a 6AG7-1625 rockbound 15-watter on 14,020 kc., a BC-348 receiver and Windom wire. Ashok may be full-fledged VU2LW by now, mostly active at 1500–1600 GMT on 20. (Photo via W6EFV)



1966 French Contest

C.W. 1400 GMT January 29 to 2100 GMT January 30.

PHONE 1400 GMT February 26 to 2100 GMT February 27.

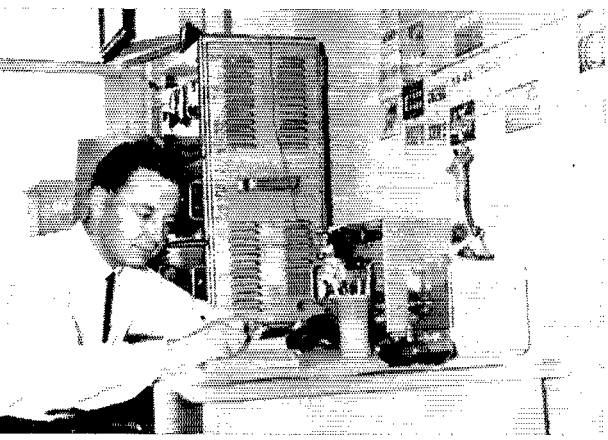
VHF 1800 GMT May 7 to 1800 GMT May 8.

Exchange report and QSO number. French stations will give their Department number after their call. Score three points per QSO multiplied by the total of all multipliers. Mail log promptly to R.E.F., B.P. 42–01, Paris R.P., France.

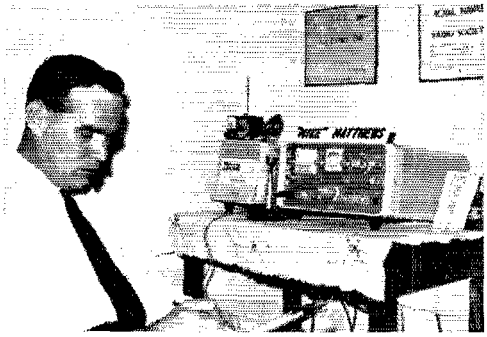
is hard to raise." . . . . YL WA1EPM says VK3AJX likes to roll his own, breaking into the game on 40 and 80 c.w. with a 60-watt 6146 job, and now constructing a 150-watt sideband sender . . . . VK1s AU JG VK VP and VK4YG/1 sport sideband in Australia's Capital Territory . . . . After Ebon atoll, those cruising Colvins, W6KG and XYL, aimed for Nauru DXcitement . . . . "WA1BOK/KG6 is another active here," reports Guam's K3SWW/KG6. "DX has been quite good lately on 20, and 15 is picking up nicely for my 180 watts. I've had the pleasure of working a few Novices on 21 Mc. recently. Lots of patience is required, and I have respect for the newcomer who has enough sense to ask for QRS when necessary." . . . . W8YGR mentions the stout 8-watt c.w. signal of VK3NC on 20. A quad is the answer . . . . W7s FKS and UJ sample DX life in KH6-land with an SR-150 on 14-Mc. voice and code . . . . W9WNV's Pacific DX junket with K7LMU touched Tonga (VR5AB) in mid-December after successful strikes at reefs Ebon (K7LMU/-HC8E) and Comoran (K7LMU/TI9C), then the Tokelaus (W9WNV/ZM7). Don and Chuck are really milkin' the old atlas.

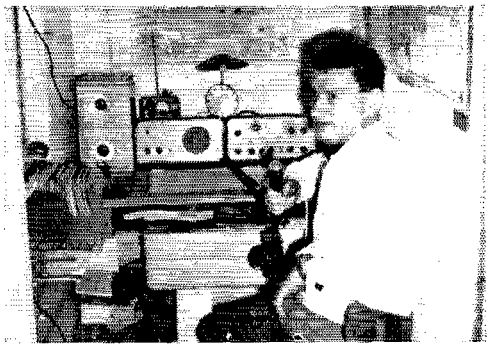
EUROPE — K3CUI, through W1ECH of the League, forwards results of the May, 1965, Russian DX Contest, a c.w.-only affair. U.S.A. entrants finished in this order: Ws 1EVT 3WJD 3MSR, K1QFC, Ws 8VSK 4KXV 6LCX 4FRO 7NPU 2KIT, WB6HDG, WAs 7CGR 6JDT and K3CUI. Best global totals were filed by UP2NK, UW4HW, DM2AND, UO5BM, UA3UJ, UB5CE, 4X4WF, W1EVT, UA4CH and LZ1CW in that order. UA3KAB, LZ1KSV, UB5KAI, KH6EPW, UB5s KKI KBA, YO3KAA, UJ8KAA, LZ1KDA and UB5KIX paced multi-operated stations. Sponsoring CRC of Moscow says amateurs in 98 countries participated. They'll fling this thing again next May 7th-8th . . . . IØFGM's October activity by several I1s at Pontecchio commemorated Marconi's hamming there 70 years ago . . . . IT1ZGY tried his DX hand from HV1CN in October, and I1KDB presented II1KDB QSOs from Ischia isle shortly thereafter . . . . Plymouth Radio Club (G3PRC) put GB2USA on the air in December to celebrate the 345th anniversary of the new-world landing of the *Mayflower*. Zooks! how time flies . . . . The top ten single-op scores in last year's TOPS C.W. Club 3.5-Mc. Contest were turned in by OK1s MG BY, OZ1LO, OKs 1AKQ 2QX, SM5s CCE DKH, OK1ZQ, OH2QV and UR2FR in that sequence. Multiop TOPS toppers: OKs 3KAG 1KKJ 2KOS 1KTL 2KFR 1KOK, LA1K, OKs 3KEU 1KDT 1KZF and DM6AA. These data courtesy club test manager G3IRM . . . . LA5FG writes, "Our club station LA1H has been on the air since 1958 for more than 14,000 QSOs, almost half of these with amateurs in the United States and Canada. Our venerable war-surplus rig took part in the Battle of Narvik a quarter century ago, and we also have a Swan 350. QSOs with LA1H seem in some demand for we are located north of the Arctic Circle. LA9OI is our most active operator." . . . . Queen Maud Land's OR5RK provides Antarctica contacts around 14,100 kc. So does VKØKH, 14,282 kc., 1230 GMT . . . . DARC's *D X-MB* indicates that G3CSP signs NS1A frequently on 160 aboard the *Caroline*, one of those free-lance offshore radio vessels perturbing European broadcasting authorities . . . . W6JFJ managed some 400 noncontest-type QSOs as M1N last autumn despite sightseeing attractions in and around picturesque San Marino . . . . G3s KVH and NVA eyeballed with W1RFQ and other W/K friends on their visit to these shores in October . . . . WB6s CPE and GZM describe IT1AGA's daily c.w. activity at 1300–1700 and 2200–0200 in search of rare western U.S. counties . . . . ZB2AO's armament includes a Courier 200-watt transceiver, a 2-element Mosley beam atop a 60-ft-high building, and a 100-ft. wire for 40, 80 and 160 meters. "I'm trying hard for WAS but I pass up no rare DX," Dick writes. "Can't work eastward as I'm located on the west side of the Rock. There's quite a lot of Gibraltar action by ZB2s AG AJ AK AL AM AN and AP, plus club station ZB2A." . . . . Continental comment courtesy the clubs press: UW3XT lugged a sideband sender with him to F.J.L.'s UA1KED in December. . . . DX connoisseur G3FKM relieves G3HDA in the RSGB *Bulletin* DX column slot. . . . G3HS commences his year-long DXcursion as 6Y5HS, VR1H, etc., and G3NAC (formerly VS9AAA) wants to shock all from Rockall in April.

HEREABOUTS — HI8XAL observes, "Dominican Telecommunications are very sympathetic toward amateur radio, the director being HI8HPC and the technical director, HI8PJA. They are honoring the reciprocal operating agreement as signed last February. A U.S. citizen desiring to operate in the D.R. need only fill out a simple application form upon arrival, and turn it in along with three passport-sized photos plus one photostatic copy of his U.S. license. The usual ten-dollar fee is waived because FCC is not charging fees to Dominicans now operating in the U.S. under the agreement. A call in the 'X' series will be issued to the U.S. applicant with the letters following being the operator's initials if said letters are not already issued to someone else." . . . . Hammarlund's W2GHK calls attention to DX-200 and DX-300 certifications sponsored by RCV (Venezuela), details available from the society's *Callbook* address, and you're also invited to check with HK3AFB concerning a "6N1" sheepskin based on contacts with six of a specific group of Colombian amateurs . . . . "The Mexican government issued forty XEØ licenses for the week end of November 19th–21st," disclose K6s ICQ and ICS (XEØs ICQ and ICS). Activity centered on Ensenada . . . . 6Y5BB, first licensed as VE3BCU in 1952, likes 20 and 40 c.w. from Jamaica where he's on the staff of Children's Hospital, Kingston. Doc expects to be on the air there for a year or so and runs 7060-kc. skeds with K2QIG/4 at 0000 GMT, Fridays . . . . KP4COR (ex-W8FTD-OQ5RL-OQØRL) works out well on 40 c.w. and phone using an old abandoned telephone wire for his antenna . . . . "This business of being on



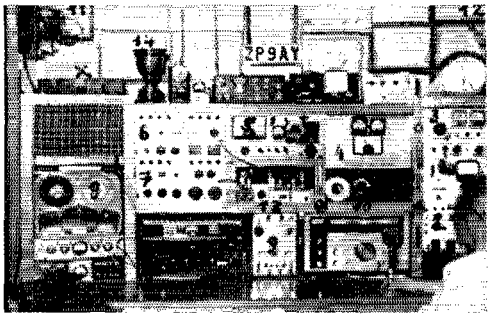
UW9PT (left) and UA9OH are friendly DX rivals in Novosibirsk, Siberia, on 20 c.w. (Photos via W1s WPO YYM)





ZB2s AM and AO, left and right, help represent the Rock on 160 through 10 meters, c.w. and s.s.b. Mike, ZB2AM, often gives the top-band gang a juicy trans-oceanic target on 1828 kc. Dick, ZB2AO, daily strives to complete his Gibraltar sideband WAS on 14 and 21 Mc., also hitting 3.7 Mc. on hot week ends. (Photo via W1HGT)

the jump all the time surely raises havoc with one's WAS and DXCC pursuits," complains HR2GK-TI2GK-KØVYR . . . . . W86MEQ finds that encroaching 42,000-volt power lines have chased low power DXpert W2QHH out of the lower layers . . . . . CO2DL tells WA9BGK he hopes to repeat his CO2DL/CO4 ventures now and then, and WA4UMX notes OK3MM still punching brass as CO2BO at year's end . . . . . According to member WA4YDR, McGill Institute Radio Club of Mobile numbers many DX enthusiasts among its forty members. Club station WB4ANP cuts a wide swath on 21-Mc. phone and c.w. . . . . "Really miss that far north DX set-up," declares VE7IG, formerly VE8RG. "Hope to return there this summer to operate as VE7IG/VE8." . . . . . Ontario DX Association brass includes VE3s BWY (ex-G6WY), pres.; UR, v.p.; DDR, treas.; EWY and CKW, secs.; and EXR, *Long Skip* editor . . . . . "Received orders to return to the U.S. in December," discloses KZ5TD, now W2ZHN, erstwhile ARRL C.Z. SCM . . . . . K3KMA's RME-69 ain't no antique yet, he declares, pointing to good DX and contest results with modest power and skyhooks. Bob also has a functional SW-5 in stock . . . . . W2COT enjoyed a recent visit to Trinidad and 9Y4TO . . . . . WN8QJK needs those two toughies, Africa and Asia, for his 21-Mc. WAC . . . . . PJ2s CE CO CU CW CZ and PJ3CJ visited sailor K4MSG aboard USS *Belmont* when the ship docked at Willemstad last October. Slim says PJ2CZ has a c.w. net going around 7065 kc. and also likes 40's low edge . . . . . W1AYK (K2UPD) will offer Vermont to the overseas crowd near 7030 and 14,030 kc. during the current ARRL DX Test, also in the Vt. QSO Party on the 19th-20th of this mouth . . . . . ARRL Official Observer K7BHJ says key clicks and chirps are still a problem on c.w. bands. Sometimes even your best friends won't tell you . . . . . "We agree that DX contests are a great way to grab new countries," chorus WA7s BOA and BOB . . . . . K8YSO says big-sig VE5US does a booming trade with WAVE hunters on 15 and 20 meters . . . . . The Globe Scout of WØYKD/KS4 and K4JFA/KS4 introduced a whole new generation of DXers to Swan island on 14-Mc. phone . . . . . W2SAW, K2LAF, WA2s HOK and WVL supplied snapped-up Socorro QSOs in December with simultaneous c.w. and s.s.b. performances as XE5BL . . . . . The 15th of next month is the deadline for filing entries in Long Island DX Association's 1965 DX marathon which wound up with the old year. You may have a better grab at glory than you think — rush your entry inquiry to LIDXA Contest Committee, P.O. Box 599, Lynbrook, N. Y., 11563. QST



ZP9AY's 160-meter QSO with W1BB/1 a year ago apparently was the first Paraguay-U.S.A. 1.8-Mc. contact of record. Robert's call, of course, is well known on higher DX frequencies. (Photo via W1BB)

Strays

The Federal Communications Commission has launched an intensive program to recruit graduate electrical engineers in grades 5 and 7 for career opportunities in the Washington area and for the Field Engineering Bureau in positions located throughout the United States.

The breadth of FCC projects — national, international and space — requires diversified skills of electronic engineers. The level and variety of assignments provide familiarity with almost every concept of modern electronic development. Satellite relay of radio signals has extended FCC interests to space communications. Our electronic engineers study the needs of and prepare frequency allocation and assignment plans for the various radio services; engage in research to keep informed on technical development; study new uses for radio; analyze the proposal of applications for wire and radio communication facilities; monitor the radio spectrum to see that radio station operation meets technical requirements; inspect radio stations of all types; locate and close unauthorized transmitters; and obtain and analyze technical data for Commission use.

Working on tomorrow's technology in the broad and challenging field of communications provides many opportunities for professional development. Careerists "with promise" are offered opportunity for further training and development by means of: (1) guided on-the-job training and specially planned work assignments providing professional growth; (2) inter-governmental training programs; and (3) special training at outside academic institutions.

You may apply to the Commission by sending a Form 57, obtainable from your local post office, to Director of Personnel, Federal Communications Commission, Washington, D. C. 20554.

Operating News

F. E. HANDY, W1BDI, Communications Mgr.
LILLIAN M. SALTER, W1ZJE, Administrative Aide GEORGE HART, W1NJM, National Emergency Coordinator
ROBERT L. WHITE, W1WPO, DXCC Awards ELLEN WHITE, W1YYM, Ass't. Communications Mgr.
GERALD PINARD, Club Training Aids PETER CHAMALIAN, W1BGD, Communications Asst.

Conditions Good on 160. This month may we start off with a timely reminder. The *Top Band Test* mentioned in these columns in December *QST* has February 6 and 20 periods to come! In the December 5 opener, many amateurs were heard overseas in transatlantic work. Some had not made it on this band heretofore. G-GI-DL-OK-PA-KV-VO-HK-ZM and EI were some of the prefixes to be worked. The number of stations worked by W1BB/1 was by early December, up 25% compared to the previous year, 87 in 16 countries. KA2JA has reported that American military personnel in Japan now have been authorized the use of 1910 kc. and 200 watts, so no telling what the whole season will bring for 160-meter workers.

V.H.F. Nets Advancing. Are you enjoying some v.h.f. capability as part of your station work? If not, we think '66 is time for it. Six-meter and two-meter traffic work is on the increase. West Virginia also is considering the use of 29.6-Mc. f.m. for a state-wide ARPSC Net in addition to the local nets using 29.6 Mc. ARRL's Net Directory this season shows 108 registered six-meter nets, 95 two-meter nets and 56 ten-meter nets. The larger number of these cover whole counties, some cover cities and some regions. ARRL would like to see *every county in the nation* have v.h.f. net coverage.

Among others the "Friendly Net" under W2ZI and W2PEV and the New Jersey Six and Two under K2VNL continue to provide reliable day-to-day traffic outlets for NNJ operators. W2GQZ through 2RN provides the long distance NTS connections every net with local and regional coverage needs. There are scores of v.h.f. nets, as above indicated, and we hope an excellent one in *your* ARRL Section that you can join. May we suggest that where there's little or no v.h.f. netting, or no regular net to report to, with a balance between fun-and-traffic, to inquire of your SCM or local Emergency Coordinator. Get information on the two- or six-net you *can* report to, or get about organizing one To organize best there should be a leader. If none, then volunteer, if you feel capable, or *recommend to your SCM* a Tech or General or Advanced Class operator for a V.H.F.-PAM. Each such SCM appointee should go about planning, establishing and extending what is being done in practical traffic and emergency communications on v.h.f. Network operation is covered on page 13 of *Operating an Amateur Radio Station*.

Leadership Appointment Applications and Recommendations. V.H.F.-PAMs and RMs function as Net Managers. We hope all these will extend present netting facilities and coverage by studying their state and county coverage and inviting new active stations at points needed. Likewise existing nets should be

FREQUENCY MEASURING TEST FEBRUARY 11 (GMT)

ARRL invites every amateur to try his hand at frequency measuring when W1AW transmits signals for this purpose starting at 0230 GMT, Feb. 11. *CAUTION:* Note that since the date is given in Greenwich Mean Time, the early run of the frequency measuring test actually falls on the evening previous to the date given. *Example:* In converting, 0230 GMT Feb. 11 becomes 2130 EST Feb. 10. The signals will consist of dashes interspersed with station identification. These will follow a general message sent to help listeners to locate the signals before the measurement transmission starts. The approximate frequencies used will be 3514, 7060 and 14,086 kc. About 4½ minutes will be allowed for measuring each frequency, with long dashes for measurement starting about 0236. It is suggested that frequencies be measured *in the order listed*. Transmission will be found within 5 or 10 kc. of the suggested frequencies.

At 0530 GMT, February 11, W1AW will transmit a second series of signals for the Frequency Measuring Test. Approximate frequencies will be 3524, 7086 and 14,147 kc.

Individual reports on results will be sent to all amateurs who take part and submit entries. When the average accuracy reported shows error of less than 71.43 parts per million, or falls between 71.43 and 357.15 parts per million, participants will become eligible for appointments by SCMs as Class I or Class II OOs respectively.

This ARRL Frequency Measuring Test will be used to aid qualification of ARRL members as Class I and Class II observers. Present observers not demonstrating the requisite average accuracy will be reclassified appropriately until they demonstrate the above-stated minimum required accuracy. Class I and Class II OOs must participate in at least two FMTs each year to hold appointments. SCMs (see listing, page 6) invite applications for Class III and IV observer posts, good receiving equipment being the main requirement. All observers must make use of cooperative notices, reporting activity monthly through SCMs, to warrant continued holding of appointment.

Any amateur may submit measurements on one or all frequencies listed above. No entry consisting of a single measurement will be eligible for *QST* listing of top results. Listing will be based on over-all *average* accuracy, as compared with readings made by a professional lab.

encouraged to step up operations, we think, to more days each week. Each such net with less than state-wide coverage definitely needs to find members who can take part also in a section's state-level net. This permits communications to be transferred to and from the National Traffic System so we have a fully integrated amateur network. Emergency Coordinators also are organization leaders needing nets. Active leadership is called for. Club recommendations and inquiries from individuals who can accept EC and V.H.F.-PAM posts are earnestly solicited. See *your* SCM's address on page 6 of *QST*. Let's make 1966 a year of real organization progress in our netting.

About Net Registrations. A net has to be purposeful and dedicated to either a traffic or emergency objective to warrant ARRL net registration. We suspect that there are quite a number of additional nets to the approximately 260 mentioned above that qualify for registration. May we ask not only v.h.f. nets but *all* nets with traffic or emergency capability to become part of our net-registration. Ask for CD-85, so headquarters may send this registration form.

Starting a V.H.F.-Net Program. Those 75- and 80-meter skip problems stay with us. One of the best suggestions to beat old man SKIP is to create a v.h.f.-traffic facility where there is now none. This month we want to excerpt some points on how to do this from a Newsletter by the North Carolina SCM, W4BNU.

(1) Present h.f.-net members should acquire and establish v.h.f. standby gear for liaison with v.h.f. netting groups.

(2) Carry some of your short-haul traffic to the v.h.f. nets; supplement what they originate to give v.h.f.ers a chance to learn to handle traffic.

(3) Establish new v.h.f. nets that handle traffic, preferably on a more than once-a-week basis.

(4) The above sounds like a big order, and it is. It can't be accomplished in a week or ten days either. The main thing is to get the ball rolling. Start using the v.h.f.'s for traffic. You will be surprised at how it will grow. . . .

Our working net has about ten or twelve fixed two-meter stations plus seven two-meter mobiles in AREC here in town. I have personally logged QSOs with 152 different two-meter stations from Hickory in the west to Raleigh in the east, from Virginia to the north and Georgia to the south. We work them with less than ten-watts input to a 2E26 and a seven-element beam. . . . It can be done. We suggest that dedicated traffic men add some v.h.f., and take traffic there. All who can should assist v.h.f.ers to know and enjoy *the ways of traffic nets. V.h.f. men might demonstrate to* traffickers how they can circumvent "skip" and make the v.h.f.s something to talk about for Public Service, too.

Some Section News. In Kentucky the SCM had a Net Manager's meeting with his new leadership personnel.

W4BAZ (RM) is assisted by WA5TPB who is RM for KSN. Kentucky's Slow-Speed Net. WA4DYL is in the parallel KYN post. The V.H.F.-PAM, K4KZH (Louisville), is making every effort to expand v.h.f.-net coverage to metropolitan areas such as Louisville, Frankfort, and Lexington as well as areas that are not toll free from those cities. Lexington will have a new V.H.F.-PAM, to provide for interchange of traffic (a principle all nets must have for station-wide, and nation-wide connections). A KSN operator is designated to report into the other net prior to KTN's operations nightly.

In Oklahoma, Tulsa reports developing a new AREC kit. In the Tulsa (Okla.) set-up K5ZCJ has three alternates, WA5DBM, W5DFQ, and W5GZS. A folder entitled *Tulsa Emergency Plan* has been distributed to all concerned. It contains (1) A Tulsa City Map (2) a full AREC membership roster, giving Red Cross and c.d. telephone numbers. (3) For the 50-member amateur group the business and residence telephone numbers and addresses are given. Also for each there's listed data on bands, emergency generators and assignments. (4) The 5-page community plan gives full information on communications centers, as well as the h.f. and v.h.f. circuits. (5) A damage survey form and important how-to-report information pertinent to disasters is given. (6) A procedures plan is included for reference (station posting possible). A nice job ZCJ.

In West Virginia emphasis is on organizing for emergencies and traffic handling. The 29.6 Mc. f.m. coverage is tested once-a-week in Wheeling. 22 mobile and base station(s) drill and only the NCS for the week knows the simulated problem for a given early-evening. New Martinsville has 15 f.m. units, Fairmont five. W8IYD, V.H.F.-PAM at Wheeling, is commended for fine organization results. W8JM (SCM) says 80-mile contact is reliable (any hour) Fairmont-Wheeling as well as mobile, Parkersburg to Wheeling.

In New Jersey (from the end-of-year report by SCM-W2CVW and SEC-K2ZFD): "Those interested in traffic operation at Novice c.w. speeds are advised to use the Eastern Area Slow Net, 3748 kc. It meets at six P.M. local time daily. For intermediate speeds, use the Empire Slow Speed Net, 3590 kc. also at six P.M. . . . PRESET was a joint simulated emergency test exercise with NYC-LI, based on a simulated hurricane. The successful test was due to the fine work of the Emergency Coordinators, also the excellent special-session coverage by NTS nets: NJN, NLI, NJPN, NJNN, NJ62, NYCLI VHF, ESS, NYCLIPN and 2RN . . . *Let's Recruit in '66.* Talk up our organized program in your club this New Year. Demonstrate PICON by taking part in nets and ARPSC."

PICON Award. A PICON award has been available to each section of the Rocky Mountain Division for the past five years. The Director (WØBWJ) evaluates the recommendations of the SCMs in the four ARRL Sections in

A.R.R.L. ACTIVITIES CALENDAR

(Dates are shown in GMT)

Feb. 4: CP Qualifying Run — W6OWP
Feb. 5–20: Novice Roundup
Feb. 11: Frequency Measuring Test
Feb. 12–13: DX Competition (phone)
Feb. 16: CP Qualifying Run — W1AW
Feb. 26–27: DX Competition (c.w.)
Mar. 3: CP Qualifying Run — W6OWP
Mar. 12–13: DX Competition (phone)
Mar. 17: CP Qualifying Run — W1AW
Mar. 26–27: DX Competition (c.w.)
June 11–12: V.H.F. QSO Party
June 25–26: Field Day

OTHER ACTIVITIES

The following lists date, name, sponsor and page reference of *QST* issue in which more details appear.

Jan. 29–30, Feb. 26–27: French Contest REF (p. 92, this issue).

Feb. 5–6: Tennessee QSO Party, Radio Amateur Transmitting Society (p. 106, this issue).

Feb. 19–20: YL/OM Phone, YLRL (p. 88, this issue).

Feb. 12–13: N. Y. C-L. I. QSO Party (p. 110, this issue).

Feb. 18–20: QCWA QSO Party (p. 73, last month).

Feb. 19–21: Vermont QSO Party, Central Vermont ARC (p. 118, this issue).

Mar. 19–21: Missouri QSO Party (next month).

determining annual awards for meritorious and noteworthy service in the Public Interest by amateurs. Utah has led all sections, receiving four PICON awards, New Mexico is next with three, and Colorado and Wyoming amateurs have been recipients twice. Consideration for nomination is based on the performance of a beneficial public service in either a continuing manner or on a special occasion. Results must benefit someone *beyond* the amateur performing the services.

Working for License? Get our Novice Helps. This is the time of year when most up-and-coming clubs are starting a new series of *Licensing Classes*. Any club is invited to ask ARRL for "Suggestions for a Radio Course" (our outline to follow). Also any society's class-group theory instructor may receive on his specific request a copy of WA6VTL's "Licensing Classes," a compilation of instructor information. *What for the individual Novice* who is getting ready to take the FCC-required exam and using *How to Become . . .* and the *License Manual*? The ARRL Communications Department has additional help for him. Ask for the Reference Guide and a schedule of W1AW's twice-daily code practice runs. There's no charge; we'll be happy to send you this information and advice on getting started.

About the Novice Roundup. The "NR" is our annual get-acquainted party for newcomers to amateur radio. It's for all active licensees, *primarily* for Novice, but also for the Novice to work back and forth with some General Class and other licensees. Use page 6 of *QST* as a check-off list of the *new states* that you will work. For all other than Novice licensees we suggest keeping your calls in the frequencies 20 to 30 kc. outside the Novice bands, so as not to add unnecessarily to the congestion there. Start a list of the Novices worked in the Feb. 5–20 Roundup. The rules in full appear on page 50 of January *QST*; let's have all scores, large and small reported. Only the Novice Operators, leading each ARRL Section, are, of course, eligible for the certificates. This is a real chance for Novices to see how well his first station can be made to perform.

The Frequency Measuring Test, Feb. 10. The League periodically sends signals from W1AW to permit individual operators to try their hand at accurate measurement of frequency. This February 10 (Feb. 11, GMT) brings one of those opportunities. Please see the detailed announcement elsewhere in these columns. If you have a 100-kc. standard or other type equipment especially for measuring, be sure to try it out in this activity. Five or six weeks after the FMT run, we will have compared your results with those of the frequency measuring lab retained to act as our umpire, and we'll send an Individual Report of your results giving the parts-per-million error average. Besides the aim to make all amateurs conscious of the precision that determines how safe or near one can operate with respect to the band edges, we hope some (who measure up well) may be interested in contacting their SCMs to qualify for Observer appointment. So we invite all who can to try the FMT. See what you can do in frequency measuring.

ARRL's 31st DX Competition. See January *QST*, page 59, for the full announcement of this popular activity. There's a Phone Section in both February and March (12th–13th) followed after a rest up period by a C.w. Section (26th–27th). Please note in the announcement that some new Log Forms and Prefix Check Lists have been devised as necessary and convenient for your use in the Test. Always an operating highlight, we'll be interested to see how the upward progress of the propagation cycle will affect use of the various bands this year. DXers overseas will be looking for Canadian provinces as well as for *new states* to advance their WAS standings. We have alerted the many clubs in VE-land to this. May we also appeal to amateurs

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for Nov. Traffic:

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
KØONK	121	3050	3017	34	6222
K6BPI	97	3022	2440	182	5741
W3CUL	221	2408	2323	64	5016
WA9CCP	18	1348	1135	6	2507
K6EPT	98	968	670	298	2034
K5TEY	12	841	833	8	1694
W6WPF	9	704	661	43	1417
WA2RUE	82	692	550	49	1373
W1PEX	324	535	42	437	1338
K2KQC	6	650	619	7	1282
K9IVG	20	614	538	5	1177
WA4SCK	15	586	572	3	1176
K6WAH	119	512	503	9	1143
W3EML	27	586	484	19	1116
W9JOZ	32	498	497	1	1028
WØOHJ	4	497	490	7	998
W6RSY	37	433	145	273	888
W6ZJB	67	382	354	28	831
K9KZB	21	403	396	7	827
WB6JUH	22	397	351	46	816
WB6BBO	69	386	320	8	783
K6YVN	13	383	355	23	774
W1CRX	90	326	281	17	714
W6GYH	60	317	296	12	685
W6VNQ	20	316	316	0	652
K8LNE	1	314	297	8	620
KØGSY	153	191	264	0	608
WØZWL	0	411	0	184	595
WA5AUZ	26	210	260	98	594
WØLGG	24	294	245	14	577
WB2ACH	14	280	240	40	574
WA5CBL	53	252	240	12	557
W2OE	108	262	180	5	555
W5OBD	8	269	269	0	546
WA9CNV	13	331	145	54	543
WA7EBR	17	253	252	10	532
K4EVY	380	80	24	32	516
W4FX	4	249	248	3	504
Late Reports:					
K2KQC (Oct.)	9	495	472	10	986

More-Than-One-Operator Stations

W6YDK	8784	155	188	41	9168
W6IAB	683	1186	835	351	3055
K6MCA	80	1166	1108	58	2412
KR6DI	226	209	138	59	632

BPL for 100 or more *originations-plus-deliveries*

K5MBK 227	W6TXJ 129	W8DAE 108	
WØHTO 177	W3TN 127	WA4NEV/4 107	
WA4AGH 152	K9IMR 122	WB2HZY 105	
WAØMKF 152	WAØJKT 122	WA6HYU 102	
W4FP 151	K9UTQ 113	Late Reports:	
WB6GMM 143	VE3BIT 113	WA8GTY (Oct.) 144	
W4PQP 135	W4DFU 110	WA4TID (Oct.) 137	
K1CLM 130	WA9GJU 110	W6GYH (Oct) 121	

More-Than-One-Operator Stations

K4HJX 189	KR6MB 134	WØYO 114
KR6GF 145		WB4ABF 113

BPL medallions (see Aug. 1954, p. 64) have been awarded to the following amateurs since last month's listing: WB2DXM, W4FX, W5OBD.

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.

in those regarded as the "rarer" states to do their best to "give out" with contacts to our friends overseas at this time. For domestic participants of course it is the annual time for those who ordinarily pursue their DX in leisurely fashion to extend the DX countries-worked lists somewhat and to re-work some old DX friends overseas at the time we find some new ones for you. Good hunting!

—*F. E. H.*

ARRL DX COMPETITION

Just a brief reminder that January *QST*, page 59, carries the full explanation of rules for the classic ARRL DX Competition. Reporting forms are ready, have you requested yours yet?

Briefs

The November Field Day report erroneously listed a Class E score which should be attributed to WN7COB, not WN7LOB.

DX CENTURY CLUB AWARDS

From November 1 through November 30, 1965, DXCC Certificates and Endorsements based on contacts with 100-or-more countries have been issued by the ARRL Communications Department to the Amateurs listed below.

New Members

W8BQH....233	W6KNE....126	KØDYM....108	SP6GB.....104	DJ4PX.....101	W3AXW....101
W1BFA.....186	SM6AEK...123	WA4NGO...108	JA4CNS....103	G3OZP.....101	DM2ANN...100
VE3EDR...182	VS9AWR...114	DL9DH....107	VE4SK.....103	HB9ZE.....101	K2US.....100
WB2MFX...177	W3HTW....114	JA2XI.....107	W8MRS.....103	K1ZHJ.....101	K6EBB.....100
I1BAY.....149	I1AVD.....113	W4WHF....107	WA8GYX...103	K2UMM....101	VS9AMD...100
TG9GZ.....140	G3JQC.....112	HK3SO.....105	WA9IVL....103	K7AHO.....101	W1ZLX.....100
W6LYC.....135	LA7VE.....111	DJ4FZ.....104	K1YPN.....102	K9HUU.....101	W9HTF.....100
OH3XZ.....134	W6NUU.....110	DM2AXO...104	K9PTW.....102	K6BUD.....101	WA2CYQ...100
LA7WI.....128	WA8GUA...110	OA4CG.....104	WB2BOM...102	OE5CA.....101	

Radiotelephone

WA2WVL...205	PY2CYK...149	CR4AJ.....113	5A4TK.....107	KØHUU....101	K4YYL.....100
W8BQH.....196	WB2MFX...137	IS1VAZ.....112	HK3SO.....104	VS9AWR....101	K8QYA.....100
W1BFA.....156	OZ5OF.....120	YV6BR.....112	9K2AN.....103	W7LEB.....101	WB2ICS....100
		LA7WI.....110	HK3AUE...101	WB6GOV...101	

Endorsements

W1GKK....340	K9LUI.....300	OZ7BG.....248	K4ZCP.....200	W9YYG....161	9K2AN.....132
W6CUQ....340	SM5CCE...300	W2YCW....248	W9ZTD.....200	OH3TA.....160	W7RVM....131
W8JIN.....340	W1KXU....300	DJ9GD.....247	W0CAW....200	WB6AKZ....159	WØOMM....131
W1HX.....331	W3GJY.....300	K9WTS.....243	ZS1NQ.....200	W4FNS.....156	KØGSV.....130
W2AYJ.....331	W5IYU.....300	WA6KNE...241	W2RSJ.....199	WA4QBX...154	W2KIT.....130
DL3LL.....330	W2BMK....292	G5VU.....240	VE3BHS....193	K2ZCD.....152	W4JD.....130
W2BOK....330	W5NW.....292	WB2CKS...240	VE3XK.....193	K4ZJF.....152	W4NTE....130
W4GXB....330	W8CUT....291	WB2HXD..240	K2OUS.....192	K6BIA.....152	W9ALP....130
WØBFB....330	KP4RK....290	K6POC.....240	DJ1QP.....190	K8QYA.....152	WB2CKO...130
W6KZL....321	W9TKD....290	W9LJU.....240	ON4ZY.....190	WA8GUN...152	KØWTT....127
W8WZ.....321	K2YXY.....280	EA4CR.....234	W4HOS.....190	W6TZN.....151	WB6LZI....127
K5BGB.....320	K5AAD.....280	WØNGF....234	W4OEL.....186	OZ6RI.....150	SM6ARH....126
K6EC.....320	W4JJL.....280	K4RZK.....230	VE3ACD....185	W1MRQ....150	HB9ABN....125
W1BAN....320	SM5BPJ....277	W1ECH....230	W7GJ.....183	W4GTS.....150	W8EGR....125
W2GNQ....320	HB9MO....271	DL9KP.....226	K5QVH.....182	W9BGX.....150	WØNCK....123
W2RDD....320	VE6TP.....270	ZL1AJU....226	W4FZO.....182	WØLBS.....150	K6AJ.....121
W2TP.....320	W6ISQ.....270	ZS2U.....222	DL1CF.....181	WA4IWC....149	KØYIP.....121
W4LRN....320	W9TQL.....270	K4EZ.....220	WA2FQG....180	K4KIF.....145	K1SCQ....120
WØAJU....320	W6ABA.....268	K8AJK.....220	DL1KS.....180	OZ2NU.....144	K4JSZ.....120
JA1DM.....311	WA6CLD...262	DJ5IM.....216	W6GSV.....180	K8DBW....143	K4KLR....120
K4TWF.....311	W8IJZ.....261	K8SWE.....214	K4WMB....177	W4HKQ....143	K9QVB.....120
VE3BWY....311	W9AZP.....261	LA5Q.....212	OE5EF.....172	W8TRN....143	W1BGD....120
K6KII.....310	SP8CK.....260	OK1MP....212	WA2EFN...172	WA4WIP....142	W1YRC....120
W2AEB....310	W6PQT.....260	W3JW.....212	JAØAC.....171	K9DKU.....141	W3GJR....120
W7CMO....310	W8KSR.....260	K4CEB.....211	I1ARS.....170	W2RIR.....140	W9QWM....120
W8ZCQ....310	YV5AE.....256	K4YFQ.....208	OE2EGL....170	W7NPU.....140	SM3CJD....119
W6HYG....304	ZL4BO.....253	I1SF.....204	VP7NY.....170	WA4WAO...140	K2MGM....110
W1CBZ.....303	K6BPR.....252	W6BCT....203	W7FUL.....170	WB6CFO...140	K2MPS....110
W6LN.....303	W3KDF....252	W6OMR....203	W8BQV.....170	YU1AA.....136	K3FGO....110
ON4FU.....302	W4VMS....251	KØJPL.....203	WA2LMW...170	OH5SS.....135	VE3FKL....110
W7BTH....302	DL1GU.....250	ZL1ARY....202	WA2RUB...170	WØQEV.....134	W3MHR....110
W7DLR....301	K1IGO.....250	W7TDK.....201	K8AXG.....163	K5BZU.....133	W6USV.....110
W8QJR....301	W1YYM....250	K1LPL.....200	K2HVN.....162	K2DQI.....132	WA4EPL...110
			K5JCC.....161		

Radiotelephone

FY4TK.....330	JA1DM.....250	W2YTH....220	W2FXA....190	VE3EDR....152	K9WTS.....131
W1ONK....320	WB2FSW...250	WA5EFL...220	W7DQM....190	OZ7BG.....151	VE3EG.....130
W2RGV....310	OA4PD.....249	SM5BPJ....217	PA0LOU....185	9Q5AB.....151	W1FDL.....130
W8QJR....301	W8EVZ.....244	W4VMS.....217	WB2EPG...185	K4ZJF.....149	ZL1ARY....129
K1IXG.....300	DL7AA.....243	W4AVY.....212	PY2QT.....182	K4KIF.....144	K8RDE....125
W5IYU.....300	DJ3CP.....242	VE5LM.....211	W8GLK.....182	WA6GLD...144	K2DQI.....124
W9ILW.....300	W3AYD.....241	K6HZP.....210	K8AJK.....180	OH2XA.....143	WA4WAO...124
W1JYH....290	W9HP.....237	ZL4BO.....210	OK1MP....180	K6BPR.....139	WA6WWG..124
W6HYG....289	VE6TP.....232	HB9FE.....202	VE3ACD....174	TG9GZ.....139	K6EC.....123
WØMLY....283	W7QPK.....232	DJ9GD.....201	I1SF.....173	WA4WIP....138	WA2PJQ....121
W7DLR....282	WØQUU.....231	VE3MIR....200	K8IKB.....173	W6TZN.....136	VE3IR.....120
G3HDA....270	OA4KY.....230	W6KUT....200	IT1GAI....172	K4PQV.....135	WA1AOE...120
WØPGI....270	W8CUT.....230	W9JT.....200	ZS1DC.....163	VE3BHS....135	W5LZZ.....115
W2ODO....263	K2YLM.....225	W5DNL....197	F2FO.....162	W3MYE.....134	W6PQT.....114
W2WMG....263	W7BTH.....223	DJ5LA.....196	K6KII.....160	K4WMB....132	CT1LN.....111
W8IJZ.....260	W3OBD.....222	W1RO.....196	W2CES.....160	KØGZN....132	PY2CTL....110
W2ZTV....251	W1HJB.....220	K1IMP.....191	WA5KBK...160	OHØNI.....132	WB2GSK...110
		W8WZ.....191	W6ABA....157		

ELECTION NOTICE

To all ARRL members in the Sections listed below:

You are hereby notified that an election for Section Communications Manager is about to be held in your respective sections. This notice supersedes previous notices.

Nominating petitions are solicited. The signatures of five or more ARRL full members of the Section concerned in good standing, are *required* on each petition. No member shall sign more than one petition.

Each candidate for Section Communications Manager must have been a licensed amateur for at least two years and similarly a full member of the League for at least one continuous year immediately prior to his nomination.

Petitions must be received at ARRL on or before 4:30 P.M. on the closing dates specified. In cases where no valid nominating petitions were received in response to previous notices, the closing dates are set ahead to the dates given herewith. The complete name, address, and station call of the candidate should be included with the petition. It is advisable that eight or ten full-member signatures be obtained, since on checking names against Headquarters files, with no time to return invalid petitions for additions, a petition may be found invalid by reasons of expiring memberships, individual signers uncertain or ignorant of their membership status, etc.

The following nominating form is suggested. (Signers will please add city and street addresses to facilitate checking membership.)

Communications Manager, ARRL {Place and date}
225 Main St., Newington, Conn. 06111

We, the undersigned full members of the.....
.....ARRL Section of the.....
Division, hereby nominate.....
as candidate for Section Communications Manager for this Section for the next two-year term of office.

Elections will take place immediately after the closing dates specified for receipt of nominating petitions. The ballots mailed from Headquarters to full members will list in alphabetical sequence the names of all eligible candidates.

You are urged to take the initiative and file nominating petitions immediately. This is your opportunity to put the man of your choice in office.

— F. E. Handy, Communications Manager

Section	*Closing Date*	*SCM*	*Present Term Ends*
Idaho	Feb. 10, 1966	Raymond V. Evans	Apr. 10, 1965
Saskatchewan	Feb. 10, 1966	Mel Mills	Dec. 17, 1965
East Bay	Feb. 10, 1966	Richard Wilson	Jan. 10, 1966
Arizona	Feb. 10 1966	Floyd C. Colvar	Apr. 15, 1966
Tennessee	Feb. 10 1966	William A. Scott	Apr. 15, 1966
Alaska	Mar. 10, 1966	Kenneth E. Koestler	Apr. 10, 1964
Canal Zone	Mar. 10, 1966	Thomas B. DeMeis	Resigned
Wyoming	Apr. 11, 1966	Wayne M. Moore	June 9, 1966
Louisiana	Apr. 11, 1966	J. Allen Swanson	June 10, 1966
Quebec	Apr. 11, 1966	C. W. Skarstedt	June 11, 1966
Maritime	Apr. 11, 1966	D. E. Weeks	June 11, 1966
E. Mass.	Apr. 11, 1966	Frank L. Baker, Jr.	June 15, 1966
South Carolina	Apr. 11, 1966	Charles N. Wright	June 26, 1966
Utah	May 10, 1966	Marvin Zitting	July 15, 1966

ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed by members in the following Sections, completing their election in accordance with regular League policy, each term of office starting on the date given.

Oklahoma Daniel B. Prater, K5CAY Oct. 11, 1965

In the Illinois Section of the Central Division, Mr. Edmond A. Metzger, W9PRN, and Mr. Kenneth Bauer, Bauer, W9WGQ, were nominated. Mr. Metzger received 1387 votes and Mr. Bauer received 514 votes. Mr. Metzger's term of office began Dec. 15, 1965.

1965 A.R.R.L. SWEEPSTAKES

High-Claimed Scores

Following are the high-claimed scores for the 1965 ARRL Sweepstakes Contest held in November. Included are only those claimed scores over 70,000 points (without bonus) *received* at Headquarters by December 15, our copy deadline. *QST* will carry the full official SS results as soon as checking is completed. The following figures show the score claimed, number of contacts and number of different sections worked. *— W1YYM*

C.W.

W4KFC.....153,327-818-73
W2PVX.....141,750-757-75
WA6GFY[1].....139,590-781-72
K8TIG[2].....138,790-740-75
W7TDK.....135,716-917-74
W3BES.....129,393-711-73
K2EIU/5.....124,598-675-74
W2VJN.....123,950-670-74
W9AQW.....123,120-688-72
K2DGT.....120,250-650-74
W6RW[3].....118,252-799-74
WB2ALF.....118,610-670-72
W9IRH.....118,260-648-73
K5RHZ.....113,778-641-71
W9RQM.....109,591-603-73
K5OCX.....108,180-605-72
W2NNL.....106,365-511-70
W3MSK[4].....106,005-576-74
K4BAI.....105,570-612-69
W7ZMD.....100,101-558-73
W5PXN.....99,110-591-68
W4BCV.....98,568-687-72
K2KTK.....98,087-561-70
WØAIH.....97,835-580-68
W4DVT.....97,406-521-75
WA2BLV.....97,125-525-74
W3MsR.....96,564-577-67
K8BPX.....96,205-542-71
W3PZW.....95,995-527-73
W9RCJ.....95,630-524-73
W4BFA[5].....95,115-563-68
WB6AKZ.....94,938-547-70
K8QDD.....93,840-546-69
K1WJD.....93,328-542-69
K7TNW.....92,122-531-71
W8VPC.....91,889-505-73
K3GUR.....90,825-519-70
W9GFF.....90,093-481-75
W3YUW.....89,595-545-66
K1YKT.....89,172-510-70
W9EWC[6].....88,963-631-71
W3GRF.....88,948-602-74
WØISJ.....87,856-653-68
W3EIS.....87,685-494-71
K2AJA.....86,562-458-70
WØTDR.....86,400-600-72
W4JTA.....85,215-499-69
K1ZND.....85,215-494-69
WØJPH/5.....84,671-511-67
W9LNQ.....84,343-468-72
WØWME.....83,530-450-72
WØYCR.....82,875-514-65
WA9AUM.....81,738-505-65
W1WPO.....80,247-584-69
WØIYH.....79,740-443-72
K5HRR[7].....79,570-464-69
K3KMO.....78,594-457-69
W8CRD.....78,575-449-70
W1WLZ.....78,575-449-70
K7SNB.....78,401-455-69
W1ECH.....78,242-554-71
W9YYG.....77,674-548-71
W6GEB.....76,840-453-68
W9QQQ.....75,600-433-70
K4AEV.....74,655-470-65
VE3BHS.....74,497-452-66
W8RSW.....74,277-407-73
K8QHJ.....73,868-444-67
W1BGD.....73,292-502-73
W3GAU.....73,182-401-73
W1BIH.....71,923-508-71
W6TYM.....71,658-422-68
K1HTV.....71,000-400-71
WA7AHH.....70,525-402-70
K8HLR (K8HLR, WA8KYJ)
92,478-521-71

PHONE

W4BVV[8].....161,438-725-75
W4KFC.....157,837-706-75
W4MCM.....156,399-708-74
K5RHZ.....155,052-708-73
W3GRF[9].....148,962-672-74
WB6GVV.....146,370-703-70
K2EIU/5.....145,688-652-75
WAØEMS.....145,013-636-75
W2RLM.....137,751-629-74
W3BES.....135,890-711-73
K8DOC.....134,946-678-68
WA4NGO.....133,663-926-73
W9WGQ.....127,575-556-75
W2NSD/1.....123,662-850-73
K8KJN[10].....121,050-538-75
K3LYW.....117,450-522-75
K8TIG[11].....116,220-596-65
W7WLL.....114,048-795-72
W7AYY.....111,362-515-73
W9RQM.....110,813-508-73
K4BAI.....110,160-510-72
K3MNT/3.....108,153-591-61
W8LLT.....106,782-481-74
W9AQW.....106,029-544-66
W3AZD.....105,750-470-75
W9YT[12].....105,060-520-68
W7ZMD.....100,590-492-70
WØLBS.....97,525-440-75
K9ZBI.....95,317-449-71
W4PTR.....94,860-560-68
K8BPX.....91,872-464-66
W5MYM.....88,638-416-71
K5HWO.....88,043-453-65
W1BGD.....87,624-609-72
W2HHK.....85,801-425-69
W7CAL.....84,246-437-66
K6GII/Ø.....82,518-407-68
WAØLEW.....81,685-386-71
K2AJA.....80,544-420-64
W1FJJ.....78,971-382-69
W8DHG.....75,969-367-69
W9TQL.....72,720-505-72
W8CEA.....72,450-322-75
K3JYZ/3.....70,972-343-68
W4JJ.....70,785-363-65
K5IIS (W5s LZG PTV)
114,525-770-75
KØUKN (5 oprs.)
108,186-749-73
KØPAU (5 oprs.)
94,044-459-68
WA9JCV (WA9s GQT JCV NCS).....74,960-429-59
WA4RES (WA4s RER RES)
71,490-355-68

[1] W6CUF, opr. [2] W8CQN, opr. [3] K9ELT, opr. [4] W6HOH, opr. [5] WA4RPK, opr. [6] K9WIE, opr. [7] K5ABV, opr. [8] K3EST, opr. [9] K1ANV, opr. [10] K8MFO, opr. [11] WA8CZH, opr. [12] K9KGA, opr.

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.

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 Feb. 16 at 0230 GMT. Identical tests will be sent simultaneously by transmitters on c.w. listed frequencies. The next qualifying run from W6OWP only will be transmitted Feb. 4 at 0500 Greenwich Mean Time on 3590 and 7129 kc. *CAUTION:* Note that since the dates are given per Greenwich Mean Time, Code Proficiency Qualifying Runs in the United States and Canada actually fall on the evening previous to the date given. *Example:* In converting, 0230 GMT Feb. 16 becomes 2130 EST Feb. 15.

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.

Code practice is sent daily by W1AW at 0030 and 0230 GMT, simultaneously on all listed c.w. frequencies. At 0230 GMT Tuesday, Thursday and Saturday, speeds are 15 20 25 30 and 35 w.p.m.; on Monday, Wednesday, Friday and Sunday, speeds are 5 7½ 10 13 20 and 25 w.p.m. For practice purposes, the order of words in each line may be reversed during the 5 through 13 w.p.m. tests. At 0030 GMT daily, speeds are 10 13 and 15 w.p.m. The 0230–0320 GMT runs are omitted four times each year, on designated nights when Frequency Measuring Tests are made in this period. To permit improving your fist by sending *in step with W1AW* (but not on the air!) and to allow checking strict accuracy of your copy on certain tapes note the GMT dates and texts to be sent in the 0230–0320 GMT practice on those dates:

Date Subject of Practice Text from Dec. *QST*
Feb. 3: *Weak-Signal V.h.f. Reception*, p. 25
Feb. 7: *From a MONITORING ENFORCEMENT Viewpoint*, p. 32
Feb. 15: *SOME RANDOM THOUGHTS ON PUBLIC SERVICE*, p. 38
Feb. 18: *Stunts you can do with Tape*, p. 44
Date Subject of Practice Text from *Understanding Amateur Radio*, First Edition
Feb. 23: *Transformer Coupling*, p. 39
Feb. 28: *Power Amplifiers*, p. 40

OPERATOR OF THE MONTH

Have you thought back over the past month and picked out your nomination for "operator of the month?" Considerations to bear in mind include a clean signal, good keying, careful enunciation, correct procedure, judgment and courtesy. The League's Operating Aid No. 11 lists further examples. Send your vote for "Operator of the Month" to the ARRL Communications Department.

During December the following additional amateurs were nominated in recognition of their extra skills and courtesies:

W1VG	WA4HOM
WA2GPT	K4NSU
WB2HZY	K4WHW
W2RHN	WA5FNB
W3FFZ	WN8RNZ
K3YMR	WAØHSA

SUGGESTED OPERATING FREQUENCIES

RTTY 3620, 7040, 14,090, 21,090 kc.

WIDE-BAND F.M. 52.525, 146.94 Mc.

GMT CONVERSION

To convertto 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.

W1AW SCHEDULE, FEBRUARY 1966

The ARRL Maxim Memorial Station welcomes visitors. Operating-visiting hours are Monday through Friday 3 P.M.–3A.M. EST, Saturday 7 P.M.–2:30 A.M. EST and Sunday 3 P.M.–10:30 P.M. EST. The station address is 225 Main Street, Newington, Conn. about 7 miles south of Hartford. A map showing local street detail will be sent upon request. The station will be closed February 22, Washington's Birthday.

*GMT**	*Sunday*	*Monday*	*Tuesday*	*Wednesday*	*Thursday*	*Friday*	*Saturday*
0030	**Code Practice Daily[1] 10-13 and 15 w.p.m.**						
0100	.....	C.W. OBS[1]	C.W. OBS[1]	C.W. OBS[1]	C.W. OBS[1]	C.W. OBS[1]	C.W. OBS[1]
0120–0200[4]	.....	.....	7.080	3.555	7.080[6]	3.555[6]	7.080
0200	.....	Phone OBS[2]	Phone OBS[2]	Phone OBS[2]	Phone OBS[2]	Phone OBS[2]	Phone OBS[2]
0205–0230[4]	.....	.....	3.945	50.7	145.6	1.82	3.945
0230	**Code Practice Daily[1] 15-35 w.p.m. TThSat., 5-25 w.p.m. MWFSun.**						
0330–0400[4]	.....	.....	3.555	7.080	1.805	7.080	3.555
0400	RTTY OBS[3]	.....	RTTY OBS[3]	RTTY OBS[3]	RTTY OBS[3]	RTTY OBS[3]	RTTY OBS[3]
0410–0430[4]	.....	.....	3.625	14.095	3.625	14.095	3.625
0430	Phone OBS[2]	.....	Phone OBS[2]	Phone OBS[2]	Phone OBS[2]	Phone OBS[2]	Phone OBS[2]
0435–0500[4]	.....	.....	7.255	3.945	7.255	3.945	7.255
0500	C.W. OBS[1]	.....	C.W. OBS[1]	C.W. OBS[1]	C.W. OBS[1]	C.W. OBS[1]	C.W. OBS[1]
0530–0600[4]	.....	.....	3.555[6]	7.080[6]	3.555	7.255	3.555
0600–0700	.....	.....	7.080	3.945	3.555	7.255	7.080
0700–0800	.....	.....	3.945	7.255	3.945	3.555	3.945
2000–2100	.....	14.280	21/28[5]	14.100	21/28[5]	14.280	.....
2100–2200	.....	14.100	14.280	14.100	14.280	14.100	.....
2300–2345	.....	7.255	21/28[5]	21.1[6]	21/28[5]	7.255	.....

[1] C.W. OBS (bulletins) and code practice on 1.805 3.555 7.08 14.1 50.7 and 145.6 Mc.
[2] Phone OBS (bulletins) on 1.82 3.945 7.255 14.280 50.7 and 145.6 Mc.
[3] RTTY OBS (bulletins) on 3.625 and 14.095 Mc.
[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.
[6] W1AW will listen for Novices on band indicated before looking for other contacts.

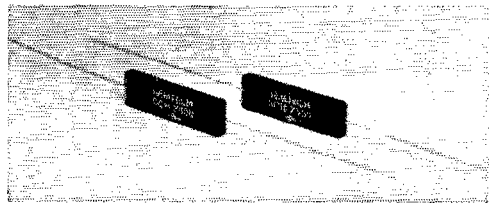
Station Staff: W1QIS W1WPR W1NPG. * All times/days in GMT, general operating frequencies are approximate.

• New Apparatus

Semtech "Slimpacs"

THE silicon rectifier packages in Semtech Corporation's new "Slimpac" line are by far the smallest high-voltage units we have seen. Available with peak-inverse-voltage ratings from 5000 to 25,000 volts, each rectifier will handle 500-ma. average current and 50-amp. surge. Yet a "Slimpac" is only ½ inch high, ¼ inch wide, and 1 to 4 inches in length, depending on the p.i.v. rating. The reverse current through the rectifier, when tested at the rated p.i.v., is less than 0.1 ma.

The rectifier is housed in a hard epoxy case, and is said to be corona-free and relatively immune to mechanical shock. Complete specifications on Semtech's rectifiers are available in their Technical Bulletin No. H-46. Semtech Corporation is located at 652 Mitchell Road, Newbury Park, California. The price class for the SCH 5000 is $6, and $9 for the SCH 7500 shown in the photograph. — *W1KLK.*



• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

DELAWARE—SCM, Roy A. Belair, W3IYE—SEC: K3NYG. RM: W3EEB. V.H.F. PAM: K3OBU.

Net	*Freq.*	*Local Time*	*Days*
DEPN	3905 kc.	1800	Sat.
DSMN	50.4 Mc.	2100	Tue.
Dover 6 & 2	50.4 Mc.	2000	Wed.
KCEN	3905 kc.	1300	Sun.

K3YHR has been promoted to lineman with the local phone company. W3CZS and W3JFR are now on s.s.b. K3NYG is on 160-meter c.w. and s.s.b. with a 500-ft. long wire. WA3DYG has the station completed for operation 80 through 2 meters. Traffic: W3EEB 217, K3YHR 20, K3NYG 10, WA3DYG 7, W3HKS 4, K3UXQ 2, W3IYE 1.

EASTERN PENNSYLVANIA—SCM, Allen R. Breiner, W3ZRQ—SEC: W3ELI. RMs: W3EML, K3YVG, K3MVO. PAMs: W3SAO, WA3BYH. The EPA Net reports QNI of 368 with QTC of 278; PTTN had QNI of 318 with QTC of 159; EPA Emergency Phone & Traffic Net had QNI of 294 with QTC of 116. K3MVO spent Thanksgiving with the children in Ala. 3RN NCS for Tue. and Wed. is K3KTH. By coincidence, K3KXJ's gym locker is 807! For the first time in years, Mae, W3CUL, has been left alone with the store. OM W3VR was sent on an emergency repair job in Hawaii. After a 9-year-leave, W3UVI is on the air with an HW-12. W3NHJ also returned to the QRM with an HW-12. We wish to QSL SS messages from the following stations: K3RZE, K3FSV, K3KPV, WA3COJ, K3BNS, K3YVG, K3ZYT, WA3BGN, W3BIP, K3HNP, W3WYD, W3GHM, W3CDB, K3HTZ, W3ISE, W3YUW, W3BES, W3KDF, W3KFQ, K3JGG, K3MCO, K3JCT and W3KT. K3LNV has joined the instructors at Inglis House, Philadelphia. SEC W3ELI and W3WEU appeared on two radio shows discussing ARRL and ARPSC. The Lancaster Radio Transmitting Society held a transmitter hunt in Nov. WA3BBI says he cannot acclimate himself to 75-meter QRM. K3MEH visited K7UGA for some operating. KØWEU is a new resident in the Levittown area. K3NOX now has 80-meter RTTY going. Quakertown area organized the R.F. Hill ARC with W3PNL pres.; K3QZT, vice-pres.; W3EOU, secy.; W3SYC, treas.; W3BUR, act. mgr. WA3BSV and WA3ESV are now General Class in the Hazleton area. The Hazleton ARC has started code and theory classes. W3EU has replaced the guy wires on his towers. There are no Emergency Coordinators in the following counties: Adams, Berks, Bucks, Chester, Columbia, Cumberland, Dauphin, Juniata, Lancaster, Lebanon, Luzerne, Monroe, Montour, Northampton, Northumberland, Perry, Pike, Schuylkill, Snyder, Sullivan, Tioga, Wayne, York and Wyoming. If interested, drop a line to our SEC, George Van Dyke, 4607 Convent Ave., Philadelphia, Pa., for information and details. Traffic: W3CUL 5016, W3EML 1116, K3MYS 361, WA3AIZ 270, K3MVO 264, K3YVG 116, K3PIE 82, K3ZSK 78, W3ZRQ 76, WA3BYH 62, W3FGQ 58, W3VAP 48, W3RV 46, K3KTH 45, W3CBH 41, K3LPT 38, W3BFF 37, K3KXJ 35, W3QDW 35, W3CDB 33, W3JKX 27, K3RZE 26, K3MDG 19, W3OY 16, K3YKK 16, W3BKF 11, W3ADE 8, WA3CCC 8, K3WEU 8, WA3BBI 6, K3HNP 6, K3KKO 6, WA3AFI 4, K3NOX 2, W3PVY 2, W3KJJ 1.

MARYLAND-DISTRICT OF COLUMBIA—SCM, Bruce Boyd, W3QA—

Net	*Freq.*	*Time*	*Day*	*Sess.*	*QTC*	*Avg.*
MDD	3643	0000Z	Daily	—	—	—
MEPN	3820	2300	M-W-F	22	21	1.0
MEPN	3820	1800	S.-S.			
MDDS	28200	0130	Daily	19	2	0.1
MSTN	50150	0100Z	Daily	29	76	2.6

Station activity reports were down 16 per cent compared to the past three month's average, perhaps because of the Sweepstakes and DX. Sweepstakes messages were received from W3AFM, WA3BTA, K3CKT, WN3CRW, K3CYA, W3DVO, W3EFZ, W3EIS, W3EIV, W3FYS, K3GUR, K3GZK, K3JYZ/3, W3LBC, W3MCG, W3MSK, W3MSR, W3PZW, K3QDD, W3UE, K3URZ, K3VCG, K3ZIX and W3ZUH. K3EJF reports that the Baltimore Nite Owl Net got some fine publicity when ten of the members put up a new antenna for their YL member, K3NNF. W3WTW and W3QA both had antennas blown down in the mid-month wind storm. Both are back in business. WN3EOP is making antenna measurements on 2 meters. K3UXY is struggling with crystal filters in a transceiver he is building. W3LBC has added a 500-watt p.a. and K3LFD's power transformer failed so he is back to 75 watts. K3FKY soon will be heard with a new home-brew electronic key. W3TN made the BPL again in November in spite of the Sweepstakes. WA3CRA made his debut in MDD. K3ZSX was appointed OPS. W3RKK is active in a number of 6-meter nets. K3LLR and W3ZNW also are exploring this band. K3ZIX is plagued with TVI at his own QTH. Congratulations to K3IPX/3 as "Operator of the Month." Don't miss W3QCW's "Christmas QNI" in Dec. QST. K3ZYP has joined the ranks of the automobile owners. Recent elections find K3URE as pres. of the Maryland V.H.F. Society, K3CBW as pres. of the Friendship ARC and K3OJG as pres. of the Antietam ARC. Thanks to

WN3EOP for the Antietam report. Traffic: W3TN 196, K3ZYP 124, W3LBC 106, K3JYZ/3 104, K3GZK 71, K3UXY 63, K3ZIX 51, K3FKY 37, K3TJE 37, W3QCW 28, K3LLR 27, K3ZSX 27, K3LFD 22, W3UE 19, W3EOV 18, W3MCG 16, K3EJF 14, K3URE 13, W3CQS 11, W3PRC 11, W3RKK 10, K3VHS 10, W3WTW 10, K3QDD 9, K3URZ 7, WN3EOP 4, WA3CBC 3, WA3CEK 3, WA3CFK 3, WA3CRA 3, W3ZNW 3.

SOUTHERN NEW JERSEY—Acting SCM, Edward G. Raser, W2ZI—SEC: K2ARY. PAM: W2ZI. RM: WA2BLV, K2BG, WA2BLV, WB2APG, WN2TEN, WB2EBW, WN2UVB and W2ORS sent in reports on the Nov. SS Contest. W2VCX and K2CPR participated in the Sept. FMT. WN2SRW applied for membership in the AREC. K4RAD/2, Princeton, submitted an OO report. W2ORS had his ORS appointment renewed. He also is a new Class IV OO. New Jersey Emergency Phone & Traffic Net totals for Nov.: 30 sessions, QNI 517, traffic 177. NJN C.W. Net totals for Nov.: 30 sessions, QNI 479, traffic 285; different stations checked 63. WB2SBD received his General Class ticket. W2EWR has applied for ORS appointment. Ex-SCM W2BEI still is going strong in Audubon. WA2KIP is 2RN rep. for Sun. sessions. WB2GUK received his Amateur Extra and radiotelegraph 2nd class tickets recently. W2BZJ is in dire need of radio operators for the C.D. Control Center. See him if interested. W2EWR has a new s.s.b. rig in his car. W2YPZ has applied for ORS; he is very active on NJPN. K2CBK is a new check-in from Sussex County. The N.J. Phone & Traffic Net now has coverage in all N.J. counties. Net certificates were issued to WB2EJR, WB2EOV, W2EWR, W2IGL, WB2QLF, W2RLY, K2RXB, W2YPZ, WA2YSR and K2SHE. WA2KAP sends in his monthly traffic report via radio. Try our nets, fellows, use 3695-kc. c.w. or 3900-kc. phone for quick service. NJN meets daily at 1900 local time and NJPN at 1800 daily through Sat. at 0900 Sun. DVRA officers for the new term are W2HX, pres.; W2JBF, vice-pres.; K2AAR, secy.; W2WOA, treas. Traffic: (Nov.) WA2BLV 96, W2RG 60, WA2KIP 59, W2YPZ 50, W2ZI 36, W2EWR 24, W2BEI 10, W2RXB 10, K2SHE 5, W2BZJ 4, W2GIW 3, WA2KAP 3, WB2SBD 2. (Oct.) WA2KIP 47.

WESTERN NEW YORK—SCM, Charles T. Hansen, K2HUK—SEC: W2ZRC. PAM: W2PVI. RMs: W2RUF, W2EZB, 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 3510.5 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. Congratulations to K2KQC and W2OE on making the BPL. WA2TDG was appointed EC for Tioga County. K2MQN was appointed OBS. WB2NNA was endorsed as OO. The Western New York Frontier Radio Amateur Teletypewriter Society, or FRATS, is in the process of distributing used Western Union teletype equipment. The only charge is for handling, which is nominal. The officers are W2RUI, W2FAN, WA2ZVL, K2QIB and W2RGO. Priority will go to hams in the areas from which the machines were originally obtained. Applicant must have a ham license, not already own a machine and have a working terminal unit. This offer is good in the ARRL W.N.Y. section only. Queries should be directed to W2RUI, 199 Ontario St., Lockport. Don't delay as this report was written Dec. 6. How did your AREC and RACES networks fare during the blackout? New officers of the Syracuse V.H.F. Club are K2AVA, pres.; W2UKA, vice-pres.; W2IYR, treas.; K2PPK, secy.; W2RHQ, act. mgr. WB2NNA/WA2PZD was elected pres. of the Hudson Valley Comm. College Radio Club. The Canisteo Valley ARC code class, with K2AIG as instructor, graduated WN2UHK, WN2TUN, WN2UHH and WN2UUF. W2ETY resigned as RAGS pres. to concentrate on the QCWA Chapter, among other things. W2ZOJ takes over the presidency to fill out the term. W2SEI added an 85-kc. filter to his homebrew superhet and took on the traffic assignment from EAN to 2RN. WA2YSC was a cover girl in full color in a Guide to Leisure Living supplement of the *Rochester Times Union*. The accompanying article describe amateur radio and its benefits. Livingston and Monroe county RACES organizations were activated during the big blackout. Oswego County C.D. sent in a fine picture of its RACES mobile control center, compliments of WA2SOO. Traffic: (Nov.) K2KQC 1282, W2OE 555, WB2GAL 270, W2SEI 123, W2FEB 76, K2IMI 34, W2RQF 34, K2RYH 34, W2MTA 33, WA2RLV 30, K2OFV 28, WA2UFI 27, WA2IHP 26, W2FCG 24, WA2FOJ 17, K2DNN 11, WA2GLA 5, W2EMW 2, WB2NNA 2, W2PNW 2, WN2UHK 1. (Oct.) K2KQC 986, WA2RLV 37, WB2HLV 28, K2HOH 9, K2RYH 5.

WESTERN PENNSYLVANIA—SCM, John F. Wojtkiewicz, W3GJY—Asst. SCM: Robert E. Gawyrla, W3NEM. SEC: K3ZMH. PAMs: W3TOC, K3VPI (v.h.f.). RMs: W3KUN, W3MFB, K3OOU, W3UHN. Traffic nets: WPA, 3585 kc. 0000 GMT Mon. through Sun. KSSN 3575 kc. 2330 GMT Mon. through Fri. W3SMV had his phone SS activity curtailed to welcome a newly-born son. K3ZGI uses a new G.E. wide-spaced beam for 6. K3GYD moved to Erie. WN3EIA became a General. K3ENA bought a transistor 2-meter converter. WA3DHU is now WB2UZZ in New York. K3FFJ received the Worked All Fords (New Jersey) certificate. K3AUD is looking for skeds on 6-meter RTTY. Members of the Two Rivers ARC are working on an emergency disaster communications plan in collaboration with McKeesport Hospital. K3CFA and K3BBO/3 are building 432-Mc. gear. W3AGO is 2-meter minded. K3FNG Fayette County EC has formed an AREC net on 6 and 2 meters. Amateurs interested in emergency communications on these bands should contact him for details. W3KQD has been awarded an Amateur Radio Public Service certificate. W3KPI has plenty of time for DXing now that he has retired. Election news: Cumberland Valley ARC elected K3IDJ, pres.; K3ZUZ, vice-pres.; K3FFJ, secy-treas.; W3SHU, K3WWH and Harry Hess, SWL, act. mgr. The McKean County ARC's 1966 slate of officers is K2IWY, pres.; K3FUI, vice-pres.; K3FRQ secy.-treas. Congratulations to W3YA on his reelection as Director of the Atlantic Division. K3KMO, K3SIQ, K3FCK, W3KQD and W3SMV participated in the Sweepstakes. Credit Steel City ARC for the following: Amateur radio draws its participants from such a broad scope of our population that their diverse personalities and interests defy most attempts at self-government. Your club succeeds in being self-governing and manageable only because you have been selective in your membership, and your members have placed the interests of the club ahead of their personal interests and frailties. Your club will succeed as long as this condition prevails. Be sure your actions are not self-serving but, rather, serve the club. New appointments: K3KMO as EC Centre Co.; WA3BGE as ORS. Endorsements: W3MFB as RM; W3KWO as ORS. Traffic: W3KUN 237, W3MFB 105, K3SOH 94, W3LOS 71, W3GJY 48, K3PYS 43, W3BLZ 41, W3SMV 29, WA3AKH 24, K3KMO 19, K3EDO 10, W3JHG 10, W3YA 10, W3OEO 6, W3UHN 6, K3EXE 5, WA3BGE 3, W3TOC 2.

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.). Net reports:

Net	*Freq.*	*Times*	*Days*	*Traffic*
ILN	3760	1900 CST	M-Sat.	123
111 PON	3925	1700 CST	M-F	230
111 PON	3925	0830 CST	Sun.	
111 PON	3545	1830 CST	M-W-F	8
111 PON	50.9	2000 CST	M&Thurs.	22
No. Cent. Phone Net	3915	0800 CST	M-Sat.	699
No. Cent. Phone Net.	3915	1300 CST	M-Sat.	1148
IEN	3940	9000 CST	Sun.	no report

We are sorry to hear of the untimely passing of two of this section's prominent amateurs. We send our sympathy to the family and friends of W9FVU, William Gago, chairman of the Chicago Area Radio Club Council, who was asphyxiated while tuning the engine of his automobile; and W9BMV, Robert Montgomery, who evidently slipped from the cab of a strip mining machine while maintaining a radio unit. New officers of the Rockford Amateur Radio Association, Inc., are WA9DXC, W9BRY, WA9BLE and K9SAN. K9BQQ, net manager of the 75-Meter Single Sideband Net, reports a traffic total of 560. Officers elected for the coming year of the Starved Rock Radio Club are W9OBB, WA9MQI and W9QLZ. K9WMP has built a new Heath SB200 and is working the hard ones. W9LNQ is the proud grandfather of his 4th granddaughter. The Elgin Radio Club and MARS set up a lobby display in the local theater and invited patrons to send messages to the men and women in service. New appointments include K9ZAF as OO and K9WMP as OPS. The Elmwood Park Net held a drill Nov. 10 to test the effectiveness of its 2-meter a.m. mobiles. Those participating were W9LIW, WA9KHR, W9LXL, K9UYB and K9DQU. A last report for October reflects a traffic total of 259 for the Ill. PON. WA9MAG has a new TR-4 and T4Y and hopes to be working good DX soon. W9EEP has been transferred by RCA and his new QTH will be Dallas, Tex. W2QPQ has moved from New York City to Skokie and his 9-Land call is W9IWI. The Chicago Suburban Radio Assn. held its Annual Dinner Nov. 20 at McCook, Ill. K9VJB has returned to the Massachusetts Institute of Technology. WA9LEF, K9IVJ, WA9BKA and W9QFT are the newly-elected officers of the Bloomington High Amateur Radio Club (BARK).

WA9CCP, K9KZB and WA9CNV are recipients of the BPL. Traffic: (Nov.) WA9CCP 2507, K9KZB 827, WA9CNV 545, W9EVJ 174, K9AVQ 98, W9DOQ 81, K9WMP 79, WA9GUM 72, K9BQQ 68, W9JXV 58, W9HOT 55, K9BTE 52, K9CYZ 41, W9PRN 30,K9HSK 21, WA9MPW 18, W9IDY 12, WA9AJF 8, W9HJM 8, W9HPG 8, K9VBK 7, W9LNQ 5, WA9FIH 3, K9RAS 3, K9VIY 3, K9IFE 2. (Oct.) WA9GCM 2, K9UIY 1.

INDIANA—SCM, M. Roberta Kroulik, K9IVG—Asst. SCM: Ernest Nichols, W9YYX. SEC: K9WET.

Net	*Freq.*	*Time*	*Nov. Tfc.*	*Mgr.*
IFN	3910	1330Z Daily, 2300Z M-F	463	K9IVG
ISN	3910	0000Z Daily, 2130Z M-Sat.	773	K9CRS
QIN	3656	0000Z Daily	183	WA9BWY
RFN	3656	1400Z Sun.	95	WA9IZR
	3910	1800Z Sun.		
PON	3885	1300Z Sun.	46	K9EFY

K9GLL, PAM of the Hoosier v.h.f. nets, reports Nov. traffic of 88. W9QLW, RM of 9RN reports that Ind. was represented 100% in Nov. W9JOZ and K9IVG made the BPL. QIN Honor Roll: K9VHY, K9HYV, W9HRY, WA9IQV, K9DHC, W9RGB, K9KTL, W9QLW, K9WWJ, W9ZYK, WA9BWY. New appointments: WA9NFK as OES, K9KTL as OBS. WA9IZR is enjoying a new R4A receiver. K9BWJ is back on the air with an inverted "V" but is now vacationing in Florida. W9DGA is now a police lieutenant in Evansville. W9QLW is telephone relaying. W9JSV is building a sideband rig. W9NIM is on 6-meter f.m. new officers of the Tri-State ARC are K9JQY, pres.; W9IXA, vice-pres.; W9DGA, secy.; W9OG, treas. New Officers of the Elkhart Red Cross ARC: W9FQN, pres.; K9DOF, vice-pres.; WA9COE, secy.-treas. *Amateur radio exists because of the service it renders.* Traffic: (Nov.) K9IVG 1177, W9JOZ 1028, WA9BWY 280, W9QLW 274, W9MM 200, K9HYV 142, K9VHY 136, W9BUQ 76, WA9IZR 73, K9CRS 68, WA9JWL 58, W9EJW 50, K9KTL 42, K9GLL 40, WA9LUG 38, WA9BGI 37, K9EFY 37, WA9GJZ 36, K9ZLB 34, WA9CJR 33, WA9BVS/9 30, W9SNQ 30, K9RWQ 27, WA9BRD 26, W9HWR 26, W9FYM 24, K9YFT 24, WA9CHY 23, WA9FGT 21, WA9JWL 20, K9QVT 20, W9RTH 20, W9URQ 20, W9FJI 19, W9DGA 16, WA9MYF 14, K9FPA 13, W9YYX 12, WA9DBK 11, W9DZC 11, K9FUJ 11, W9CC 10, W9HNL 10, K9IIV 8, K9ILK 8, K9UEO 8, W9HRB 7, K9DHJ 6, K9APH 5, W9BDP 5, K9UHQ 5, K9YBZ 5, WA9CFW 4, WA9CYG 4, W9DOK 4, W9FWH 4, W9HCQ 3, W9JSV 3, WA9QCS 3, W9PNA 2, WA9DRU 1, WA9EQC 1, WA9OYT 1, W9TKK 1. (Oct.) W9HRB 133, WA9CFW 15.

WISCONSIN—SCM, Kenneth A. Ebneter, K9GSC—SEC: K9ZZP. PAMs: W9NRP, K9IMR, K9HJS. RM: None.

Net	*Freq.*	*Time*	*Days*	*QNI*	*QTC*	*Mgr.*
BEN	3985 kc.	1300Z	Mon.-Sat.	233	75	W9NRP
BEN	3985 kc.	1800Z	Daily 30	623	308	K9HJS
WSBN	3985 kc.	2315Z	Daily 30	1209	418	K9IMR
WIN	3535 kc.	0045Z	Daily 29	264	120	W9KQB
SWRN	50.4 Mc.	0300Z	Mon.-Sat. 25	385	6	W9CIU

Net certificaets went to WA9NBU and KØASR for WSBN. WA9AOE for BEN. New appointments: W9YT as OPS. W9SQM as EC for Buffalo County, W9GGN as EC for Adams county. K9UTQ as EC for Wood county. WA9JGI as EC. Renewed appointments: K9WIE as ORS. W9KJW made WAS. A CAN Net certificate went to W5NND (ex-W9VHP). WA9MIO and WA9NTU are on s.s.b. with an SR-160. K9JEK was appointed Asst. EC. W9VSO led the OOs with 20 notices sent. BPL on Nov. traffic was made by K9IMR, WA9GJU and K9UTQ. Ex-W9GSS now has the call W4DFI in Alabama. WA9AVZ and K9YBC passed the General Class test. A WSBN net certificates went to WA9FNG and WAØGBD in addition to those above. New WNA officers for '66 are K9IMR, chairman; W9NGT, secy.; K9HJS, treas. The 1966 WNA Picnic will be held at Stevens Point July 10. Traffic: (Nov.) K9IMR 341, WA9GJU 290, K9HJS 290, K9UTQ 222, W9DYG 212, WA9LWJ 104, W9GOC 87, W9YT 73, WA9NBU 68, WA9MIO 45, K9GSC 44, W9NRP 42, WA9NFG 32, W9BLQ 30, W9KQB 30, W9AYK 27, W9CBE 25, K9JXW 19, K9DJY 18, K9QKU 18, W9IRZ 14, W9KRO 13, K9FHI 8, WA9MRG 4, W9QQQ 4, W9ONI 2. (Oct.) W9HWQ 49.

DAKOTA DIVISION

MINNESOTA—SCM, Herman R. Kopischke Jr., WØTCK—SEC: WAØBZG.

Net	*Freq.*	*Time*	*Days*	*RM-PAM*	*QNI*	*QTC*
MSN	3595 kc.	0030Z	Daily	WØISJ	237	104
MJN	3595 kc.	0100Z	Daily	WAØIDZ	130	30
MSPN	3820 kc.	1805Z	M-Sat.	KØQBI	908	248
		2300Z	M-Sat.	KØFLT	710	172
		1500Z	Sun.&Hol.			
MSSB	3805 kc.	1730Z	M-F	WØHEN	654	54
	3812 kc.	0045Z	M-F			
MSTN	50.4 Mc.	0430Z	M-F	WAØDWM	637	35
		0200Z	Sat.			

Congrats to KØBAD, a new RTTY OBS. KØFLT maintained contact with WAØEDN for nearly four hours on Nov. 8, when long distance phone lines were severed between Duluth and the Iron Range. RM WAØIDZ worked 36 sections in 56 QSOs during his first activity in the CD Parties. WAØCQG has a new Drake R-4. Carl is looking for contacts on 144 and 432 Mc., having disposed of his 6-meter gear. The Rochester ARC operated its e.d. station. WØMXW, with eight mobiles to provide communications for the Eagles Telethon for two days. Newly-elected board members of the St. Paul ARC are KØPML and KØZYM. WØTCK has been busy taking down a used 60-ft. windmill tower, hauling it home and trying to get it back up and loaded with antennas. WAØIAW was active in the various nets during the Thanksgiving week end. BPL certificates went to WAØJKT and WAØMKF. Traffic: (Nov.) WAØJKT 457, WAØMKF 205, WAØIIJ 133, WØISJ 130, WAØEPX 96, WØTCK 68, WØHEN 64, KØQBI 62, WAØBYO 56, WAØIAW 48, KØFLT 41, WAØFCJ 29, WAØKQU 28, KØPIZ 25, WAØKFJ 21, WØMFW 19, WAØEDN 18, WØATO 17, WAØUPR 15, WAØBZG 14, WAØDFT 13, KØICG 12, KØZRC 12, WAØIUJ 11, WAØDWM 10, WAØHRM 10, KØIGZ 10, KØSRK 10, WØUMX 9, WAØDVH 8, WØFHO 8, WAØFUR 8, WØKLG 8, WØTKX 8, KØIKU 7, KØLWK 7, KØZKK 7, KØZRD 7, WØBUO 5, WØENY 4, WAØLCF 4, WØFKC 1, WØSZJ 1. (Oct.) WAØJPR 13, WAØCQG 12, WAØDWM 5, WAØHRM/Ø 3.

NORTH DAKOTA—SCM, Harold L. Sheets, WØDM—SEC: WAØAYL. PAM: WØCAQ. OBS: WØPQW, K6GII/Ø, WØCGM, WØGQD, WAØFWC, W1ZIP/Q, WAØGQJ, WAØCAQ and WAØELO sent in reports of SS activities. KØSPH is on 75 meters now that the wind took his tower and most of the high frequency beam. The North Dakota Weather Net has been hampered with the long skip in the morning so now meets at 7:30 A.M. CST. WAØGRX and WAØMND are spelling off WAØAYL as NCS. WØWWL has been playing with a transitorized transmitter on 80 meters and has 250 miles on 6 watts. WAØIVI is running mobile since getting his Conditional. WØTOM has come up for air now that farm work has come to a standstill. WØNVK braved a blizzard to take a Shrine initiation at Grand Forks. New additions to the 75-phone band are WAØKSB and WAØLEU. KØCND has an HT-37 so will be on s.s.b. WAØNRH and WAØNJY are new Conditionals in Bismarck. WAØNJY and his dad, WØQWG, keep a sked while he is in school at NDSU. WAØDAR and KØMHB were home from Milwaukee during the Thanksgiving holidays. WØDXC has a new Galaxy 300, while WØHQC has a mobile on from Mandan. KØQYD is on 20-meter c.w. with low power. The Bismarck Radio Club is trying a 20-meter net in the evening once a week to take the place of a meeting for traffic and later will be on 2 meters. Traffic: KØITP 119, WAØKSB 74, WØWWL 28, WØDM 20, WAØAYL 19, WØEFJ 17, KØCND 9, WAØGRX 8, WØVBE 1.

SOUTH DAKOTA—SCM, Seward P. Holt, KØTXW—SEC: WØSCT. RM: WAØAOY. The Sioux Falls Amateur Radio Club auction held Nov. 29 was well attended. The next one will be held Jan. 31. OES WØNEC reports a total of 32 states in 8 call areas worked on 144 Mc., maximum distance 1250 miles. New calls are WAØCJI, Redfield: WAØKEM and KØKFC, Mitchell. KØKFC is engineer and announcer of KORN at Mitchell. The 147th Army band at Mitchell also has been assigned WAØCJJ. KØTKN/mobile proved the worth of amateur radio by being at the scene of an accident and with the aid of KØTVJ had the Highway Patrol and ambulance there in a very few minutes. Traffic: KØGSY 608, WØZWL 595, WØSCT 123, WAØAOY 119, KØVYY 79, WAØBZD 32, KØBMQ 29, WØDJO 21, WAØLYO 18, KØYGZ 13, WA6VPN/Ø 11, KØTNM 11, KICAU/Ø 8, WØBQS 6, WAØDNG 6, WØZAL 6, WNØNAG 4, WAØJLH 2.

DELTA DIVISION

ARKANSAS—SCM, Don W. Whitney, K5GKN—PAM: WA5GPO. RM: K5TYW. NMs: WA5IIS, K5IPS. WA5HNN and W5MJO. Two vacancies have occurred in our organization with the resignation of W5NPM as SEC and Asst. SCM. Sam is a sgt. with the Air Force and recently drew a two-year hitch in the Philippines. I need volunteers to fill these and other vacancies, particularly EC. Congratulations to W5MJO, the new net manager for the newly-organized Post Office Net, which

(*Continued on page 106*)

YOU MIGHT BE INTERESTED in some of the Quality Control procedures we use to get National equipment to go together efficiently and to assure high reliability for the customer. There's quite a bit more than a quick once-over at the end of the production line and then — bang — into a shipping carton!

A TYPICAL National product is the NCX-5 transceiver. The NCX-5 has 480 solder connections . . . each of which must have the proper wire attached — be connected to the proper value component — and which must be properly soldered. In addition, there are 191 mechanical points which must be properly riveted, secured, tightened, assembled, etc. There are also over 1259 individual components in an NCX-5 — each of which must be of the proper electrical value, or be of the proper size, finish or plating. There are 20 vacuum tubes and 19 diodes and transistors (with a total of 42 functions) which must maintain their operating parameters.

WHEN ALL OF THESE BITS and pieces are finally assembled, they result in an equipment as complex in function and performance as any laboratory instrumentation. And the NCX-5 is not a box that is just turned on and off — there are a total of 26 separate operating control functions to provide the versatility demanded by our customers.

NOW . . . how do we try to make sure that the equipment "plays" when first put into operation by the customer?

INITIALLY, we attempt to minimize variance by making the maximum number of parts in-house — sheet metal parts such as cabinets and chassis, for example . . . knobs, drives, panel hardware, etc. All parts purchased from outside vendors, such as resistors, capacitors, meters, tubes and transistors, go through an Incoming Inspection group equipped with test instrumentation ranging from production tube checkers to optical comparators.

THE ASSEMBLY LINE itself is unusual for a number of reasons. For instance, our ratio of supervision to direct assembly labor is about twice as high as the electronics industry average. In addition to close supervision, the ratio of inspectors to assemblers is one out of four. That's right — *every fourth position in the production line is an inspection position.* Each inspector is not only specially selected, trained, and closely supervised, but is equipped with programmed audio-visual aids to make certain that every inspection point is checked.

NATIONAL EQUIPMENT is laid out and assembled to make quality manufacture and inspection as easy as possible. Take the trouble, sometime, to look at the below-chassis wiring on National gear. You'll see "right-angle" component placement and lead dress found elsewhere only in military equipment and commercial instrumentation. Even resistors are carefully placed with their color codes oriented in the same direction!

AFTER ASSEMBLY is complete, the unit goes to the test and alignment area — where any possible defects in workmanship or components are most likely to signal their presence by either puffs of smoke or a singular lack of willingness to respond to alignment procedure. The equipment must work properly in order to get through the alignment positions, since in the process of alignment every single control function and characteristic is placed in operation. Immediately after alignment, every NCX-5 goes to an aging rack where it is placed in continuous operation for many hours to help ferret out any latent defects which decided to wait until after alignment to manifest themselves. After aging, each unit is placed on a shake-table to simulate vibration encountered during transit to the dealer. The equipment is then permitted to cool completely, and is drift-tested to determine whether adjustment of the temperature-compensating capacitor is necessary. Following drift-test all units are again checked completely by the final factory inspector for proper operation of all parameters. Units released by the final inspector then go to the Quality Control Department, where every unit is checked by a licensed amateur for proper operation of all controls and functions, a visual inspection is made for scratches or other external flaws, and a complete electrical test is made. Power output on all bands, dial calibration, sideband and carrier suppression, audio — all these characteristics, plus many others, are measured and recorded. If the NCX-5 meets specs, the chassis is stamped by the QC Department and the unit is packed for shipment.

IT SHOULD BE APPARENT that we take a double-barrelled approach to Quality Control — first we build it in, and then we put up every screen we can to try to make certain that failures occur in the factory and not in the field.

WE'RE NOT PERFECT — otherwise we wouldn't need a Service Department — but we're good enough to offer a One-Year Guarantee against component failure instead of only 90 days.

MIKE FERBER, W1GKX

National Radio Company, Inc.

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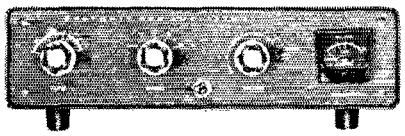
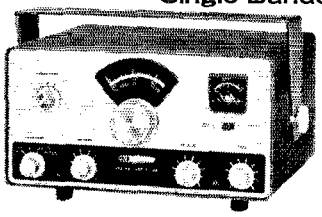


HA-14
$99.95

World's Smallest KW SSB Linear! . . . 1000 watts P.E.P. input SSB. Tunes 80–10 meters. ALC output to exciter. Built-in antenna change-over relay. Built-in SWR meter. Operates fixed or mobile with appropriate power supply. Drive with 100 watt exciter. Perfect final for Single-Banders.
Kit HA-14, 10 lbs. $99.95
Kit HP-14, Mobile Power Supply (12 v. neg. gnd.), 10 lbs. $89.95
Kit HP-24, AC Power Supply, 22 lbs. $49.95

"Single-Bander" 200-Watt P.E.P. Input SSB Transceivers



HW-12
Choose 80, 40, or 20 meters
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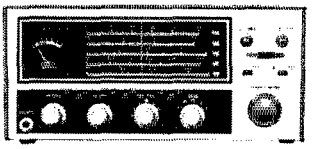
Go SSB Fixed Or Mobile On The Band Of Your Choice . . . with built-in PTT and VOX. Designed for fast, easy assembly. **Kit HW-12** (80-meter), **Kit HW-32** (20-meter), **Kit HW-22** (40-meter), 16 lbs. . . . . each $119.95
Kit HP-13, Mobile Power Supply (12 v. DC), 7 lbs. $59.95
Kit HP-23, AC Power Supply, 19 lbs. $39.95

HR-10 & DX-60A "Combo" . . . Perfect For The Novice

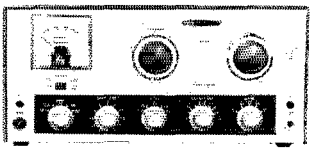
Here's inexpensive amateur radio . . . yet the finest quality! HR-10 provides amateur band coverage 80-10 meters with xtal filter, calibrator, BFO, S meter & AVC. Receives AM, SSB, & CW. 1 uv sensitivity. Excellent stability.
Kit HR-10, 20 lbs. $75.00

HR-10
Receiver
$75.00

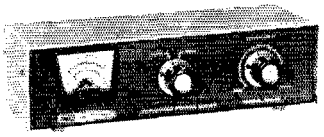


DX-60A provides 90 watts AM or CW with low harmonic output from xtal control or external VFO. Will run reduced power for novice class. Use it with the HD-10 Electronic Keyer.
Kit DX-60A, 24 lbs. $79.95

DX-60A
AM/CW Transmitter
$79.95

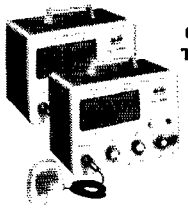


New! SWR Meter . . . Build It & Use It In One Evening



HM-15
$14.95

Check The Efficiency Of Your Antenna. Shows SWR and % reflected power. Handles up to one kw, up to 6 meters. Here's an enjoyable kit to build . . . a couple hours or so.
Kit HM-15, 3 lbs. $14.95



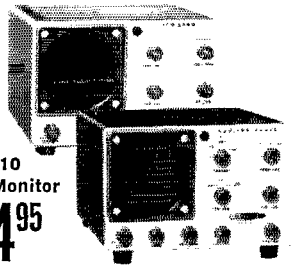
6 & 2 Meter
Transceivers
$44.95

Benton Harbor Lunch Boxes . . . handy 5-watt transceivers for 6 or 2 meters. Built-in 117 VAC power supply.
Kit HW-29A (6 meter) & **HW-30** (2 meter). . . . . Each $44.95
Kit GP-11, mobile power supply 6/12 VDC. $16.88

HD-10
Electronic Keyer
$39.95

All-Solid-State Electronic Keyer . . . 15 to 60 or 10 to 20 wpm with self completing dashes. Built-in sidetone. For grid blocking keying circuits . . . such as DX-60A & SB-Series.
Kit HD-10, 6 lbs. $39.95

HO-13
"Ham-Scan"
Spectrum Monitor
$82.95



HO-10
Signal Monitor
$64.95

Most Popular Amateur Scopes! "Ham-Scan" shows signals 50 kc's on each side of receiver tuning.
Kit HO-13, 12 lbs. $82.95
HO-10 shows actual quality of transmitted & received signals.
Kit HO-10, 12 lbs. $64.95

For Complete Descriptions See Your 1966 Heathkit Catalog

Kit HM-10A Tunnel Dipper outperforms the grid-dip meter. 3 lbs. $34.95
Kit PM-2 RF Power Meter. 2 lbs. $12.95
Kit HG-10 VFO, 80-2 meters. 12 lbs. $34.95
Kit HD-20 100 kc Crystal Calibrator. 1 lb. $14.95

Kit SBA-300-3 (6 meter), **SBA-300-4** (2 meter) converters for SB-300 Receiver. 2 lbs. . . . . each $19.95
Kit HN-31 "Cantenna" Transmitter Dummy Load handles up to 1 kw., 3 lbs. $9.95
Kit HS-24 Mobile Speaker, 3 lbs. $7.00

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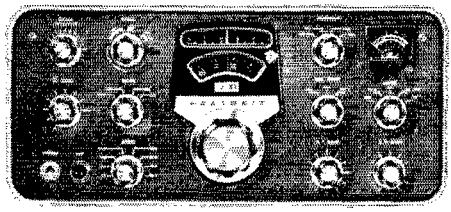
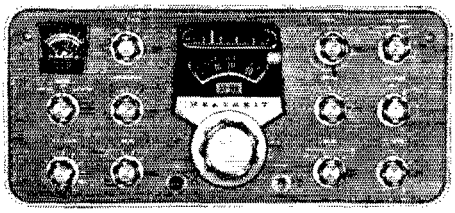


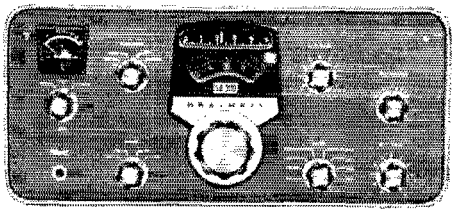
SB-100 80-10 Meter SSB Transceiver $360.00

• 180 watts input P.E.P. SSB—170 watts input CW on five bands 80-10 meters • Upper/Lower sideband • PTT & VOX • 1 kc calibration • Stable Heath LMO • Built-in 100 kc calibrator • Shipping wt. 23 lbs. • Fixed or Mobile power supplies below
Kit HP-13, Mobile Power Supply, 7 lbs.....**$59.95**
Kit HP-23, AC Power Supply, 19 lbs.....**$39.95**



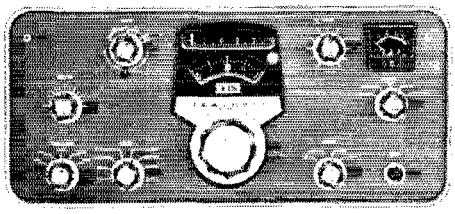
SB-110 6-Meter SSB Transceiver . . . $320.00

• *Here's the high stability, linear tuning, & 1 kc dial* calibration of the Heath LMO in a 180-watt input P.E.P. SSB rig on 6 meters • 150 watts CW • Switch select Upper/Lower sideband/CW operation • 100 kc calibrator • ALC & ANL • Shipping wt. 23 lbs. • Operates fixed with HP-23 & mobile with HP-13 power supply—listed above.



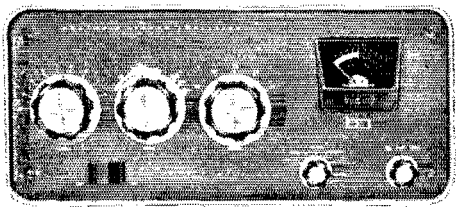
SB-300 Amateur Band Receiver . . . $250.00

• A new standard of amateur performance & value • 80-10 meters with provision for VHF converters • Crystal-controlled front-end for same rate tuning on all bands • 1 kc dial calibrations—100 kc per dial revolution • Bandspread equal to 10 feet per megacycle • Provision for transceive operation with matching SB-400 transmitter • Drift less than 100 cps per hour after warmup • 8 ohm audio output matches HS-24 speaker • Weight 23 lbs.



SB-400 Deluxe SSB Transmitter . . . $325.00

• Built-in power supply • Complete transceive capability with SB-300 receiver • Linear master oscillator frequency control • Built-in antenna change-over relay • All crystals supplied for complete 80-10 meter coverage • Automatic level control for higher talk power, minimum distortion • 180 watt PEP SSB, 170 watts CW • Crystal filter type SSB generation (upper or lower sideband) • VOX operated CW uses CW sidetone • 1 kc dial calibration—100 kc per dial revolution • 500 kc coverage per bandswitch position • Weight 34 lbs.



SB-200 KW Linear Amplifier . . . $200.00

• 1200 watts P.E.P. input SSB—1000 watts CW • 80 through 10 meter band coverage • Built-in SWR meter —Antenna relay—Solid-state power supply • Automatic Level Control (ALC) • Shielded, fan-cooled amplifier compartment • Pre-tuned cathode input circuit for maximum efficiency & low distortion • Circuit-breaker power supply protection—no fuses • Designed for 120/240 volt operation • Weight 41 lbs.

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AM-162

(*Continued from page 102*)

meets daily at 2130Z on 3820 kc. Congratulations also to WA5CBL and W5OBD on making BPL during November. WA5HNN reports working 24 DX stations and four new countries.

Net	*Freq.*	*Time*	*Day*	*Sess.*	*QTC*	*QNI*	*Time*
RN	3815 kc.	0001Z	Daily	30	50	487	591 Min.
AFN	3885 kc.	1200Z	Mon.-Sat.	26	30	783	1684 Min.
OZK	3790 kc.	0100Z	Daily	?	?	?	?
PON	3820 kc.	2130Z	Daily	(First Session Dec. 1.)			

Traffic: WA5CBL 557, W5OBD 546, WA5HNN 326, W5MJO 160, W5NND 148, K5TYW 116, WA5IIS 79, WA5KJT 73, W5DTR 24, K5GKN 16, W5YM 16, K5EDH 8, WA5KUD 8, K5UEK 6, K5TCK 2.

LOUISIANA—SCM, J. Allen Swanson, Jr., W5PM—SEC: K5KQG. RM: W5CEZ. PAM: W5TAV. V.H.F. PAMs: W5UQR, WA5KHE. WA5KIV is working on a t.r. switch for LAN. W5MXQ is busy handling traffic. W5EA again is working for KNOE. WA5HGX likes Navy MARS. WA5KAJ lost a trap in his vertical. K5OKR reports another nice traffic total. WA5FNB, LAN Net Mgr., has the State C.W. Net working very smoothly. W5CEZ thanks the gang for the flowers and get-well cards sent to him while he was in the hospital. K5FYI likes chasing DX, K5HFI is helping a fellow ham work over a 2-meter converter. WA5DES says he gets a lot of pleasure and needed code practice by sending ARRL OBs. WA5EID now has a 75A-4 and is building a 35-watter for 160. K5KQG has completed the Louisiana AREC Plan. If you desire a copy send Dan your QSL. W5SWS received a 2-meter transceiver from Santa. WA5NJR is now mobile with a KWM-2. W5TAO has been appointed an Asst. Director. Congratulations to W5LDH on his reelection as our Director. W5GHP still is working traffic and has a new SB-300 receiver. WA5JVL reports no good v.h.f. openings during Nov. WA5DXA has a new TX-62. The Chetimachi has nine League officials included in its roster. At a recent meeting the Central La. ARC was given a talk on RTTY by W4DPQ/5. The Lafayette ARC had another rip-snorting Annual Banquet. Traffic: W5GHP 387, K5OKR 121, W5CEZ 80, WA5FNB 60, W5MXQ 45, W5PM 37, WA5DES 31, WA5EID 27, K5KQG 8, WA5HGX 7, WA5KIV 6, K5FYI 5, W5EA 4, WA5JVL 3.

MISSISSIPPI—SCM, S. H. Hairston, W5EMM—SEC: W5JDF. I recently visited The Keessler ARC, which is doing a fine job as OBS from K5TYP. I also had a good talk about net situations with W5JDF, W5OVD, W5BW and others at the Gulf Coast Sideband Net Dinner. WA5IMU has made a most complete station in one box—power up to a k.w. on c.w., a.m., s.s.b., 80 through 10 meters, all necessary controls and keyer. K5VBA is very busy at State but still puts in a good signal. W5BW has added a 6-meter transceiver to his station. WA5FAD is working lots of 20 meters mobile. I certainly appreciate cooperation of the NCS for Miss. Sideband net, which W5ODV reports is doing a fine job. WA5LJX, secy. of the new Lumberton ARC, reports the club is affiliated with ARRL. Glad to hear from WA5JTB in Booneville. New appointment: WA5GHF as OO. Net schedules: Gulf Coast Sideband, daily on 3925 at 5:30 CST; Mississippi Sideband, daily on 3888 at 6:15 CST; Miss. C.W., daily on 3647 at 6:45 CST; Miss. Magnolia, daily on 3870 at 7 CST. Traffic: W5WZ 48, W5ODV 31, W5BW 23, K5VBA/5 16, WA5JTB 13.

TENNESSEE—SCM, William A. Scott, W4UVP—PAMs: WA4GQM, WA4EWW, W4PFP. RM: W4MXF.

Net	*Freq.*	*Days*	*Time*	*Sess.*	*QNI*	*QTC*
ETPN	3980 kc.	M-F	1140Z	20	374	28
TPN	3980 kc.	M-Sat.	1245Z	30	1052	195
		Sun.	1400Z			
TSSB	3980 kc.	Tue.-Sun.	0030Z	26	1091	123
TN	3635	Daily	0100Z	58	217	43
			0230Z			

New officers of the Memphis V.H.F. Club are WA4KOG, pres.; WA4VWQ, vice-pres.; WA4ISC, secy. Memphis ARA officers are W4KQM, pres.; WA4VHM, vice-pres.; K4HTB, secy. Congrats to W5LDH and W4WHN on election as Director and Vice-Director of the Delta Division for the next two years. Phil's newsletters and Max's *Tennessee Ham* indicates strong approval of amateurs to be informed of amateur affairs. Glad to report that W4UOT has returned to 75 after a five-year absence. A recent visit with Col. Wallick, of State C.D., resulted in strong interest on his part for full cooperation with amateurs toward obtaining RACES plan approvals and the need for close ties with the AREC. Badly needed are East and West Tenn. groups and individuals. See your local c.d. director or write me if interested. Traffic: (Nov.) W4FX 504, W4OGG 249, W4PQP 183, WA4IBZ 104, K4UWH 59, WA4GQM 53, K4RCT 48, W4WBK 48, W4UVP 40, WA4YNF 32, WA4YDT 31, W4PFP 27, W4TYV 20, W4TZB 17, W4TZJ 17, WA4WNK 17, WA4CUQ/4 13, WA4IZB 13, W4LLJ 13, K4SXD 13, K4UMW 13, WA4VWQ 13, W4VTS 11, WA4SPD 8, WA4NUJ 7, WA4PTD 7, WA4EWW 5, W4VJ 5, WA4CGK 4, W4SGI 4, WA4YHO 4, K4BTY 3, W4TDZ 2, K8UFD/4 1. (Oct.) W4WBK 30, W4SGI 19, W4TZJ 16, WA4PTD 7, WA4REJ 1.

TENNESSEE QSO PARTY

February 6, 1966

All amateurs are invited to participate in the Third Annual Tennessee QSO Party, sponsored by the Radio Amateur Transmitting Society. Tennessee stations are urged to work as many out of state stations as possible to permit others to earn credit for the "King Cotton Chattanooga Choo Choo" "Metro Nashville" and "USA-CA" awards.

Rules: 1) Contacts may be made during the 24 hour period starting at 0000 GMT and ending 2400 GMT February 6. 2) No power or time limitations. 3) The same station may be worked on different bands and modes. 4) The general call is CQ Tenn. C.W. and phone will be considered separate contests, requiring separate logs. 5) Exchange QSO number, report and county (Tennessee stations) or state, province or country (non-Tennessee stations). 6) Tennessee stations count one point for each complete contact, multiplied by the number of states, provinces, countries and Tennessee counties for final score. Out of state stations multiply QSO points by the number of different Tennessee counties worked. 7) Certificate awards for the first three places per state, province or country and for the first five places within Tennessee. All amateurs contacting 10 separate Tennessee stations during the contest will be awarded a "Certificate of Achievement." 8) Suggested frequencies: 3530 3900 7030 7250 14070 14275 21050 21325 28300 28900. 9) Any station disrupting a working Tennessee traffic net for the purpose of contest contacts will be automatically disqualified for any award.

Logs showing date, times, stations contacted, bands, modes, locations and computed final scores must be received no later than March 5, 1966. Send logs to the club station WA4NZE, 612 Hogan Road, Nashville, Tennessee 37220.

GREAT LAKES DIVISION

KENTUCKY—SCM, Lawrence F. Jeffrey, WA4KFO—SEC: K4URX. PAMs: W4BEJ, K4YZU. V.H.F. PAM: K4KZH. RM: W4BAZ.

Net	*Freq.*	*Days*	*EST*	*Sess.*	*QNI*	*QTC*
EMKPN	3960	M-Sat.	0630	22	174	23
MKPN	3960	Daily	0830	30	474	142
KTN	3960	Daily	1900	30		
KYN/KSN	3600	Daily	1700/1900	66	484	268
LVL6	52.525	Daily	—	29	347	176

The Louisville HAM KENVENTION is definitely scheduled for Oct. 15, 1966, at the Kentucky Exposition Center in Louisville. W8UPB, our recently reelected Director, spoke at a meeting of the Wilderness Radio Club, Danville. WA4UMN reports a simple PTT hookup for the Clegg 99er he will be glad to share. W4WNH reports a good month in Nov. for MS work on 144 Mc. WA4GHQ lists 83 QNI with 29 stations, 10 cities and 2 states on the Lexington 50.3-Mc. Net for Nov. W4TPB is home from the hospital and now on 6 meters. WA4QZV, WA4MRG and WA4LTP are on 6-meter s.s.b. WA4YSK has the new 6-meter rig debugged. WA4OMH is working 6-meter DX with 7 watts. WA4UAZ says his Sunday School class is radio-minded with WA4RTI as teacher and WA4ROY and WN4YEA class members, along with several SWLs and prospective amateurs. WA4LLZ has been doing extra duty as NCS three mornings a week on MKPN. WA4AVV has the KPON well organized and meets at 1300 EST on 3945 kc. every Sat. Traffic: WA4AGH 307, WA4DYL 221, W4BAZ 204, WA4KFO 169, WB4ABF 144, WA4TPB 143, W4RHZ 88, WA4UMN 65, WA4VCN 60, K4MAN 52, WA4GMA 37, W4KJP 32, W4CDA 31, WA4IBG 12, W4OYI 12, WA4TTE 12, WA4WQZ 11, W4BTA 9, WA4QLK 6, W4JUI 4, WA4UAZ 3.

MICHIGAN—SCM, Ralph P. Thetreau, W8FX—SEC: K8GOU. RMs: W8ELW, K8QKY, W8EU, K8KMQ. PAMs: W8CQU, K8LQA, K8JED. V.H.F. PAMs: W8YAN, W8CVQ. Appointments: W8SLV as EC; W8-

SS-1R

The New 701 Series SS-1R is Greater than Ever

The SS-1R, with its unique approach to receiver front-end design, has been called a major advance in HF receiver art. Continuing engineering improvements now incorporated in the 701 series make the SS-1R greater than ever. For example:

Sensitivity has been improved by 3 to 6 db. Typical production units measure 0.25 μv for 10 db S+N/N.

Sideband Stability is even better; USB and LSB BFO frequencies are now *crystal-controlled* while retaining variable BFO for CW.

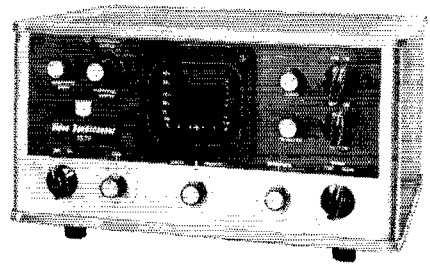
Sideband Quality is clean and distortion-free over a tremendous range of signal strengths (from a microvolt to as much as a volt!). An improved product detector (employing a 6BY6) combined with an i.f. cathode-follower (now a 6AV6) to drive the a.g.c. circuits has increased the already large dynamic range of the SS-1R.

Reliability and Performance Stability have been improved through 1) redesign of a simpler, rugged dial-drum and display mechanism, 2) use of precision glass and ceramic piston trimmers in all critical circuits, and 3) an effective quality – assurance program throughout production and test.

Plus: Crystals for full 10 meter coverage provided.
Improved super-durable sand-blasted finish for the rugged extruded cabinet.
Superior SS-1R Speaker quality.

SPECIAL FEATURES: Freedom from Cross Modulation and Overload • Extreme frequency precision with digital readout in kilocycles. Slow (10 KC per turn) manual tuning rate provides precise tuning of sideband signals • Motor Drive of tuning mechanism for fast traverse of band • 5.0, 2.5 and .35 KC Selectivity with 2:1 60/6 db skirt characteristic • Crystal Lattice Filters • Special Hi Q IF Circuits • Autocalibration of amateur bands to WWV • Choice of AM, USB, LSB or CW modes • Provision for use with the unique SS-1S Noise Silencer and with dramatic new SS-1V Video Bandscanner.

SS-1V, Video Bandscanner. This unique oscilloscope display unit, when used with the SS-1R shows all signals in the band in use, or any portion of the band can be expanded to full screen for detailed examination. Both linear and logarithmic displays are provided. A marker pip constantly shows the exact frequency to which the receiver is tuned. The sharp resolution of this unit permits observation and measurement of two AM sidebands displaced only 2.5 kc. from the carrier. Provision is made for transmitter monitoring or analysis.



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WXO as ORS; W8FSZ and K8JED as OPSs. New officers: Grand Rapids Jr. College ARC—WA8IKP, pres.; K8ZAJ, vice-pres.; WA8QJM, secy.; W8IDP, trustee of WA8MTY. Amateur V.H.F. Assn.—WA8FGK, pres.; K8BMC, vice-pres.; W8KOX, secy.; W8VRU, treas. Lake Huron RC—WA8HQW, pres.; K8GWA, vice-pres.; K8EFG, secy.-treas. Metropolitan Rag Chewers Club—K8MDV, pres.; W8CXS, vice-pres.; W8RNY, secy.; WA8EMN, treas. Michigan 6-Meter Club—K8JGF, pres.; K8BOU, vice-pres.; K8SPE, secy.; K8PCN, treas. Silent Keys: W8JUU and W8QBI. W8JUU left a big hole to be filled in the Van Buren ARC. K8SJQ is in the Philippines. W8CAM started code practice Dec. 1 on 1804 kc. at 7 P.M. Mon. through Fri. and W8CTY holds elementary code classes each Mon. evening at his home. WA8NHY got a new Ameco 6 & 2 transmitter. WA8HNM has a new 150-ft. tower up. WA8IKL has a tower and beam up two houses away from WA8LUQ! W8NRX put up a tower and 20-meter beam. The Oakland County AREC banquet will be held Feb. 19 at 7 P.M. in the Birmingham Masonic Temple. K8MHS has a new Swan 350 transceiver, a gift from U.P. friends. New officers of the Twin Sault RC are WA8HHD, pres.; WA8IXD, vice-pres.; K8ILN, secy.; W8III, treas. WA8HBZ has a new SB-300 receiver, as has K8AMH. W8IV has water in his line—which line, bathroom, telephone or coax? WA8DJC is operating from Mich. Tech. at Houghton. The U.P. evening Net Manager is W8LSZ. Michigan 6-meter PON Manager is WA8LRC with W8YAN as secy. Mich. C.W. PON Manager is VE3DPO. WA8BLU and his XYL spent four weeks in Phoenix with their daughter and son-in-law, WA7EDI (ex-WA8CDR) and WA7-EDH (ex-WA8BZZ). WA8BLU has retired after 40 years at Ford's. The whole family visited K7UGA. The Auto State YLS (TASYLS) has been formed and meets Thurs. at 0130Z on 3900 kc. with WA8ENW, pres.; K8VCB, vice-pres.; WA8CTE, secy.; WA8ARJ, treas. K8LNE made the BPL. Traffic: (Nov.) K8LNE 620, K8QKY 382, K8KMQ 224, K8JJC 205, W8CQB 184, K2SJL/8 182, K8ZJU 154, K8GOU 143, WA8LRB 138, WA8PIM 129, W8-MRM 115, W8FX 113. WA8HDM 109, WA8ENW 105, WA8BQK 88, W8BEZ 86, WA8LRC 72, W8RTN 69, K8BYX 68, WA8MQT 68, W8ELW 67, K8HLR 57, K8JGF 50, W8UFS 50, K8WQV 46, K9RHU/8 46, W8YAN 43, W8EU 40, K8JED 37, WA8MGM 25, W8EJR 24, WA8-CZJ 21, W8TBP 21, W8AUD 19, W8FWQ 16, WA8HGE 14, W8PJS 13, K8DJQ 11, W8AHV 10, W8DSE 8, WA8-CTE 7, K8AQA 6, WA8LNE 6, K8QLL 4, W8IFK 2, K8VDA 2, W8AAM 1, W8WNX 1. (Oct.) W8AXF 73, W8IWF 15, WA8NPF 4, K8LOS 1.

OHIO—SCM, Wilson E. Weckel, W8AL—Asst. SCM: J. C. Erickson, W8DAE. SEC: W8HNP. RMs: W8BZX, W8DAE and K8LGB. PAMs: W8VZ, K8BAP and K8-UBK. The Six Meter Nomads had nominations for its 1966 officers. Canton ARC's *Feedline* says W8OYV was on vacation, K8YVZ was in the hospital, W8YKA moved back to Canton and the Canton Chapter of the QCWA held its banquet-meeting in Massillon. The Univ. of Akron ARC has been reactivated with WB2FPI/WA8-PGD elected as its manager, K8OYQ its chief operator, WA8LIJ its faculty advisor and W8CMO trustee. The Seneca RC held its annual pot-luck dinner and saw a film taken by K8ZMP on his trip to Canada. W8PL and K8GTS joined the Silent Keys. Toledo's *Ham Shack Gossip* tells us W8STF joined the Silent Keys; WA8-SQB received his General Class license; WN8RZP, WN8RZQ and WN8RZR are new Novices from De-Vilbiss High School; WN8SAE, WN8SAR, WA8RAIC and WA8RWE are new Technicians; Toledo Mobile RA held a dinner dance; K8LUC was married; W4ABL, ex-W8RCU, visited K8TVX; W8MUK spoke to the Toledo RC on linear amplifiers; W8YKF was in the hospital and W8HUX now has a new 40- and 80-meter dipole. WA8AFT sends in this news: WN8SCY is a new Novice in Bucyrus, WA8MZD lost his beam because of the wind, K8BZZ has a new baby boy and his wife, WA8NJF, kept in touch with home on 2 meters from the hospital. W8AQ and his wife vacationed in Florida. W8DQG received his amateur Extra Class license. Marion ARC saw a movie of Col. Glenn's Flight of the Freedom 7 and the club conducts General Class license classes with W8SSL and WA8CUX as instructors. Newark ARA's *NARA News* informs us that the club station was issued the call WA8SBT. WA8IGJ was elected club treasurer, a code and theory class was started by WA8DYD, K8PKJ demonstrated the techniques of radio control flying of model aeroplanes, WA8JGE received a certificate of merit for perfect copy of the Armed Forces Day RTTY broadcast, WA8LTO moved to Tennessee. According to Mt. Vernon ARC's *K8EEN Newsletter*, the club held a White Elephant auction and swap and the nominating committee decided on a list of names to be voted on. Columbus ARA's *Carascope* says they saw an ARRL movie explaining the theory of s.s.b. radio techniques and discusses s.s.b. as compared with a.m. techniques and elected its 1966 officers. K8DHJ is snooping on 6 and 2 meters with a VHF-152A converter. Miami County ARC's code classes average 33 per session. WA8NUN is now on 6 meters. WA8SHO received his General Class license. WA8FBF is on s.s.b. with a new Swan 350. W8KDJ has a TR-3. W8TAE uses higher power with a Warrior amplifier. WA8SIB (ex-WB2-MCW) has moved to Warren. K8NJS moved to Parma. The V.H.F. High Banders held an auction. Babcock & Wilcox ARC saw two movies, "Rest of your Life" and "White Tailed Buck." 1966 officers of the Westpark Radiops are W8WUO, pres.; WA8PIW, vice-pres.; K8DZR, secy.; and W4SON/8, treas. W8DAE made the BPL in November. WA8DUY says the East Shore V.H.F. Club has two new members, W8YOS and W8-DKI. Traffic: (Nov.) W8DAE 294, WA8CFJ 205, W8-FSM 150, K8LGA 136, K8UBK 116, W8BZX 77, W8QCU 63, K8DHJ 62, K8YDR 55, W8MGA 51, WA8FKD 50, WA8FSX 49, K8BYR 46, K8LGB 45, K8LFI 30, W8LZE 30, W8LAG 27, W8DQD 25, W8ENM 10, WA8JXT 10, WA8PMN 10, K8DIU 9, W8FGD 5, WA8KPN 5, W8WEG 4, WA8HFI 3, K8BNL 2, WA8-RWZ 2, W8IBX 1. (Oct.) WA8GTY 253, WA8HVR 165, W8DRU 88, WA8JXM 7, WA8WFG 4, W8DIH 2. (Sept.) WA8HVR 25. (Aug.) WA8HVR 215. (July) WA8HVR 126.

HUDSON DIVISION

EASTERN NEW YORK—SCM, George W. Tracy, W2EFU—SEC: W2KGC. RM: WA2VYS. PAM: W2IJG. Section nets: NYS on 3670 kc. nightly at 2400 GMT; NYSPTEN on 3925 kc. nightly at 2300 GMT; ESS on 3590 kc. nightly at 2300 GMT. Endorsements: WA2LJM and WA2WGS as ORSs. Congrats to WB2HZY on his first BPL for Nov. traffic. Official Observer K2LSX has moved to N.J. We wish you luck, John. ESS Mgr. WA2VYS reports traffic of 218 for October on the net. The Westchester Club moved back to the County Center for its Oct. meeting. At the Albany Club, W2AWF brought in some old gear which he demonstrated for the newer members. At Westchester, K2UYH spoke on weak signal detection methods and their applications to h.f. and v.h.f. November was Auction Month at the Schenectady Club with a large attendance. Reports from the nominating committee and the Board of Directors featured the meeting of the New Rochelle Club. Its mobiles handled the Thanksgiving Eve Parade in New Rochelle. Congrats, WB2HZY reports he completed WAS during the Sweepstakes for 50/35. Hunting was good for WB2HYA, who reported both a buck and doe, but like all sportsmen he didn't say where he shot them. The Schenectady Club has a v.h.f. transceiver stationed at Ellis Hospital for portable use by any member who may be a patient. Seems like a good morale builder. Traffic: (Nov.) WB2HZY 259, WA2VYS 178, K2AJA 66, W2BXP 50, W2ANV 26, WA2WGS 21, W2URP 9, W2ODC 8, K2HNW 5, WB2HYA 3, WA2DXB 1. (Oct.) WA2ZPD 6, W2SZ 2.

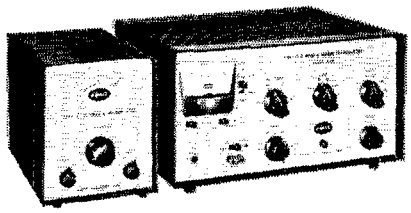
NEW YORK CITY AND LONG ISLAND—SCM, Blaine S. Johnson, K2IDB—Asst. SCM: Fred J. Brunjes, K2DGI. SEC: K2OVN. Section nets:

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 AREC Nets: *See Dec 1965 column for schedules.* Many thanks for all of the reports on the "Blackout" Emergency. In addition, the section officials wish to express their heartfelt thanks to all who signed into their various nets, or turned up at their e.d. headquarters. BPL certificates were awarded to WA2RUE and WB2ACH. WB2HWB has resigned as PAM for NYC-LIPN for personal reasons. WB2DXM was appointed PAM-NYCLIPN to succeed him. K2LCK has settled in Baldwin with a brand-new XYL! WA2EXP has received the Clamdigger's certificate and the RTTY SECDEF award. WB2NGZ has changed his abode, but he's still in Freeport. W2PF keeps three skeds per week with KV4AB/W2KW in St. Thomas, V.I. WB2RBA has a new Eico 730K modulator and a new s.w.r. bridge to keep him company. WB2UDD is on 40 meters with 75 watts and an NC-88. WB2EMJ, a resourceful type OPS, is trying to interest YL WB2DGE in traffic, among other things. W2GP operated from KP4BEZ and enjoyed being on the receiving end of pile-ups. New officers of the QRP Chapter #1 are WA2JKX, pres.; WA2-HYY, vice-pres.; WB2CSS, secy.; WA2EEI, treas. WN2TOM has converted a Mark 2 and it works fine. WB2KSK, who went off to Fairleigh Dickinson U., is back on 15 meters from the club station at F.D.U. K2UMM put an 80-meter dipole up about 125 feet and worked 15 countries the first night. WN2UBE, vice-pres.

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

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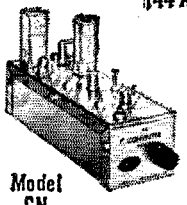
NUVISTOR CONVERTERS FOR 50, 144 AND 220 MC. HIGH GAIN, LOW NOISE



Model CN

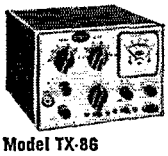
Has 3 Nuvistors (2 RF stages & mixer) and 6J6 osc. Available in any IF output and do NOT become obsolete as their IF is easily changed to match any receiver. Average gain — 45 db. Noise figure — 2.5 db. at 50 Mc., 3.0 db. at 144 Mc., 4.0 db. at 220 Mc. Power required 100-150V. at 30 ma., 6.3V. at .84A. 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

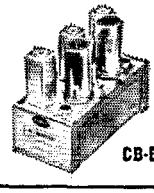
2 Nuvistors in cascode give noise figures of 1.5 to 3.4 db. depending on band. Weak signal performance, image and spurious rejection on all receivers are greatly improved. PCL's overall gain in excess of 20 db. Panel contains bandswitch, tuning capacitor and 3 position switch which puts unit into "OFF," "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

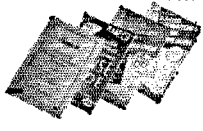
Handles 90 watts phone and CW on 6 thru 80 meters. Final 6146 operates straight thru on all bands. Size — only 5″ x 7″ 7 7″ — ideal mobile or fixed. Can take crystal or VFO. **Model TX-86 Kit $89.95 — Wired Model TX-86W. $119.95. Model PS-3 Wired $44.95. Model W612A Mobile Supply wired $54.95.**



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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Radio Operators' Lic. Guide, EL 1-2 ..... **.75**
EL 3 ..... **1.75** EL 4 ..... **1.25**
Amateur Log Book ..... **.50**
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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.

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of the Patchogue HSARC, reports the club station is on with an SCR-522 transmitter, HE-30 receiver with Ameco nuvistor converter and a pair of stacked three-element beams. WB2NDI and YL WB2OGP got hitched Nov. 30. The New York City YLRL-type girls held a luncheon for the lovely G2YL which was attended by our own lovelies, W2EEO, W2EUL, W2JYZ, W2OWL, W2QWL, W2RAQ, WA2GPT and WB2OGP. By the way, W2GPK, daughter of W2EEO, is expecting her 4th li'l rascal! WA2FTS was one of the stalwarts who manned a rig atop a cold and windswept roof during the Pope's visit. WA2GKQ visited NASA and met the astronauts! WA2GPT not only received the section ARPSC Achievement award, but also was recognized as the station handling the most Navy traffic in this district. WB2PYI (ex-W3TSC) of Sag Harbor is the new 1966 Second District Chairman of the YLRL. Anyone interested in joining YLRL, or having YL-type news should contact WB2PYI. The Long Island Mobile Amateur Radio Club (LIMARC) was formed to promote technical, operational and social activities of mobile enthusiasts in this area. Temporary officers are W2KPQ, pres.; WA2BVU, vice-pres.; K2PKH, secy.; WB2FNT, treas. The LI-MARC will meet the 1st Tue. of each month at the Carle Place Lounge, Carl Place, N.Y. All mobile enthusiasts, regardless of band of operation, are welcome. The first ARPSC Conference was held between County ECs, PAMs, RMs, SEC, Asst. SCM and SCM for the purpose of gluing together the section ARPSC activities. Traffic: WA2RUE 1373, WB2ACH 574, WB2DXM 372, W2EW 263, WA2FTS 128, WB2EUH 101, K2AAS 88, W2GKZ 78, WB2AEK 77, WA2EXP 61, WB2NGZ 51, WA2LJS 29, W2PF 26, WB2RQF 26, W2DBQ 25, WB2-MLN 24, WB2RBA 24, WN2TCS 23, WB2UDD 18, WB2EMJ 16, K2UAT 16, W2EC 11, WB2DBW 10, W2JTZ 10, K2KYS 10, WA2WAO 6, K2YQK 4, WB2BKS 3, W2GP 3, WB2TBX 3, WB2AWX 2, W2SEU 2.

NYC-LI QSO PARTY

February 12-13

The South Shore Amateur Wireless Assn. invites all amateurs to participate in the New York City-Long Island Section QSO Party by contacting as many NYC-LI stations as possible.

Rules: (1) *Contest Period:* 2300 GMT Feb. 12 to 0500 GMT Feb. 14. (2) *General Call:* On c.w. "CQ NL" or "DE NL." On Phone "CQ New York City-Long Island." (3) *Scoring:* Stations outside NYC-LI count two points for each NYC-LI station worked, and multiply by the number of counties worked (7 maximum). NYC-LI stations count two points for each station worked outside the section, one point for section contacts and multiply by the number of ARRL sections worked. Multiply final score by 1.25 if power 150 watts or less at all times. Phone and c.w. are considered the same contest. (4) *Exchange:* QSO number, RS(T), ARRL section or NYC-LI county. (5) *Awards:* Certificates go to section winners, county winners, and Novice high scorer. (6) *Frequencies:* 3560-70, 3900, 7030-40, 7250, 14080-90, 14250, 21050-60, 21350, 28010-20, 29000 kc., and 50.4 and 144.5 Mc. Check 1810 kc. at 0300 GMT both evenings. (7) *Entry:* Logs must be postmarked no later than Feb. 28, 1966. Contacts during contest apply for WNYC-LI certificate, participating logs confirming. Send logs to the SSAWA, 116 Locust Street, Valley Stream, New York 11581.

NORTHERN NEW JERSEY—SCM, Edward F. Erickson, W2CVW—SEC: K2ZFI. NNJ NTS section nets:

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 6&2	51,150 kc.	11:00 P.M.	M-W-Sat.	K2VNL	PAM
NJ 6&2	146,700 kc.	10:00 P.M.	Tue.-Sat.	K2VNL	PAM

All times local. AREC skeds are available from K2ZFI. New appointments: WA2TEK as OBS-Mon., Wed., Fri. on 3625-kc. RTTY at 4:45 P.M. local, 3900-kc. phone at 5:45 P.M. local. WB2OHK is now an ORS. Welcome to K2LSX-OO, transferred from the E.N.Y. section. WB2QLF is trying to keep the New Jersey Two active. Please call in Tue. and Sat. at 10 P.M. local time on 146.700 kc. The Navesink Emergency Net meets daily at 9:00 P.M. on 145.8 Mc. All Monmouth County amateurs are encouraged to check in. Contact WB2BCS for details. WB2BXK and WB2KTO are active members. WB2QGB has a new NCX-5 which he is using for Official Bulletin transmissions on 15 meters. WB2IYO has constructed a station console. WA2UDT needs two more states for WAS. W2NKD has been appointed director of C.D.D.C. in Scotch Plains. W2NVA is active on 20-meter c.w. and 15-meter phone. W2MITP/M, in a new apartment, is sticking strictly to 10-meter mobile. WB2LAM has a new Clegg 22er and has earned the nickname of "The Big Ear" for his long listening sessions on all bands. WB2UIR has a new DX-60. WA2EJZ is back on the air and has a new 14AVQ antenna. W2COT, now retired, recently toured the West Indies. Bruce has been appointed financial advisor for the 1966 Hudson Division Convention. K2UKQ is active in CD parties and YL contests. Kay is back on 2 meters now that the beam is fixed. WB2HJW has a new linear and two-element quad. W2CVW has a new HQ-180AX for general coverage. SEC K2ZFI and yours truly spoke to the Irvington Radio Amateur Club on appointments and AREC. ECs WB2NSV and W2-COT AND ORS W2NAK also were in attendance. Good luck to OES WB2GKF in the military service. School work and other activities have been responsible for a general drop in radio operating activities and hence this column is shorter than usual. Hope to hear from more of you in 1966. Official observations—Nov.: W2TPJ 20; no other reports. Traffic: (Nov.) WA2TEK 344, WB2AEJ 270, K2VNL 189, WB2JWB 164, WB2FIT 153, WB2KSG 50, K2ZFI 49, WB2OHK 31, WA2CCF 27, WB2HLH 21, W2PEV 15, K2JTU 13, WB2QLF 13, WB2KTO 12, W2DRV 10, K2EQP 9, WB2BCS 8, K2-MFX 7, WB2BXK 6, WA2DEW 6, K2SLG 5, WB2OYK 4, WA2TAF 4, WB2ICH 3, W2NIY 3, WB2QGB 3, WB2IYO 2, WA2UDT 2, W2EWZ 1, WB2GFY 1. (Oct.) K2KDQ 246, WB2KTO 33, WA2SRQ 24, K2JTU 7.

MIDWEST DIVISION

IOWA—SCM, Dennis Burke, WØNTB—SEC: KØBRE. No change in the other appointees. All clubs who are not ARRL affiliated, please send your club name and roster of officers to Ronald M. Schweppe, 920 32nd St., Sioux City, Iowa, former SEC of Iowa, who is organizing an Iowa QSO Party for next spring. Do not delay because time is running out and Ron wants to notify all clubs of the time and rules for the party so that their members will be ready to participate. This is one way of getting our section on the map. Get ready to go when the day comes. Net reports for Nov.

160 M Phone Net	QNI 810 QTC 13 Sessions 30
75 M Phone Net	QNI 1292 QTC 101 Sessions 26
Hamilton County Net	QNI 211 QTC 3 Sessions 29

Traffic: WØLGG 577, KØASR 129, WØUSL 90, WØNTB 80, WAØDYV 54, WAØJEC 32, KØEVC 20, KØTDO 13, WØMMZ 10, WØQVZ 10, WØBKR 8, WØNGS 6, KØTFT 6, WØLJW 5, KØQKD 5, WØJPJ 3, WAØMHH 3, KØAZJ 2.

KANSAS—SCM, Robert M. Summers, KØBXF—SEC: KØEMB. RM: WAØJII. V.H.F. PAMs: WØOHJ, KØVHP.

KPN:	16 sessions	151 QNI, 42 QTC.
QKS:	1830 CST daily	3610 kc. QTC 36 Mgr.: WA6JII
HBN:	1205 CST M-Sat. 3880 kc.	22 sessions QNI 801
	QTC 132	WAØEMQ asst. net mgr. reporting.
KWN:	1800 CST M-Sat.	3920 kc. QNI 253 QTC 8
EC Net:	1300 CST Sun.	3920 kc QNI 41, QTC 6

Your SCM has bought a new home and the new address is 3045 North 72nd, Bethel, Kans. 66009. Tel. CY9-1128. SEC KØEMB reports there now are 553 AREC members in the state, with 49 Asst. ECs serving them. KØYLV is having a ball with a new Apache and an SB-10. WAØCCW says that 2 meters is quite the band, having regular skeds with no problems. WØBYV will be off the air because of a burned-up receiver. WØVBQ is traveling as an inspector on a new 245-kv. transmission line from K.C. to Wichita, and ham radio will take a back seat for about a year. V.h.f. around K.C. 6-meter-wise is reported by WAØDZI with 100-mile ground-wave consistently. New Asst. ECs are WØVRZ and WAØHIH for Zone 10; WAØKEC for Zone 13; and WAØISL for Zone 11. Traffic: (Nov.) WØOHJ 998, KØHGI 170, WAØEMQ 48, KØEMB 47, KØBXF 46, WAØJII 46, WAØECO 38, KØGZP 31, WAØCCW 27, WØBYV 18, KØJMF 18, KØLPE 14, KØPSD 11. (Oct.) KØJDD 43, WØWFD 4.

MISSOURI—SCM, Alfred E. Schwaneke, WØTPK—SEC: WØBUL. New appointments: WAØDGG and WAØKNW as OPSs. WAØFMD as ORS. Appointments renewed: WØKIK and WØOUD as ORSs; KØJWN as OES. SS messages were received from KØAXU, WAØBGU, WØBUL, WAØCHH, WAØCTV, WAØ-DGG, WØEEE, WAØELM, WAØEMS, WAØFKD, KØ-

EIMAC introduces 5-500A pentode for retrofit into 1 kW AM transmitters

If you use 400 feet of RG8U coax between transmitter and antenna, your 1 kW AM transmitter using a pair of 4-400A's has to work harder to generate 1200 watts so you'll have 1 kW at the antenna base. That's marginal operation. There's no need for marginal operation with Eimac's new 5-500A power pentodes. Running well within ratings, this inexpensive new 500 watt tube is ideal for retrofit in 1 kW AM transmitters: just change the filament transformer and readjust bias and screen voltage. The 5-500A features a balanced filament which comfortably exceeds FCC hum and noise specifications. As a linear amplifier, the 5-500A will provide a two-tone signal with third order products of – 39 db at 450 watts PEP, or – 32 db at 600 watts PEP. Write Power Grid Product Manager for details or contact your local EIMAC distributor.

5-500A CHARACTERISTICS CHART

Maximum Ratings Plate Modulated	
Radio Frequency Amplifier	
DC Plate Voltage	3200 V
DC Plate Current	340 mA
Typical Operation (Carrier Conditions)	
DC Plate Voltage	2700 V
DC Screen Voltage	475 V
DC Plate Current	280 mA
Carrier Power	600 W

EIMAC
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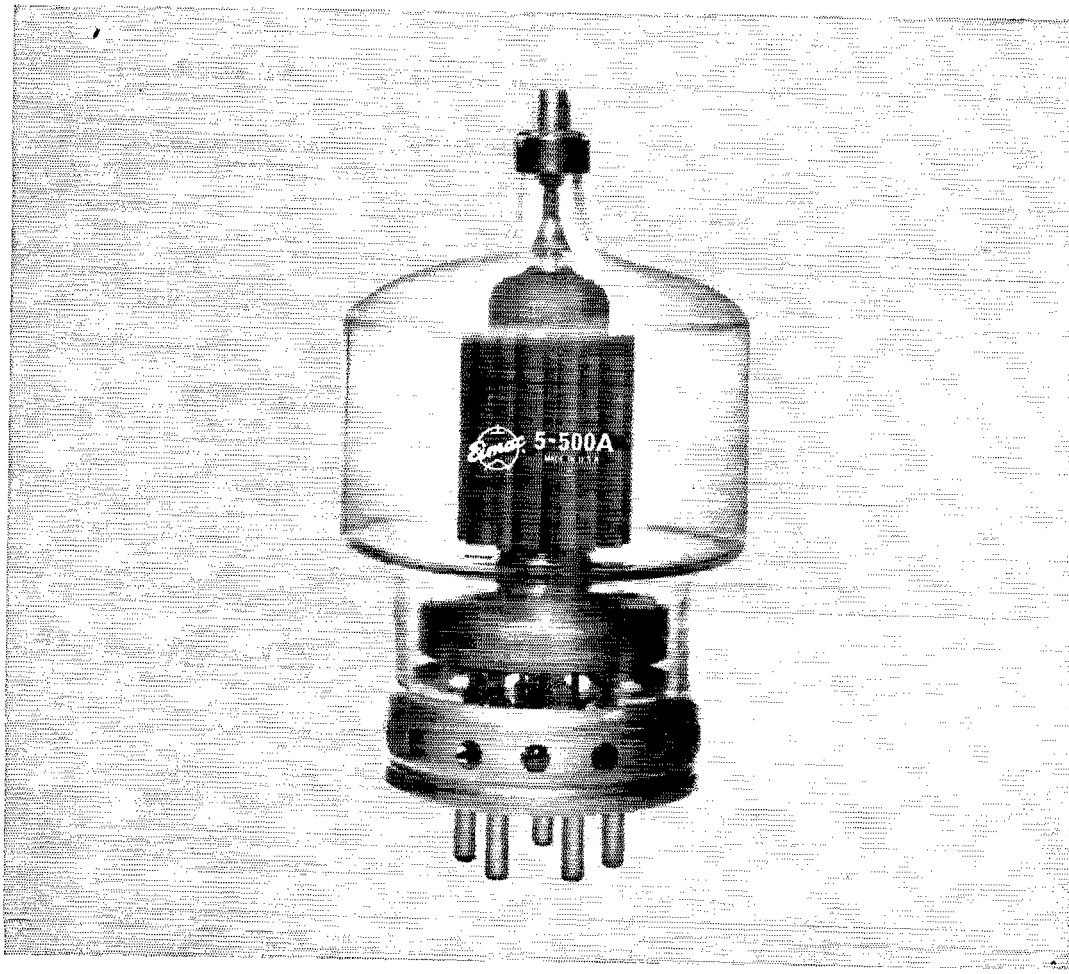


FPC, KØGSV, WØGUZ, KØIOG, KØJNF, KØJPL, WØTDR, KØYGR, KØYIP. KØAXU, of the NW St. Louis ARC, operated portable 9 in the SS with KØs ECG, TLO, JPL, YIP, GSV, EOD assisting. MEN has changed its schedule to meet at 2330Z (5:30 P.M. CST) on M-W-F to overcome winter skip. The PHD Net is operating on 50.45 Mc. Mon. at 2330Z. WØZLN, U. of Mo. ARC, has 2-kw. s.s.b. with 4-slot on 144 Mc. for Oscar work. KØGYK, WAØCWV and WØBAZ are new traffic managers for WØZLN. The SLARC (KØLIR) elected WØDSW, pres.; KØTOV, vice-pres.; KØHUO, treas., for second terms. New secy. is WAØKMF. The SLARC Ham of the Year Award goes to WØKY, c.d. director of St. Louis County. WØKY's Novice class produced 34 new hams! WAØBGU received DXCC. WAØEMS made DXCC on s.s.b. WØEEE has a new TA-33 Sr. beam. F.m. in KØONK's s.s.b. rig was caused by neighbor's hooking on the far end of the antenna for a BC receiver. WAØEMS clipped the lead off to cure the f.m.

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*	*Mgr.*
MEN	3885	2330Z	N-W-F	13	173	36	WØBUL
MON	3580	0100Z	Daily	30	210	141	WØWYJ
SMN	3580	0400Z	Daily	20	34	25	KØAEM
MNN	3580	1900Z	M-Sat.	26	49	11	WØOUD
MSN	3715	0300Z	Daily	24	32	4	KØONK
MsSSB	3963	2400Z	M-Sat.	26	695	180	KØTCB
MoPON	3810	2100Z	M-F	23	337	217	WØHVJ
QMO	3580	2200Z	Sun.	4	17	9	WAØFKD
MTTN	3940	2300Z	M-F	22	269	248	WAØEMX
PHD	50.45	0130Z	Mon.	5	89	15	WAØFLL

Traffic: KØONK 6222, WØHTO 214, WØWYJ 208, WØHVJ 192, WØYO 165, KØAEM 162, WAØEMS 135, WAØFKD 131, WØEEE 104, WØZLN 89, K4OJD/Ø 76, WAØCHH 69, WAØFMD 57, WØOUD 57, KØTCB 40, KØJPL 37, KØELM 32, WAØDGG 26, WAØDKT 26, WØRTO 26, WØBUL 25, WØTPK 24, WAØFLL 21, WØAMO 18, WAØBGU 17, WAØLYE 16, WAØHWJ 15, KØOYV 13, KØLGZ 11, KØJPS 10, KØDEQ 9, KØYIP 8, WAØKNW 7, WØGQR 6, WAØJRJ 6, WØBVL 3, KØBWE 2, KØFPC 2, WØKIK 1.

NEBRASKA—SCM, Frank Allen, WØGGP—SEC: KØJXN. Monthly net reports: Nebr. AREC Net, WØIRZ, QNI 111, QTC 4; Nebr. Morning Phone Net, KØUWK, QNI 632, QTC 44; West Nebr. Net, WØNIK, QNI 444, QTC 20. WX 171; 160 Meter Net, WAØCBJ, QNI 377; Nebr. AREC C.W. Net, WAØEET, QNI 9, QTC 1; Nebr. C.W. Net, WAØGHZ, 1st session QNI 150, QTC 32, 2nd session QNI 123; Nebr. Emergency Phone Net, WAØBID, QNI 1257, QTC 77; Nebr. Storm Net, KØJXN, 1st session QNI 774, QTC 24, 2nd session QNI 736, QTC 17. WØNYU has been appomted OBS and now sends Official Bulletins on RTTY and c.w. each Mon., Tue., Wed., 1st and 2nd Thurs. and 3rd and 4th Fri. at 7:30 P.M. CST, c.w. first, RTTY following on 3627.5 kc. Bob has put in a lot of work in getting the RATT on. Thanks, Bob, for getting a Nebr. RTTY Bulletin Station. Traffic: WØNIK 161, WAØGHZ 107, WAØGVJ 64, WAØBIE 58, WØGGP 51, WAØBID 48, WAØAES 32, KØFRU 29, KØRRL 25, WAØBOK 24, WØBFV 23, WAØKRK 15, WØFQB 14, WØVEA 12, WAØEEI 8, KØDGW 7, WAØFNY 7, WØUKD 7, WAØHWR 6, WØNOW 6, WØVRE 6, WAØERN 5, WAØIXD 5, KØFBD 4, WØHOP 4, KØJXN 4, KØVTD 4, WØBMN 3, WØEGQ 3, KØUWK 3, WØERW 2, KØFJT 2, WØFTQ 2, WAØHSX 2, WAØIXF 2, WØPQP 2, KØTSU 2, WØWKP 2, WØZAG 2.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, Fred Tamm, K1GGG—SEC: W1PRT. RM: W1ZFM. PAM: W1YBH. V.H.F. PAM: K1RTS. Nov. net reports:

Net	*Freq.*	*Days*	*Time*	*Sess.*	*QNI*	*QTC*
CN	3640	Daily	1845	30	279	137
CPN	3880	M-S	1800	29	392	150
		Sun.	1000			

High attendance: CN—W1ZFM, K1ZND, WA1APY, K1LMS; CPN—W1YBH, W1FVU, W1LUH, WA1CBW. New stations on CPN are WA1CYB and W1MPW. QRM on CN by commercials: The ARRL Intruder Watch can use help in reporting unauthorized stations on our bands. The power failure in Connecticut activated RACES/c.d. groups in Southington and Bloomfield to provide communications via mobiles. Halloween "Goblin Patrols" were provided by HARA and CARA members and the Ledyard RACES group. K1HJV hosted the annual Mobileer Dinner-Dance in Bethlehem. The SARA is sponsoring an Extra Class course at Southington High. New officers: Waterbury ARC—K1OQK, pres.; K1QFM, vice-pres.; K1OVF, secy.; W1GTE, treas. CARA—WA1AWX, pres.; W1DDJ, vice-pres.;

New Webster
"Circle W" quality symbol
heralds the

BIG K

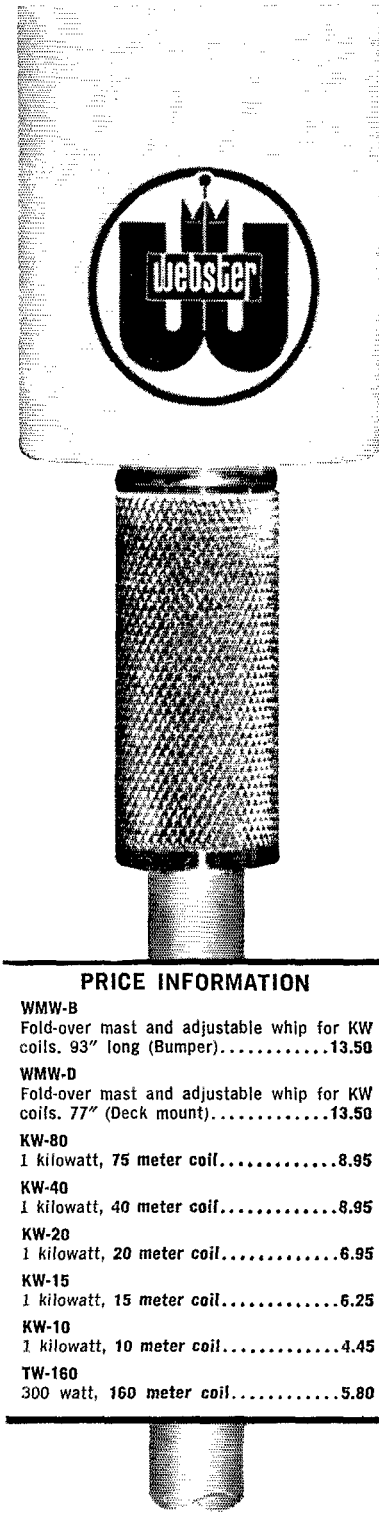
high power antenna at a low power price

Now . . . **BIG-K** . . . basically an improved version of the well-known Top-sider mobile antenna but with ONE-KW (p.e.p.) coils and priced to represent exceptional value.

New techniques and large quantity production have lowered manufacturing costs while maintaining highest quality. All of the savings are being passed along to the customer. **Compare these prices for a KW-rated mobile antenna!**

There will be only one type of coil—**BIG-K**—1000 watts p.e.p. for all bands (except the coil for 160-meters which is 300 watts p.e.p.). The basic antenna remains the same with the exception that the **BIG-K** aluminum column will be given a special coating for environmental protection. As before, the column is hinged, permitting coil and top whip section to fold over. Webster's exclusive fast release and positive lock-up feature remains intact.

Write for descriptive literature.



PRICE INFORMATION

WMW-B
Fold-over mast and adjustable whip for KW coils. 93" long (Bumper).....13.50

WMW-D
Fold-over mast and adjustable whip for KW coils. 77" (Deck mount).....13.50

KW-80
1 kilowatt, 75 meter coil.....8.95

KW-40
1 kilowatt, 40 meter coil.....8.95

KW-20
1 kilowatt, 20 meter coil.....6.95

KW-15
1 kilowatt, 15 meter coil.....6.25

KW-10
1 kilowatt, 10 meter coil.....4.45

TW-160
300 watt, 160 meter coil.....5.80

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K1ZXJ, secy.; W1ZKQ, treas. Loomis School ARC, K1QKR—KN1ZUJ, pres.; W1VW, faculty advisor. K1PKQ has completed a new 829B 2-meter rig. WV1DUV finished a 2½-watt 2- and 6-meter rig. WA1FGN is working on an EICO 753 transceiver. K1TKS is at Worcester Tech., WA1ATW at U. Conn., W1ZZK at Elon College (N. Car.), K1GUD/4 NROTC at Louisville U, Ky. K1CSB is in Germany with the Army. W1APA was /VE1 in Nova Scotia. WA1ALZ is at Storrs. DX results: W1ECH, 250.232, K1LMS, 94/66. With deep regret, I have to report the passing of K1-IKJ, who was killed in action in Viet Nam. John was a radio operator with a Special Forces team serving his country using skills gained as an amateur operator. Reports received: W1ECH-OO, WN1DUV-OES. SS reports: C.w. 16 stations, phone 8 stations, with W1-BGD and K1ZND leading in scores. New appointments: K1SRF as OPS. Endorsements: W1ADW as ORS and EC; K1VMI as OES. Traffic: (Nov.) WA1APY 465, K1ZND 428, W1EFW 307, W1ZFM 250, W1YBH 137, K1LMS 121, K1EIC 83, K1EIR 83, W1BDI 82, W1CTJ 59, WA1CBW 48, K1GGG 47, W1MPW 27, K1SRF 21, W1ECH 13, K1EYY 12, K1NTR 12, W1OBR 11, W1-BNB 9, WA1CYB 8, W1PRT 7, K1AFC 6, W1APA 6, W1CHR 5, W1QV 5, W1CUH 4, W1FVU 4, K1PKQ 4. (Oct.) K1EIR 154, K1EIC 92, W1ADW 4.

EASTERN MASSACHUSETTS—SCM, Frank L. Baker, Jr., W1ALP—W1AOG, our SEC, received many reports from c.d. groups who were called out during the "Blackout" of Nov. 9. K1VJT, is the new EC for Lynn. He is secy.-treas. of the North Eastern Mass. ARA. K1VJX is pres. K1PNB, our RM for the Eastern Mass. Novice Net on 3733 kc. Mon., Wed., Fri. at 6:30 to 7 P.M., says that the net is going along fine with 92 QNIs, 13 sessions, 33 traffic. QNIs: WN1s DWS, DRH, EVD, FDL, ECY, ELX, WA1s DSZ, EDQ, ECC. K1s PNB, ETT, VOK, YSJ, YUB, W1s CDN, ZUB, DRO. K1PNB is now sending General Class Basic Electronics Theory to Novices. If interested drop him a line. The 6-Meter Crossband Net held 20 sessions, 301 QNIs, 17 traffic. Silent Keys: W1NFQ, W1VSU, WA1BKP. W1s IHF, CED and MPT are in the hospital. K1YMW has a Swan 350. WA1APX has a Tri-band beam. W1-DIR has a new beam for 15. K1LZV is out on the high seas as a radio operator. WA1DUR, in Amherst, used to live on the North Shore. W1WAJ, now in Weston, has room for antennas. K1ONW says W1KN is back on the air. W1RST has no time to get on the air. K1VCB is on many bands. WA1DWV is working DX. W1AUQ is doing a lot of OO work. The T-9 Radio Club met at W1MNK's. W1YHZ says things at the Fall River Club are a bit quiet. Another meeting was held to get the South Shore Club going again. W1MGP is mobile on 10 and works with various c.d. groups. W1s MVO and HXK have Drake TR4. Malden C.D. had slides from ARRL. W1THT's transmitter is OK now. The Framingham Club nets are on again on Wed. nights: 6 Meter, 51.15 Mc. at 8 P.M. and 10 Meter, 28.7 Mc. at 9 P.M. W1ALP attended the Netfest of the Winthrop group at W1BB's QTH. Our sympathy to W1TEO on the death of his wife. WA1DLU is secy. of the Norwood Club and classes are being held Mon. nights at 1930 in theory and code for all grades of licenses. W1LUG is in charge. The Middlesex Amateur RC had an auction with W1s QXX, AEM, LJO and K1OQX as auctioneers. WA1FEU is on 40. W1EUJ is on 2 and will be on 220 Mc. He is trustee for the Merrimack Valley ARC. W1NBN, and issues the WAMC awards. W1ZLX, PAM for our 10 Meter Net, now on 29.2 Mc. Mon. through Fri. at 2000 EST or 0100 GMT, is doing a lot of DX work and contests. W1NTA is busy teaching Electronics in Winthrop H.S. WN1EOT, on 15, has worked 20 states. W1NF joined the Morse Telegraphers Club. W1JSM gave a talk at the Quannapowitt RA on "Meteor Scatter QSOs on 2." W1CTS has retired and moved to Maine. K1SWU is in the Navy. W1QV, our New England Division Director, spoke at the Middlesex ARC. W1TY was awarded life membership by the Yankee RC. W1OFY is a busy fellow in many nets. K1UVX is alternate NC for the Yankee RC nets. WA1-FGQ, ex-KN1ZQD, will be on 6. W1BJO will be on the air soon. The Capeway RC met at W1ZST's and the new officers are K1IPR, group mgr.; W1EYU, asst. group mgr.; W1ZST, treas.; K1NFZ, secy.; K1HGT, certificate secy. K1RSZ now is in Needham. K1VDQ is in Cleveland, Ohio. W1RGH is in Brookline. W1FON is very active in Army MARS. W1QVK is state director. Appointments endorsed: W1s AUQ, BB, SVU as OOs; W1s BB, HBB, JVZ, K1QAM as ECs; K1OJQ as ORS. Our BPLers: W1PEX, W1CRX, K1CLM. K1CLM has a Tornado 500 p.e.p. WA1DJC has a new 80 antenna. K1WJD has an SR-150. W1SUR and WA1CFQ are on 75. WA1CKJ is on 2. New officers of the Marlboro ARA are K1RDC, pres.; W1JNS, vice-pres.; W1BNE, secy.; K1LNY, treas.; W1PRC, WA1CIB, directors. Meetings are held the 1st Wed. of the month on 28.6 Mc. W1VAH

NOW! A TRI-BAND SSB TRANSCEIVER KIT FOR 189.95

NEW EICO 753 SSB/AM/CW TRI-BAND TRANSCEIVER

Build the finest of SSB/AM/CW tri-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:**

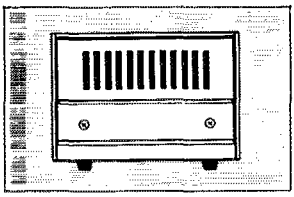
■ Full band coverage on 80, 40 and 20 meters. ■ Receiver offset tuning (up to ±10kc) without altering transmitter frequency. ■ Built-in VOX. ■ Panel selected VOX, PTT & STANDBY. ■ High level dynamic ALC to prevent flat-topping or splatter and permit the use of a linear amplifier. ■ Automatic carrier 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

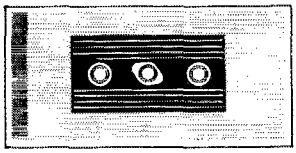
FREQUENCY COVERAGE: 3490-4010kc, 6990-7310kc, 13890-14410kc. SSB EMISSIONS: LSB 80 and 40 meters, USB 20 meters. RF POWER INPUT: 200 watts SSB PEP and CW, 100 watts AM. RF POWER OUTPUT: 120 watts SSB PEP and CW, 30 watts AM. OUTPUT PI NETWORK MATCHING RANGE: 40-80 ohms. SSB GENERATION: 5.2 Mc crystal 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): 5 13/16" x 14 1/4" x 11 1/4". 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

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worked 5VZ8CM on 40-meter c.w. W1PRC has a G66B receiver. The EM2MN had 22 sessions, 185 QNIs, 156 traffic. Traffic: (Nov.) W1PEX 1338, W1CRX 714, K1-CLM 401, W1EMG 249, W1OFK 161, W1DOM 119, K1-PNB 109, K1VPJ 59, K1GKA 45, K1VOK 45, WA1CRR 42, W1CTR 39, K1KBO 34, WA1DEC 15, W1JDP 14, K1LCQ 14, W1SIV 14, WA1DLT 13, K1EYM 12, WA1-DED 11, WN1EAT 4, W1CDN 1, WA1CKJ 1, WA1-DJC 1. (Oct.) K1PNB 115, WA1CEV 32, W1LES 19, K1WJD 18, WA1CRR 10, K1LCQ 7. (Sept.) K1WJD 20.

MAINE—SCM, Herbert A. Davis, K1DYG—SEC: K1QIG. RM: K1TMK. PAMs: K1MQI, K1ZVN. V.H.F. PAM: K1OYB. Traffic nets: Sea Gull Net, 1700 to 1800 and 2000 to 2100 Mon. through Sat. on 3940 kc.; Pine Tree Net C.W., daily at 1900 on 3596 kc. There was a meeting with the amateurs of the great north country at Presque Isle with fourteen present and a nice forum on many parts of amateur radio was held. K1-CLF and W1EPN were hosts for this meeting. K1TMK is headed for a hitch with the Navy. Many thanks are due him for is work on the bands. K1MTJ sends the v.h.f. news again. It seems that the fellows are going wild on the meter showers; they are working up to 15 states. K1OYB and Joel are headed for Vermont to work a meter shower portable there. Traffic: K1TMK 145, K1WQI 47.

NEW HAMPSHIRE—SCM, Robert C. Mitchell, W1SWX/K1DSA—SEC: W1ALE/W1TNO. PAM: K1-APQ. RM: W1DYE. The GSPN meets on 3842 kc. Mon. through Fri. at 2330Z and Sun. at 1430Z. The VTNH Net meets on 3685 kc. Mon. through Fri. at 2330Z. K1YSD has been appointed as OPS. Endorsements: W1AIJ as ORS and OPS, K1APQ reports 642 check-ins and 53 traffic for GSPN. W1GE, of Warner, received the "50 Years in Amateur Radio Award." Congratulations, Herb. K1UZG reports 114 check-ins and 63 traffic for VTNHN. W1DYE, W2NSD/1 and K1YSD were active in the Phone SS, while K1WKP and W1-DYE made fine scores in the C.W. SS the following weekend. K1YSD has a new inverted "V." K1NBN has a new tri-beam added to his antenna farm. OO W1-TFS's reports show that many phone stations are not identifying properly. W1YMJ has a new HW-12. K1DWK reports 25 check-ins and 5 sessions for the MVAREC. WN1FJX is a new ham in Berlin. K1APQ is glad the hunting season is over. K1MOZ is in college. K1PPE is active on 6 meters. K1RIX is on from rare Coos County. W1BYS also is K1TXC. Traffic: W1ALE 38, W1MHX 22, W1PFU 12, W1SWX 6, W1RCC 2.

RHODE ISLAND—SCM, John E. Johnson, K1AAV—SEC: W1YNE. PAM: W1TXL. RM: W1BTV. V.H.F. PAM: K1TPK. RISPN report: 3; sessions, 505 QNI, 85 traffic. RIN report: 29 sessions, 112 QNI, 91 traffic. The RISPN meets at 50.6 Mc. daily at 1830 local time. The RIN Net meets at 3,540 Mc. daily at 1900 local time. Both nets would like any R.I. ham interested to join them by simply checking in any evening. The W1AQ Club of Rumford held its Ladies Night recently. The committee consisted of K1s AMG, PEL, SMY and LII. WA1EQF is active once more in the club after returning from the hospital. The club returned to 6 meters recently after reworking its 6-meter rig. K1JSG has a new 75-ft. tower with a 6-meter turnstile for AREC use. He participates in the AREC and RACES weekly drill sessions. W1TXL is on the air again after renovations to his shack. K1EWL reports he is busy at school and hopes to join his ham friends during vacation. Participating in the 1965 Sweepstakes Contest were W1YNE, W1KAIV and WA1FAV. W1-YNE has taken over as R.I. Area Coordinator of Navy MARS. Traffic: W1BTV 153, W1YKQ 126, WA1FAV 79, W1SMU 71, K1TPK 63, K1VPK 56, K1VYC 49, K1YEV 29, W1YNE 22, K1YVN 19, WA1CSO 9, W1TXL 1.

VERMONT—SCM, E. Reginald Murray, K1MPN—SEC: W1VSA. RM: W1WFZ. Nov. Net Reports:

Net	*Freq.*	*Time*	*Days*	*QNI*	*QTC*	*NCS*
Gr. Mt.	3855	2230Z	DyxS	No Report		W1VMC
Vt. Fone	3855	1400Z	Sun.	No Report		W1UCL
VTNH	3685	2330Z	M-F	114	63	K1UZG
VTCD	3990.5	1500Z	Sun.	81	13	W1AD
VTSB	3909	2300Z	DyxS	No Report		W1CBW
		1330Z	Sun.			

Note that the VTSB Net now starts at 6 P.M. EST. Net reports are rather sketchy this month because of the deer season and for other reasons. All Vermont stations are urged to be active during the Vt. QSO Party Feb. 19-20. Two-meter activity is on the upswing in Vermont—a new net is going Sun. at 8 P.M. on 145.8 Mc. W1OJO is in the hospital. Traffic: K1BQB 229, K1NZG 41, K1LLJ 8, K1EQI 4, K1MPN 4.

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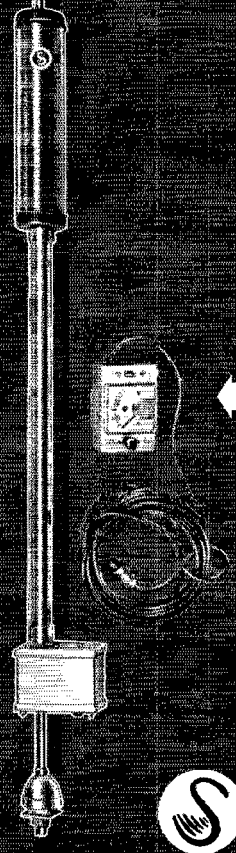

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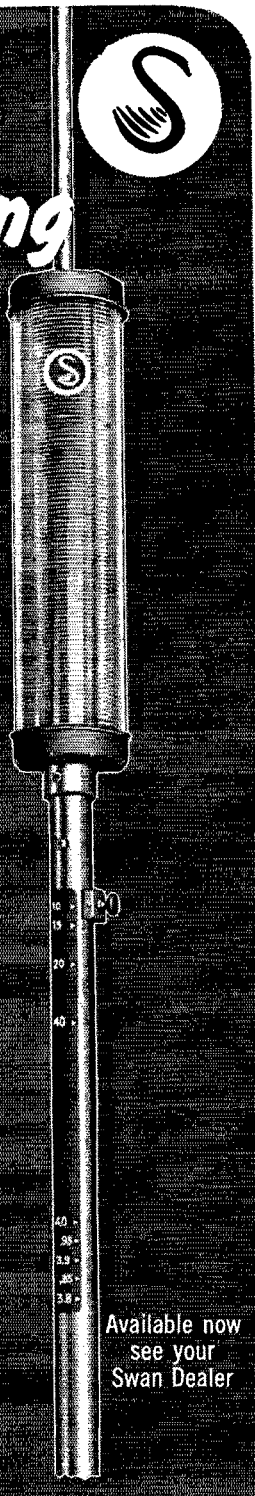

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VERMONT QSO PARTY

February 19-20, 1966

All amateurs are invited to participate in the Vermont QSO Party, sponsored by the Central Vermont Amateur Radio Club. Vermonters are urged to work as many out-of-state stations as possible so that those interested can earn credit toward WAS, WANE, W-VT and USA-CA awards.

Rules: 1) Time, the 28-hour period from 2300 GMT Feb. 19 to 0300 GMT Feb. 21. 2) No power restrictions, all bands can be used and contact credit with the same station on different bands will be given. 3) Vermont stations score 1 point per contact and multiply by the number of ARRL sections and foreign countries worked. Outside stations score 3 points per Vermont station and multiply by the number of Vermont counties worked. 4) Certificates will be awarded to the highest scoring station in each ARRL section, plus a trophy to the highest scoring station outside Vermont. A trophy will also be awarded to the top Vermont scorer, with 2nd, 3rd and 4th place station receiving a gold-trimmed certificate. 5) Suggested frequencies: 3685 3855 3909 7030 7240 7290 14,040 14,225 14,290 21,050 21,300 28,100 28,600 50.250 50.360 144-144.5 and 145.8. 6) Vermont stations send number of QSO, report and county. Others send QSO number, report and section. 7) General call to be used "CQ VT" on c.w. and "Calling any Vermont station" on phone. 8) Logs should be postmarked no later than March 31 and sent to the CVARC, c/o E. Reg Murray K1MPN, 3 Hillcrest Drive, Montpelier, Vermont 05601. 9) the W-VT (Worked Vermont) certificate will be awarded to stations working 13 out of 14 Vt. counties, provided the station has not previously been issued the ward. Party logs showing required data will be accepted in lieu of QSLs. Vermont stations are urged to be active and QSL promptly.

WESTERN MASSACHUSETTS—SCM, Percy C. Noble, W1BVR—C.W. RM: K1IJV. Net Mgr.: 10-Meter Net: K1PKZ. We now have a *new Section Emergency Coordinator*: C. Norman Peacor, *K1IJU*, 139 Cooley Street, Springfield, Mass. The Hampden County Radio Assn. is running a net on 28.7 Mc. every Wed. at 9:00 P.M. W1IC is NCS. WA1BZQ is chasing DX on 40, WN1ELX passed the General Class exam. RM K1IJV reports that WMN handled 110 messages during Nov. with the following in attendance (in order of activity): K1WZY, K1IJV, W1DWA, W1BVR, K1SSH, K1LBB, W1DVW, WA1DNB, W1MNG, W1AMI, W1CKD and WA1DAF. The Valley Amateur Radio Club has started a new theory class (with the classes meeting at Gus' Shop, 182 Oakland Street, Springfield.) The Hampden County Radio Assn. has taken under consideration the formation of an emergency group (and with the new SEC, K1IJU, a member of the club we can expect some action I am sure). W1UDT is Radio Officer for c.d. in Lanesboro. Now Engineering Section Head for Sprague Electric, he was guest speaker at the Berkshire County ARA. W1LPQ is using a Clegg 22 mobile. W1CRB is a new one on 6. W1TDS and K1UVP are on 6-meter s.s.b. W1TLQ has a new Clegg 22er. K1HFI vacationed in California and Mexico. WA1DQK now has his General Class license. Traffic: W1BVR 102, W1DWA 102, K1IJV 100, K1WZY 58, K1LBB 34, W1DVW 4, WN1ELX 2.

NORTHWESTERN DIVISION

IDAHO—Acting SCM, Raymond V. Evans, K7HLR—PAM: W7GGV. The Magic Valley group held its annual Christmas Dinner at the Town House in Kimberly with about 45 in attendance. A fine time was had by all and K7SGS took home the Heath Monitor Scope. K7-MNZ, of Aberdeen, is set up for auto start on 80 meters and is looking for someone to work with him on RTTY. Farm Net Report: 22 Sessions, 273 QNI, 33 Traffic. Traffic: K7HLR 184, W7GMC 93, W7GGV 20.

MONTANA—SCM, Joseph A. D'Arcy, W7TYN—SEC: W7RZY. V.H.F. PAM: K7IOA. OOs: K7SVR, W7FIS. Endorsements: K7UPH as Billings EC. K7NIP has a new SW-350 on the air. W7MIM, W7YLY, W7TUO and W7TYN check into the North and West Eye Bank Net. K7PFQ has a new ten-element 2-meter beam up and has been trying to set up skeds with K7IOA in Great Falls. If you are interested in receiving a first-class news letter about activities around the state write

Penta Beam Pentodes for Amateur Radio

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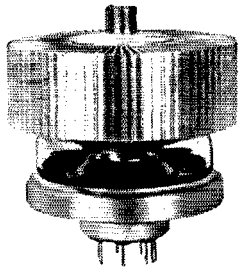
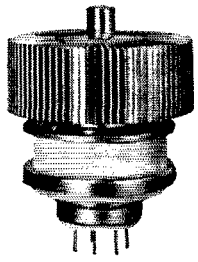


PL-8295/172



PL-8432

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PL-175A	5.0	14.5	400	—	—	445W	570W	680W
PL-177A	6.0	3.3	75	96W	140W	210W	—	—
PL-8295/172	6.0	7.8	1000	—	—	1020W	1280W	1540W
PL-8432	6.0	7.8	1000	—	—	1020W	1280W	1540W

*Actual power output delivered to load from typical amplifier.

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to *Hi Q News*, Box 242, Great Falls, and K7BYB will get you all of the details. K3LWD/7 has an AF-67, SB-10 rig on and is putting out an FB signal from Bozeman. OES W7JHR, at Billings, worked the following 2-meter stations during the recent meteor shower band openings: W5VGO, K5WXZ, K7IEW, K7ZIR, W7UAB, K6GCD, W7WDD and WØEYE. It will soon be time to think about the Glacier Hamfest. If your club or group would like to sponsor an event at the 'Fest get in touch with the committee. We still need ECs in many cities. Write your SEC or SCM if you are interested. If you are on 2 meters write K7IOA and tell him what your group is doing. Traffic: W7NPV 13, K7UPH 6, K7YNZ 5.

OREGON—SCM, Everett H. France, W7AJN—Acting SEC: W7AJN. RM: W7ZFH. New appointments: K7ZRL as EC for Yamhill County. The Newly-formed AREC group has been working with the Grande Ronde Sheriff department and c.d. officer. Nets:

NTS-OSN (Oregon State Net)	3585 kc. 0130 GMT Mon. through Fri.
Oregon AREC	3875 kc. 0230 GMT Daily
OEN	3840 kc. 0200-0300 GMT Daily

The Multnomah County-Portland AREC, with permanent station WA7APD in the Red Cross Building, is installing radioteletype and expects to have it in operation soon. The following stations reported Sweepstakes scores by message: W7TDK, W7LT, K7IWD, K7ZNE, K7WWR. Ten-year-old WN7DWK and his father, WN7DWI, built a new radio table and erected a new dipole antenna on 40-ft. poles. W7DEM reports: W7ADF is on the air with 50-ft. tower and Hy-Gain tri-band beam; K7YQM has RTTY reception; K7-GWU, Grants Pass High School club station, has converted a 522 on 2 meters; K7UAQ is on 2-meter mobile with a Heath Twoer; W7CPV, WA7ADT and WA7-ADW participated in the recent CD-CAP emergency test; WN7CGW lost his power transformer during the SS Contest. WA7CAQ, of Beaverton, using a 1-watt transistor transmitter, worked W7AJN with an S3 report on 40 meters. W7AZD, AREC net mgr. reports: 22 sessions, average 12 counties, 158 attendance, 1 QST, 21 contacts. Traffic: (Nov.) K7IFG 357, W7JHA 311, W7ZFH 56, K7BHJ 36, WA7DEI 7, W7AJN 5, W7DEM 5, W7KTG 4, W7LNG 1. (Oct.) K7TWD 47.

WASHINGTON—SCM, Everett E. Young, W7HMQ—SEC: W7HMQ. RM: W7OEB. PAM: W7LEC. V.H.F. PAM; W7PGY. NTS Nets:

WSN	3535	Daily	0100Z	QNI	346	QTC	460-Sess. 29
WARTS	3970	Ex-Sun.	0100Z	QNI	456	QTC	86-Sess. 24
NTN	3970	Daily		QNI	1107	QTC	969-Sess. 30

WARTS new officers are K7CTP, mgr.; K7YIX, dir.; and K7THY, secy.-treas. Northwestern Division Director W7PGY is retiring after 37 years, 9 months and 1 week with the Naval Air Station at Sandpoint. Bob reports a nice visit with the Renton ARC. RM/OO/ORS W7OEB informs us that WSN is changing its time to 0100Z as conditions are rough and that he was visited by W7ZMG. W7DK handled traffic for USO re: Servicemen messages to and from all the world areas and Tacoma. W7OS headed up the project. W7-BUN now is in the east with a visit to Headquarters in the plans. W7FQD joined state patrol communications. EC W7IKG got an elk, lost two weeks pay and a new coat. W7RXS and WA7ASV are now in the plumbing business—W7DK club house, that is. W7GIP is now an expert on Rangers. Mobiles call K7KOT for information on transmitter hunts on 29.510 Mc. in the Pierce County area. K7SSC, RC of Tacoma secy., is painted as the Ham of the Future by his brother members. W7DQM, Whatcom County EC, turns in an FB SET report. K7HSF lost his rotor in a Nov. wind before r.f.ing the new beam. Mount Baker ARC helped control halloween. Those turning out were W7FCH, K7-VNI, W7DQM, K7HSF, K7ONZ, K7ZPJ, W7KCZ, W7-GKG, W7GHS, K7YMB, K7JIM, K7GJN and WA7-DDY. W7CW is out of the hospital. K7VRB and W7-WPR are on with new transceivers. K7VVC (ex-prexy of ARAB) with K7VUZ is now with the 1st Marine Div. KG6APH is visiting in Tahuya. K7CHH now send Official Bulletins on 7070 kc. at 0300Z M-T-W. A new call in Wa-Wa is WN7EAI. W7EMP is back in the hospital. W7KBA is heard on 10 with a ground plane. EC K7RAO is heard s.s.b. W7DTK has a half deer in the locker. Section 1 Dinner for the QCWA was attended by 34 members and XYLs. KL7DJI reports the Arctic Net now is active on 3866 kc. at 0700Z daily. ORS W7AIB tells us the Clallam County ARC has a new home on the edge of the business district and will go for a club station. ORS W7GYF says his 1½-year-old harmonic called CQ and got an answer. He used a mike. W7AOQ still is thinking about a new layout.

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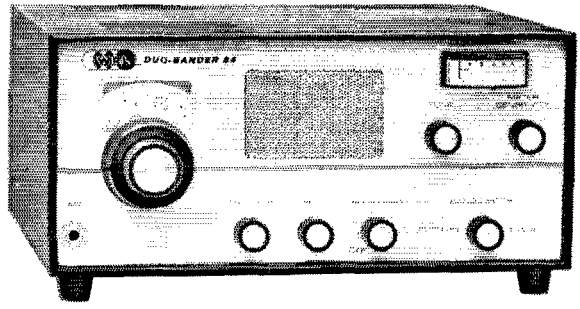

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300 Watts PEP-SSB input, covering 3.8 - 4.0 and 7.1 - 7.3 mcs. (LSB-80 and 40 meters). A pair of **proven 6HF5** final tubes. Separate, relay switched, tuned RF *receiving stage, ½ uv. sensitivity at 10DB S/N.* Rugged printed circuit boards, combination tube-transistor circuitry for best performance. **Stable solid state VFO** and balanced modulator, zener regulated. **Selectivity 2.5 kc** @ - 6DB receiving and transmitting with a 4 crystal filter. Carrier and unwanted sideband suppression - 40DB. *1 watt of audio with built-in speaker.* Fixed 50 ohm input/output impedance. Excellent AVC. COMPACT SIZE: 5" high, 11¼" wide, 10" deep, less power supply. Net weight 10¾ lbs. Shipping weight 15 lbs.

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AC384	300 Watt (115 VAC) Deluxe Supply	**$ 79.95**
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W7VFR is awaiting a kw. K7QOM was home from EWSC for Thanksgiving. NW WX Net, 3890 kc. at 1430Z, disseminates weather and road conditions to BC stations as a public service. ORS K7JHA reports SET participation was greater than any previous year with continuous liaison to RN7. ESN meets at 0030Z winter and 0000Z summer per manager K7YDM. Other Nets: CBN, 0130Z; NWSB, 0130Z. NWSSB Net officers are K7QHH, mgr.; K7SUQ, secy.-treas.; VE7-AKB, W7DSB, K7OVK, K7OUV, K7WNE, directors. NSN (Slow-Speed) 3700, 0400Z, QNI 208, QTC 51, Sess. 28.

PACIFIC DIVISION

EAST BAY—SCM, Richard Wilson, K6LRN—Each month the mail is highlighted by two very fine OO reports—from W6OJW and W6TYM. Each of these reports require a lot of work and patience but has its rewards as shown by the letters of appreciation forwarded by W6OJW. W6TYM also is an active ORS with TCC skeds and liaison work. W6EJA is becoming active again with a Drake R-4 T-4X and is planning a linear amplifier. WB6JIW is now W6CMH and W9-KFG/6 is W6AKV. WA6WNG has a new inverted "V" up for 80 meters and is pouring the output from two 4-250A-S into it. WA6WNG also has received PAN and TCC certificates and is extra class. Whew! W6-TYM, W6IDY and K6LRN also received TCC certificates. WB6RKQ was K.O.ed by OM Murphy in the SS. W6IDY lost his 70-ft. tower in a storm just before Thanksgiving. WB6ETY has an 80-meter ARC-5 going but has to take time out to put a door on the shack to keep the cold out. WN6NUI is now WB6NUI and is sporting a 75S—and a Ranger. K6LRN has an Apache and has moved the shack into the house for the winter. WB6LRV, K6LRN, W6TYM, WB6ILH, WB6RKQ, WB6ETY, WB6BKB and WB6BID are known to have participated in the SS. WA6WHY is moving and has had to resign as president of the LARK. K6UGX will give a glass-blowing demonstration for the LARK. According to the Field Day reports in Nov. *QST* there were many more stations active than there appeared to be. This column is supposed to be *your* station activities. If you don't want to send any news to your SCM we may as well ask the Board to use this space for something more useful.

NCN	0300Z Dy.	3.635
BAN	0245Z Dy.	146.7 Mc.
NCTN	0200Z Dy.	3.905

Traffic: W6TYM 473, W6IDY 194, K6LRN 183, WB6-ETY 171, WA6WNG 158, WB6RKQ 32, WA6PTU 30, W6CBF 8.

HAWAII—SCM, Lee R. Wical, KH6BZF—Asst. SCM/SEC: Ernie J. Kurlansky, KH6CCL. PAM: KH6-ATS. RM: Vacant. V.H.F. PAM: Vacant. Too!

Net	*Freq.*	*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	0700Z	Nightly (when no DX coming in)
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.

KH6AFM has undertaken license classes evenings. The RACES program is spearheaded by KH6GG. He'd like to talk to you about the RACES nets. Give him a call at home evenings, or at the Honolulu ARC meetings. WA1AWD/KH6, out Wahiawa way, has been DXing with a Swan 350 into a 14AVS. KH6DEH, KH6BBQ and KH6BZF helped KH6ATS with his new 18AVQ. KH6EXI continues to be active on Maui with his 1 kw. and ten-element beam on 2 meters. KH6CCL, our SEC, reports that AREC is slowly gaining more members in Hawaii. KH6BJ has been very active with DX. Send in your latest club election results. Inform your SCM of your activities and needs. See page 6 for his address. Traffic: KG6AIG 134, WA1AWD/KH6 21, KH6BZF 13, KH6IJ 2, KH6ATS 1, KH6CCL 1, KH6-DEM 1.

NEVADA—SCM, Leonard M. Norman, W7PBV—SEC: W7JU/K7JU. The Reno area has a 2-meter repeater that receives on 144.32 Mc. and transmits on 147.24 Mc. The NARA gang provided communications for the Nevada Day Parade at Carson City. YN1HM and HH2PR are new amateurs in Reno. Nets reported operating are 50.25 Mc. s.s.b./a.m. 1100 PST Sun.; 145.8 Mc. a.m. 2000 PST Mon. and Thurs.; 3980 kc s.s.b. 2100 PST Mon.; and the Southern Nevada Area 2-meter repeater which receives on 146.94 Mc. and transmits on 147.5 Mc. daily usually 0700 to 2200 PST. WA7-

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Orange, N.J. March 20, 1917.

Mr. C. D. Tuska, Editor,
"Q S T",
Hartford, Conn.

Dear Sir:-

Until I received your favor of the 14th instant and a copy of the current issue of Q S T, I was not aware of the fact that the American Radio Relay League issued such a splendid magazine. I have looked over this present number and find it very interesting.

It seems to me that a magazine so ably conducted ought to accomplish much for the advancement of the art in general, and I wish for Q S T a successful future.

It is very kind of you to place your columns open for suggestions which it may be desirable to bring before amateur wireless operators, and some day there may be reason to take advantage of this offer.

Yours very truly,

Thos A Edison

A/2612.

REPRODUCED FROM THE JUNE, 1917, ISSUE OF QST, COURTESY OF:

EMP/7 is interested in setting up emergency communications. K7NYU, K7RKH and K7ZOK are having a ball on 2-meter RTTY. WA7BEU keeps the green keys busy in Boulder City. WN7COL is waiting for his Tech. Class license. WA7EPT, a new ham in Boulder City, was elected secy. of the SNARC. W7YRY has been busy putting out information on SAROC. WA7-ECT has a 75S-1. K7RBM is off to California. The Navy has an attachment on him. Sweepstakes in Nevada was represented by W7AAF, W7BKK, K7CQV, WA7ECT and K7YIY.

SACRAMENTO VALLEY—SCM, John F. Minke, III, WA6JDT—RM: W6CMA. PAM: K7RHW. ECs: W6SMU, WA6TQJ.

SVN	3690 kc.	0230Z	Daily	W6CMA
SCEN	146.28 Mc.	0500Z	Wed.	WB6BWB
NCTN	3905 kc.	0130Z	Daily	K6YBV
NCN	3635 kc.	0300Z	Daily	W6QMO
Yolo CD	146.94 Mc.	0300Z	Wed.	WA6TQJ

U.C. at Davis has formed an amateur radio club with 40 members. On Nov. 21 the RAMS held a surprise SET conducted by W6QHP with excellent results. Eleven mobile and 9 fixed stations participated. Also during November Sacramento ARC AREC members held a 2-meter coverage test to determine the area that could be covered with 2-meter mobiles. Fifteen members, including 5 mobiles, participated. K6TWE was the only person to send his SCM a Sweepstakes message. Your SCM received a medallion for placing 13th of U.S. entries in the USSR DX Contest. A check-back in the logs showed 7 contacts! Come on, you guys—send in your logs whenever you participate in any contest, regardless of how little you did. Your SCM was a guest of the Nevada Co. ARC at its Nov. meeting. K6IS, of Folsom, has joined the Silent Keys. Walt was an active member of the North Hills ARC. K6YBV, WB6HAW and WB6MAE received Nov. BRAT cards from NCTN. WA6PAB is going 6-meter s.s.b. W6JRY received his DXCC. Traffic: WA6HYU 223, K6YBV 113, W6CMA 68, WB6HAW 62, WB6MAE 42, WA6JDT 19, W6LNZ 12, WB6EAG 2, WA6SLU 1.

SAN FRANCISCO—SCM, Hugh Cassidy, WA6-AUD—SEC W6KZF would like to hear from Bay Area amateurs interested in participating in the daily highway alert system. New officers in the HAMS Club in San Francisco are WB6LRQ, pres.; W6URA, vice-pres.; WA6DPJ, secy.; W6GGC, treas. W6JWF, San Francisco EC, reports some disappointment in the participation of AREC members in the Oct. SET and would like to hear from stations interested in emergency work. The NCN meeting on 3635 kc. nightly at 0300Z still is looking for more outlets in the section. WA6ROJ has finished a 15-ft. platform and has mounted azimuth and elevation rotors for his 52-element antenna for 432 Mc. W6GQA has nailed a 30-w.p.m. certificate to the wall of his shack. W6BIP had the best overall SS report, 311 contacts in 70 sections. An inquiry to WB6RGL will bring information on the California State F.M. Association. The association has published its second directory of networks above 29 Mc. in California and lists many v.h.f. repeaters. W6KVQ is net control on Navy MARS Sun. mornings. WB6AUB had rig trouble but is back on the air. The Tamalpais Radio Club has activated a 2-meter net on 146.650 Mc. Wed. at 1930 local time. W6YKS reports improved conditions with a nine-element yagi on 2 meters. John also is running 720 watts on 6 meters. W6BAJ reports working into 8- and 9-Land on 160 meters from his back-country QTH. W6HRQ is being heard on 40-meter c.w. almost daily. The Section Net continues meeting Mon. and Fri. on 3900 kc. at 1830 local time. The San Francisco Radio Club installed at its Christmas Dinner at the New Tivoli Restaurant in San Francisco Dec. 11. W6KUF was Master of Ceremonies. K6HRB is getting set to give the 2-meter band the advantage of hearing him. W6BYS has recovered nicely from surgery. The Sonoma County Radio Club held its Christmas Party at the Paso Robles Dinner House. W6CWR renewed his license for the umpteenth time. K6CPY has been active helping some new recruits to get their licenses. W6HSA is the new San Francisco Radio Club pres. WA6ULH is somewhat portable in DU-Land. W6CYO is back to work at the big state hotel down at the point (San Quentin) after a couple of months home on the sick list. He was welcomed back to work by W6SXR, who is the warden there. Traffic: (Nov.) W6YKS 326, W6UDL 47, W6-BYS 32, WB6GVT 16, W6KVQ 13, WA6AUD 11, WB6-JOX 9, W6BIP 6, W6CYO 4, K6TZN 4, W6WLV 4, W6-GQA 2. (Oct.) W6KVQ 13.

SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6JPU—It is with regret we record the passing of W6FKL, who died of a heart attack. W6PET is oper-

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40, 20, 15, 10, 6	7-54	V40	23	¾ & 1	No	B&W Base	Omni-directional	Optional	7	Vertical
80, 40, 20, 15, 10, 6	3.5-54	V80	23	¾ & 1	No	B&W Base	Omni-directional	Optional	7	Vertical
160, 80, 40, 20, 15, 10, 6	1.8-54	V160	23	¾ & 1	No	B&W Base	Omni-directional	Optional	7	Vertical

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ating portable in Fresno on 75 meters. KL7BRD has moved back to Fresno and is now WB6INO. K6SNA is on 2 meters. W6JMP is having RTTY problems but expects them to clear. W6FXV is going full blast on RTTY. W6ONK is having transmitter problems with his transceiver. WB6HVA had his Galaxy overhauled. W6LOC is using a KWM-2 on all bands. Merced County AREC is holding monthly drills. WB6MWY is leaving for the Navy in February, and WA6TZN is leaving in March. WB6JPU is net manager for the v.h.f. net on 145.35 and is active from Modesto to Bakersfield. WB6MWY reports DX on 20 meters is great in the morning. W6BYY is using a TR-3. WB6MXM is on s.s.b. in Merced. W6OHT is using an S/Line rig. WB6-DBJ is on 75-meter s.s.b. and is looking for Mission Trail outlets. Anyone interested? The Turlock Amateur Radio Club is active with good programs. W6WPV is taking a course in transistors. W6NTV has a new Swan 350. W6DIY is building a transceiver for his trailer. Would like to hear of any activities in the Bakersfield area. WB6NCJ was active in the C.W. SS Contest. Traffic: W6ADB 137, WB6HVA 121, W6-ARE 72, WB6MMY 41, WA6TZN 32, K6VSK 12, WB6-GIT 6, WA6KCS 6.

SANTA CLARA VALLEY—SCM, Jean A. Gmelin, W6ZRJ—Asst. SCM, Ed Turner, W6NVO. SEC: WA6-HVN. RM: W6QMO. WA6RRH, V.H.F. PAM, has moved to the East Bay section and is forced to resign as V.H.F. PAM and SCVSN mgr. Our thanks to Chuck on a job well done and we wish him luck. Chuck will take over the managership of the new Bay Area Two-Meter Section Net, which will replace SCVSN. Congratulations to ORS W6HC on his reelection as Division Director. The SCCARA moved W6UW into the new and Jose Area Red Cross Building and will hold meetings there in the future. The Tri-C Club, WB6-JOD, is active at Cabrillo College with WB6FFB as acting CHOP and W6KHS as advisor. The Santa Cruz Radio Club also meets at the college and during Nov. visited the FCC Field Office in Livermore. The SCARS of Redwood City held a Christmas Potluck Dinner. The *Standing Wave News* of the group featured some fine information on making Christmas decorations, along with other technical articles. W6ZRJ was guest speaker at the West Valley Radio Club. WB6IZF sends in a fine report on the SET and other activity in the King City Area. W6OII works the Mission Trail. K6GK is a transfer OO and OBS from East Bay. We welcome the major to S.C.V. and look forward to his fine reports. K6YKG is active on NCN. W6AUC is active as OO and in handling traffic. W6-PLS reports the passing of W6CHP. W6JXK handles San Francisco for NCN and works RN6. W6DEF reports poor skip conditions on NCN sessions but that the gang is keeping things going even with the difficulty. W6IDY is doing FB as a relay station for the net. W6ZRJ and W6AGR are making plans for more chess games over the air. So far W6AGR is leading three games to none. K6DYX reports the passing of W6-DWW, of Salinas, who was very active on NCN in years past and also on the RATTS Net. W6YBV is converting an ART-13 and is working some 160-meter operation. W6QMO is busy managing NCN and reports that the net went two sessions the latter part of Dec. W6RSY reports that the new RN6 frequency is 3655 kc. W6NVO reports activity from the northern part of the section. Ed attends meetings of several clubs in that area. Please pass any information on activities to him for relay to the SCM. W6QIE reported the SEC activity for the NPEC. Traffic: (Nov.) W6RSY 888, W6QMO 199, W6YBV 168, K6DYX 158, W6AGR 108, W6DEF 80, W6JXK 56, W6AIT 55, W6PLS 51, W6-AUC 44, K6YKG 30, K6GK 25, W6OII 24, WB6IZF 10, W6ZRJ 6, K6HGV 2.

ROANOKE DIVISION

NORTH CAROLINA—SCM, Barnett S. Dodd, W4BNU—Asst. SCM: Robert B. Corns, W4FDV. SEC: W4MFK. RMs: WA4ANH and K4CWZ. PAMs: W4AJT and WA4LWE. V.H.F. PAM: W4HJZ. W4UWS reports an 80/40 dipole and triband beam in the air at the new QTH, with much assistance from K4OXM. SS messages were received from WA4LSE, W5HEF/4, K4EOF, WA4-ICU, W4WE, W4UWS and K4QWQ. All report having a ball and good scores. K4TTN reports that K4QOK stayed in contact with a Navy vessel from Viet Nam to its home port and provided communication for servicemen aboard. WA4PDS has been heard checking into the NCN from Colorado as WA2WBA/Ø, her home station call. There is a need for ECs in quite a few counties in the section and your SCM/SEC will consider applications from volunteers in any county that, at present, has no EC.

Net	*Freq.*	*Time*	*Days*	*QTC*	*Mgr.*
NCN(E)	3573 kc.	2330Z	Daily	258	K4CWZ

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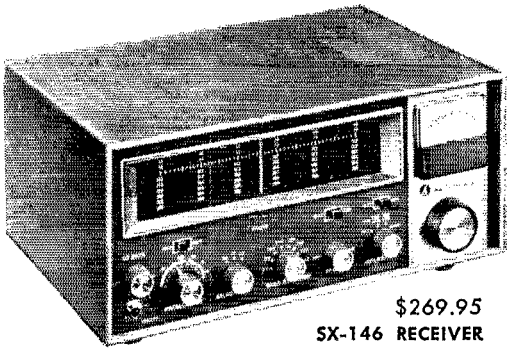

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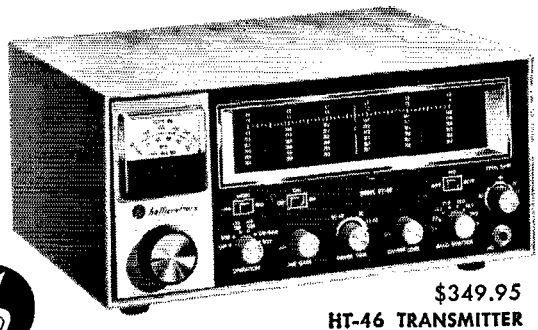

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SSBN	3938 kc.	2330Z	Daily	61	WA4LWE
THEN	3865 kc.	2330Z	Daily	44	K4WLV

Traffic: (Nov.) W4EVN 262, W4LWZ 207, K4OXM 130, K4HZP 82, K4IEX 75, WA4ANH 72, K4CWZ 66, W4-1RE 63, WOGXQ/4 61, W4UWS 54, WA4FJM 34, WA4-UFQ 34, WA4ICU 33, K4TTN 30, W4BNU 27, K4EO 19, K4CVJ 6, WA4VVT 4, K4ZKQ 4. (Oct.) K4CWZ 112, W4UWS 73, W4RWL 41, WA4BRS 20.

SOUTH CAROLINA—SCM, Charles N. Wright, W4PED—SEC: WA4ECJ. Asst. SEC: W4WQM. RM: K4LND. PAM: K4WQA.

SCN	3795 kc.	Daily	0000Z/0300Z	Nov. Tfc.: 85
SCSSBN	3915 kc.	Daily	0000Z	Nov. Tfc.: 152
SCSN	3795 kc.	Daily	2330Z	Nov. Tfc.:

New OES K4GL (ex-W8PT) reports from Pickens that S. C. on the v.h.f. bands is a far cry from the QRM he was used to in Michigan. W4VIH still is keeping N. Augusta represented on 2 meters. Let's stir up a little more non-local v.h.f. activity. K4MSK is sporting a new four-element 20-meter quad 105 feet up in the air. W4NTO reports new Clegg equipment for Spartanburg RACES is in operation. WA4LTF put on two good lecture demonstrations for the N. Augusta Club. The Rock Hill Club reports that its incentive license drive has paid off in the form of Extra Class tickets for W4AKC, W4CXO, W4GCB, W4NDH and K4YFK. Forty-eight hams took the FCC exams in Rock Hill in October. The Rock Hill Club won the State Radio Council plaque for S. C. Field Day activities. W4VIW again is active on s.s.b. from Greenville. Traffic: K4-LND 137, W4PED 45, W4NTO 41, K4WOI 34, K4OCU 29, W4VIW 11.

VIRGINIA—SCM, H. J. Hopkins, W4SHJ—SEC: W5VZO/4. PAM: K4SCL. RMs: W4QDY, W4SHJ, W4-ZM, WA4EUL. The first issue of *Virginia Ham* under WA4EUL editorship was a job well done. If you are not on the mailing list contact Bill, K4ASU, W4IF and K4ONC report having qualified for the coveted A-1 Operator award. As you read this, the Roanoke Division annual official/appointee meetings will be close at hand. If interested in attending contact the SCM or W4MWH early in February. Don't forget the Division Convention late in May. DX and SS contest participants are too numerous to list; almost all report high activity and scores. The SEC is working on a *Public Service Communication Manual* which should be out soon. This report is short this time because of SCM business travel and seasonal tasks. Support your section nets; they meet seven days per week:

S.S.B.	3935 kc.	2300 & 0300 GMT
C.W.	3680 kc.	2330 & 2400 GMT

Traffic: (Nov.) W4DVT 216, K4LJK 190, WA4EUL 169, W4RHA 148, WA4EDG 116, W4BZE 108, K4ITV 103, W5VZO/4 78, K4WCO 64, W4VCJ 48, WA4FCS 47, K4-FSS 46, WA4URN 44, K4SCL 42, W4OKN 38, WA4DAI 37, W4SHJ 37, K4MXF 35, W4TE 29, WA4UMX 24, K4-VCH 24, W4ZMT 24, W4ZAU 18, W4VCY 15, W4KFC 13, WA4PUI 13, W4WRG 13, W4MK 11, WA4NJG 9, W4JUJ 8, K4ASU 7, W4PTR 5, WA4STC 5, W4JXD 3, K4NOV 3, K4SDS 3, K4PIK 2, K4BAV 1, W4OWE 1. (Oct.) WA4PZF 120, W4ZM 72, WA4NJG 14, W4LK 2.

WEST VIRGINIA—SCM, Donald B. Morris, W8-JM—SEC: W8SSA. RMs: W8LMF, K8TPF. PAMs: K8CHW, W8IYD. S.S.B. Net Mgr.: K8SHP. C.W. Net Mgr.: WA8GRE. West Va. nets meet on 3570, 3890, 3903, 3905 kc. K8TPF has assumed duties as RM. New ORS: WA8GRE. New OPSs: WA8MAT, K8MQB and K8BIT. New OBS: K8BIT. WA8PXF, K8UZX, K8-WWW, WA8GRE, WN8PWM, WA8KQX, K8MYU, W8-HRQ and WA8FMA reported SS scores. Officers of the Morgantown Radio Club are W8GUL, pres.; WA8IMY, vice-pres.; WA8IMX, secy.-treas.; WA8HMU, historian. Congrats to WA8HSB, West Virginia's top scorer in the Illinois QSO Party. K8ELH, W8QR and W8JM have a pipeline to Wheeling on 29.6-Mc. f.m. New officers of the Opequon Radio Society are K8SDI, pres.; WA8JCC, vice-pres.; WA8OKG, secy.-treas.; WA8MRI, act. mgr. K8MYU has an HT-44 and a 60-ft. tower. New officers of the Kanawha Radio Club are W8IRN, pres.; K8BIT, vice-pres.; WA8HGA, secy.; WA8LAL, treas.; WA8ABX and WA8NXO, act. mgrs. G5DV and his XYL visited W8PQQ. New EC: WA8-AN8 for Calhoun County. Reappointed as ECs: K8-TPF, Randolph Co.; K8CFT, Fayette Co.; WA8HPE, Marshall Co. Net reports:

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*	*Mgr.*
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WVN PON	3903	2230	Mon.-Fri.	4	57	12	K8TPF
WVN SSB	3905	2330	Mon.-Fri.	15	220	10	K8SHP

Traffic: (Nov.) K8TPF 175, WA8GRE 89, W8CKX 67, K8WWW 43, K8BIT 42, W8HZA 39, WA8PXF 20, WA8IMY 15, WA8KCO 9, W8JM 7, WA8KMZ 5, K8MQB 5, K8MYU 5, K8CHW 3, WA8MRK 3, K8SYG 3, WA8CKN 2, WA8FIE 2, WA8MAT 2, WA8NDY 2, W8CUL 1, WA8JXM 1, WA8KQX 1, W8LMF 1, W8QMD 1, W8VOI 1. (Oct.) WA8IMY 46, K8MYU 9.

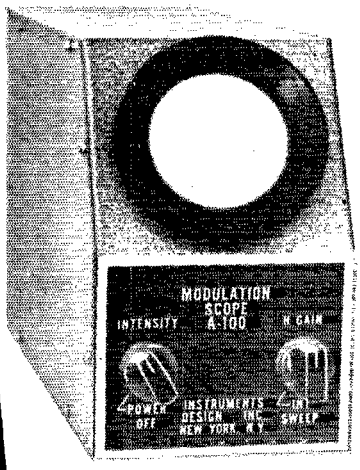
ROCKY MOUNTAIN DIVISION

COLORADO—SCM, Donald Ray Crumpton, KØTTB—Asst. SCM: Albert E. Hankinson, WAØNQL. SEC: WØSIN. PAM: KØFDH. WØSIN has returned home after a long stay in the Denver Hospital. WØCUZ also spent eight weeks in the Denver Hospital but has returned home to Creede. KØKUP has returned to South Fork after a couple of months of /5 in Roswell, New Mex. The Columbine Net is plagued by long skip much of the time but continues with a very nice list of members. WØOII, in Lamar, writes that he was in the very middle of the flood there and of course couldn't operate. He says that the AREC is now undergoing a new recruitment program. Lloyd also has written that the AREC activities were curtailed somewhat by most of the group taking flying lessons. The Denver 10-, 6- and 2-Meter Sunday Net has an increased activity. Bob Croop is certainly a very good manager. The Denver Radio Club has elected some new Board members and officers. We want to welcome WA2WBA/Ø, a high-speed c.w. operator named Martha, to Colorado. We are very happy to announce the appointment of WAØNQL as Asst. SCM for Colorado. His address is 553 West Easter Avenue, Littleton, Colo. 80120. High Noon Net traffic: 155. Traffic: KØZSQ 130, W2WBA/Ø 104, KØDCW 89, WAØCVS 2, WAØNQL 1.

NEW MEXICO—SCM, Bill Farley, WA5FLG—SEC: K5HTT. PAM: W5WZK. W5VBQ is back on the air after a couple of years' absence. His first day back on he worked three rare ones. K5FPO is rather proud of his colinear broadside array on 75 meters. So far he has worked New Zealand and the Marshall Islands. K5CYD and his XYL, K5CRG, moved to Albuquerque from Dalhart, Tex. Glad to have you. WA5NPY, of Santa Cruz, is teaching theory and code classes at the Mission School. He would like to correspond with anyone who can provide him with information on how to organize a club. The Post 86 Amateur Radio Club of Carlsbad is now officially an ARRL affiliated club. Welcome to new ECs WA5LHC and K5HTS. The Road Runner Traffic Net reports 22 sessions with 51 pieces of traffic handled. Average check-ins were 21. Traffic: WA5DUH 94, W5UBW 70, K5HPJ 54, WA5LCU 30, K5ONE 27, K5HTT 25, K5VXJ 19, WA5AMG 5.

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 meets each Sat. and Sun. on 3525.5 kc. at 1400Z and on 3987.5 kc. at 1500Z. 1966 officers of the UARC are W7APY, pres.; W7BAJ, exec. vice-pres.; K7SOT, vice-pres.; WA7EII, secy.-treas.; WA7AIA and WN7AYD, pgm. chairmen; W7VEO, Micro-Volt editor. W7ZC advises that W6DIX received "Worked all Utah Counties" certificate No. 1 and K9EAB, who operates from an iron lung, received certificate No. 2. Who will be the first Utah ham to work all Utah counties? The UARC held its annual banquet at Andy's. The 60 hams who attended were treated to a delicious dinner, an excellent program and QRM from a party in an adjoining room. W7BAJ has received a 60-w.p.m. code certificate. Traffic: W7OCX 287, K7CLS 64, WA7BME 21, W7LQE 20, W7MWR 4, K7RAJ 2, W7BAJ 1.

WYOMING—SCM, Wayne M. Moore, W7CQL—SEC: W7YWE. RM: W7BHH. PAMs and OBS: W7TZK and K7SLM. Nets: Pony Express, Sun. at 0830 on 3920; YO Mon., Wed., Fri. at 1830 on 3610; Jackalope, Mon. through Sat. at 1230 on 3920. W7NVX has been transferred to the State of Washington. A new club in the state is the Morgan Radio Club, operating out of the Dean Morgan Junior High School in Casper and sporting the call WA7CEN. A new appointment: W7HPE as EC for the Cody area. I have also learned that the Episcopal Church young people of Cody are forming a club. WA7DZH has been transferred to Viet Nam. However, before Roger left the States, his wife presented him with a new daughter—also making K7AHO a grandpa again. K7ITH, WA7BPO, K7MAT and WA7BFV all went elk-hunting near Cody. Traffic: K7POX 19, WA7ASB 14, K7SLM 9, W7HLA 8, W7BAH 3, W7BHH 3, WA7CLF 3, WA7EDC 2, K7SAR 2, K7MGM 1.



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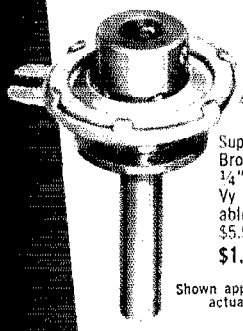

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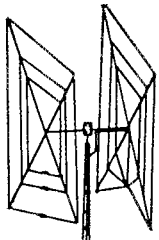

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SOUTHEASTERN DIVISION

ALABAMA—SCM, William S. Crafts, K4KJD—Asst. SCM/SEC: William C. Gann, W4NML. RM: WA4EXA. PAMs: K4NSU and K4WHW. K4GHX is the new NM of AENM. Thanks to K4NSU for two outstanding years in this job. WA4EEC and WA4EXA made Operator of the Month in Dec. K4HJX made BPL in November and WA4TID in October. We enjoyed the Decatur and Limestone Club's Christmas Parties. Nov. net reports (times GMT):

Net	*Freq.*	*Time*	*Days*	*Sess.*	*Ave.Tfc.*	*Ave.QNI*
AENB	3575	0100	Daily	31	3.1	4.5
AENH	50.7	0200	Sun./Tue.	9	.66	16.3
AENM	3965	2400	Daily	30	3	14.3
AENP	3955	1230	Mon.-Sat.	25	2.2	12.3
AENR	50.55	0115	Wed./Fri.	9	.22	20.3
AENT	3970	2230	Daily	28	.7	6.2

W4YYE and K4APK are back on the air. WN4AYL is building a keyer and K5RSI/4 an SB-400. K4IKR has DXCC and a new son. New equipment: W4WGI a TH-6DX and WA4GCS a quad. W4BIZ has joined the Silent Keys. Traffic: (Nov.) W4ZJY 345, K4HJX 204, WA4EXB 140, WA4TID 87, K4NUW 86, W4NML 85, WA4EXA 55, WA4RES 41, K4KJD 40, K4BSK 33, WA4MTG 33, WA4UXC 30, WN4AYL 22, W4YNG 20, K4WHW 18, WA4FYO 13, K5RSI/4 13, K4DRQ 12, K4NSU 10, K4ANB 9, W4HON 9, K4CZZ 8, W4CIU 5, WN4APL 4 4, K4FZQ 3, K4CFD 2, WA4EBS 2, K4WOP 2, W4YRM 2, W4ZVI 2, K4AJF 1, (Oct.) WA4TID 388, K4ANB 20, K4UEC 14, WA4OQL 7.

CANAL ZONE—SCM, Thomas B. DeMeis, KZ5TD—The CZARA nominating committee presented several members for consideration for the January elections. KZ5MV and KZ5GE report excellent results on operating 80 meters during the early evening hours to the U.S. and DX. KZ3TW is a new c.w. operator from Fort Clayton. KZ5KR is awaiting the Heath transceiver. KZ5TD has ceased operation as he has been assigned to the New Jersey area. KZ5MV has been appointed Asst. SCM to take over until a new SCM can be elected. MARS activity has been very good. KZ5RW was off the air while rebuilding his station layout. HP1IE and HP1AC reported to the CZARA on information relative to reciprocal operating privileges being worked on between the Republic of Panama and the U.S. as well as the Canal Zone. KZ5TG is reported to be working on his retirement soon. KZ5AY still is trying to put up a decent antenna. KZ5LC remarks on poor low-band performance since having to take down his "V" antenna. I would like to thank all the KZ5s who helped me during my stay here. I know you will cooperate with the new SCM and I hope to be working you from the home QTH. The home call is W2ZHN. Good by and 73.

EASTERN FLORIDA—SCM, Albert L. Hamel, K4SJH—SEC: W4IYT. RM C.W.: W4LUV. RM RTTY: W4RWM. PAM S.S.B.: W4OGX. PAMs: W4SDR, W4TUB. PAM V.H.F.: WA4BMC. Best wishes to Cathy, W4BAV, and Bill, W2HJM, recently hitched. W4PUE officiated while W4WPD and W4DUI assisted as bridesmaid and best man. Also present were W4CFR, W4TXA, W4TWR and XYLs, plus Lois Kaniss, the XYL of Silent Key W4WPF. Congrats to W4LMT on making his 2nd-class phone ticket. W4BKC tells me that the C.D.-CAP-SARDA drill Nov. 13 with K4UIZ, WA4YZH, K4HXP, K4VFV and W4BKC working came out fine. The Easter Seal Clinic in Broward County has been drumming up a lot of traffic. During the next three months how about all traffickers who *do* report grab hold of at least one of the clan who does *not* report, show them the ropes and urge them to send in regular traffic reports. Those who would rather use the Form 4 need only ask for them by radio. All of you AREC net managers, drop me a line and give me your idea of what constitutes qualification for a net certificate. We will study them all and come up with a standard for the whole section. Traffic: (Nov.) WA4SCK 1176, K4EVY 516, WA4JJH 311, WA4LHK/4 269, WA4NEV/4 245, WA4IWO 241, K4YSN 223, WB4AIW 219, W4FPC 212, WA4RQR 198, W4FP 192, K4KDN 170, W4DFU 169, K4SJH 144, WA4NBT 138, WA4DEL 128, WA4BAW 102, WA4NBE 92, W4SDR 86, W4OGX 79, WA4PDM 72, WA4FGH 67, WA4HDH 66, W4KRC 65, W4EHW 63, W4LUV 63, K4ILB 61, W4TJM 51, W4VDC 47, W4AKB 45, K4BV 45, W4MOL 45, WA4PWF 45, WA4CIQ 43, WA4VZD 43, W4IE 42, K4BNE 36, K4QAY 35, WA4AJV 34, WA4WTG 33, K4COO 31, W4AIVB 31, W4AYD 27, W4IAD 25, K4TGP/4 25, W4NUH 24, WA4OHO 24, W4IYT 22, K4EBE 21, W4BKC 20, W4GUJ 20, W4SMK 17, WA4SHJ 16, WA4MKE 15, WA4QLZ 15, WA4YGP 14, WA4VYP 12, WA4WZD 11, W4BAV 9, WA4FVP 9, K4MTP 7, W4LVV 3, W4LMT 2. (Oct.) W4OGX 90, WA4VZD 27.

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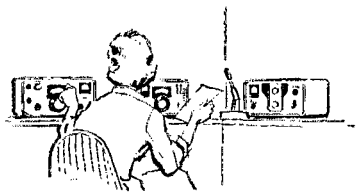

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75A2	199	CENTRAL 100V	399	HQ170AC &NB	299	HRO500	975	S40B	49
75S1	289	THOR 6&AC	259	HQ180C	259	LAFAYETTE HE10	49	S85	69
75S3	459	CLEGG VENUS	359	HX50	249	LAFAYETTE HE45B	77	S86	67
32S1	439	VENUS AC	69	GONSET G63	79	LAFAYETTE HA350	129	SX96	129
KWM2	739	POLYCOMM PC6	169	GONSET GR211	69	HEATH DX20	37	SX100	169
PM2 SUPPLY	117	AMECO CMA CONV	47	GONSET GS0	229	HEATH DX35	39	SX43	89
SM2 MIKE	34	EICO 720FW	77	III 6METER	139	DX40	47	SX110	89
SWAN350	329	EICO 722VFO	37	IV 6METER	189	DX60	77	SX111	167
AC SUPPLY	69	VIKING VFO	29	SUPER 12CONV	47	HR10	69	SX122	229
DC SUPPLY	109	VIKING TR SW	19	NCX3	239	HR20	119	SX140	79
SWAN 120	119	MATCHBOX W/SWR	74	NCX5	449	DX100B	129	CRX2A 152-174MC.	69
SWAN 240	239	CHALLENGER	69	NCX AC SUPPLY	79	RX1	149	SR46	159
SBE34	339	NAVIGATOR	77	NCX DC SUPPLY	69	TX1	139	SR150	369
SB2LA LINEAR	209	RANGER	99	NC105	97	HW32	127	HT33	179
DRAKE 2A	159	VALIANT	159	NC125	77	HW12	129	HT37	249
DRAKE 2B	189	VALIANT II	259	NC155	119	6ER	47	HT41	239
DRAKE 2AQ SPKR	14	THUNDERBOLT	249	NC183D	169	2ER	49	HT44	249
DRAKE 2BQ	32	HQ100A	139	NC188	77	SB10	89	PS150AC	69
DRAKE TR4	499	HQ110C	134	NC300	179	VF1 VFO	19	HT45	249
AC SUPPLY	67	HQ110AC	159	HRO60	229	HG10 VFO	54	P150AC	139
DC SUPPLY	109	HQ140X	107	HRO60 AD COIL	37	HO10 SCOPE	57	HOW1 SCOPE	79

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GEORGIA—SCM, Howard L. Schonher, W4RZL—Asst. SCM: James W. Parker, Sr., W4KGP. SEC: W4SAZ. RM: W4DDY. PAMs: K4PKK, K4YZE, WA4JSU. WA4UYT is operating RTTY with a Model 15 and home-brew converter. W4HWY continues to increase activity. K4ICX is NCS for Cobb County AREC. WA4LLI divides activity between GSN, MATN, GA. S.S.B. Net and 6E1X/6E2Y. WA4JES is becoming active with GSN. W4PIM once more has the day shift after six years of night duty. W4DDY is back on the active list after an illness. WN4ARB plans to take the General Class exam soon. K4YZE has an RTTY printer and is building a converter. WA4AJU, the XYL of K4YZE, will join him in RTTY work. WA4JXL with two new beams, plans to be on s.s.b. by Feb. Congratulations to K4BAI on passing the Georgia bar exams (legal type, hi.). W4YE recently was elected pres. of the Atlanta Old Timers Club. The Georgia S.S.B. Net is meeting temporarily at 1130 GMT because of propagation conditions. I would like to express my appreciation to those of you who have been so faithful in sending Form 1 cards and messages with traffic reports. 1966 will be a great year for v.h.f. activity. Will you be one of the hundreds of new stations to join in on 6 and 2? Low power and economical antennas do wonders. Try it. Traffic: W4FOE 148, W4DDY 81, W4SAZ 53, WA4UYT 42, WA4GAY 40, WA4LLI 36, W4PIM 27, WN4ARB 23, W4RZL 21, WA4BVD 16, WA4AJU 15, WN4AIU 14, WA4JES 10, K4YZE 7, W4HYW 4, K4BAI 1, K4ICX 1.

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	3836 kc.	2300Z	Daily	30	666	190
QFN	3651 kc.	2330/0300Z	"	60	700	515

WA4ECY, W4MLE, WA4WKL and K4VFY got extra SS points by sending a message to the SCM. Pensacola: WB4BSZ works up to 100 miles with his Twoer and beam. WA4WAR, WA4YPV, K4UVF, WA4VVA, K4GVH and W4UEN are newcomers to the 10-Meter Emergency Net on 29.56 mc. K4BSS/4 keeps skeds with KL7ETO/mm, the CGC *Sebago* out of Pensacola. Fort Walton: WA3APO is the area's biggest certificate hunter. W4ZWD is now R.O. on the SS *Steel Apprentice*. A 2-meter t.m. net is operating on 146.0 Mc. W4MMW now has two cars equipped for 2-meter mobile. W4RKH acquired a 2-meter converter. Crestview: K4KHV puts out an FB signal on WFPN with the new antenna. Defuniak Springs: K4VWE works Chipley, P.C., at Ft. Walton and Pensacola via 10 meters. Chipley: W4IKB has 100 watts on 145.2, using a BC-640. Panama City: It's good to have WA4FIJ/FJF back for another tour. W4PHN is new on 6 and 2 meters. Tallahassee: Neighbors W4MLE and WN4BLI have to coordinate their operating time! K4VRT was appointed OO. Traffic: (Nov.) K4VFY 277, WA4IMC 270, W4BVE 180, K4BSS/4 167, K4NMZ 104, K4VWE 69, WA4EOQ 68, K4SOI 4. (Oct.) K4BSS/4 240.

SOUTHWESTERN DIVISION

ARIZONA—SCM, Floyd C. Colvar, W7FKK—SEC: K7NIY. PAM: W7CAF. RMs: K7NHL, K7TNW, K7RUR reports that the QCWA dinner was a big success with 59 in attendance. New calls in Phoenix are WA7EDH and WA7EDI. WA7CLW and WA7CRO passed the General Class examination. W7QNC was elected vice-chairman of the Arizona Chapter of the QCWA. K7VXS recently acquired his 1st-class commercial radiotelephone ticket. K7YUC/5 is the new president of the Louisiana Amateur Radio Club. WA7EBR and K7MTZ made the BPL. W7PJY has a new National NCX-5 transceiver. W7UXZ has a new Heath HD-10 electronic keyer. K7PLO, vice-pres. of the Arizona Amateur Radio Club, has finished building an equipment console for the club including the installation of the equipment in it. Traffic: WA7EBR 532, K7NHL 229, W7CAF 57, K7UTF 39, K7PLO 14, W7FKK 9, K7RUR 2.

LOS ANGELES—SCM, H. G. Garman, W6BHG—Asst. SCM/SEC: John A. Vaidean, W6BNX. RMs: W6BHG, WB6BBO, W6QAE. PAMs: K6MDD, W6MLZ, W6ORS, K6EPT, W6WPF, K6WAH, WB6BBO, K6YVN and W6GYH made the BPL. K6WAH is on again with the Collins Line and a Henry 2/k. Welcome to W6TXJ. WB6QXY and K6IOV make a good team on the traffic nets. WA6NUA has not had much time for traffic or hamming. K6IOV now is on 160 meters. W6BNX says work and hunting for a new QTH take up most of his time. K6EA will be back from WØ-Land shortly. WB6GXI says EBN has been very active. W6MLZ had his linear go out. W6NKR got his feet plenty wet in the SS. K6UMV, WB6GFD and WA6ZIJ have a 6-ft. dish

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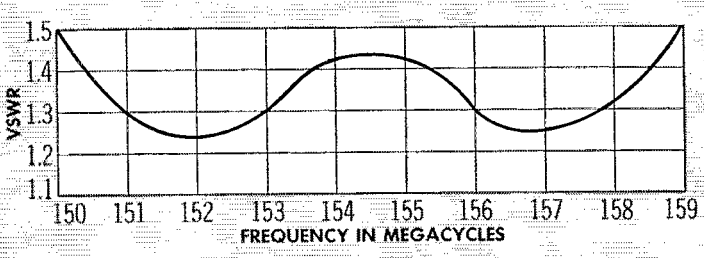
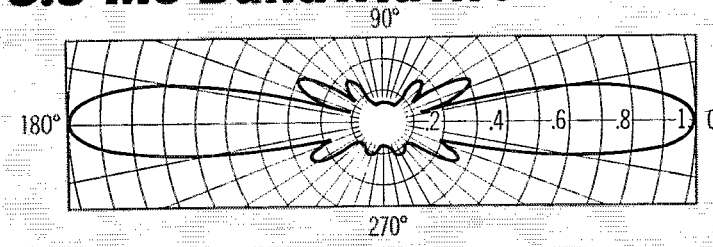


9.0 Mc Bandwidth!



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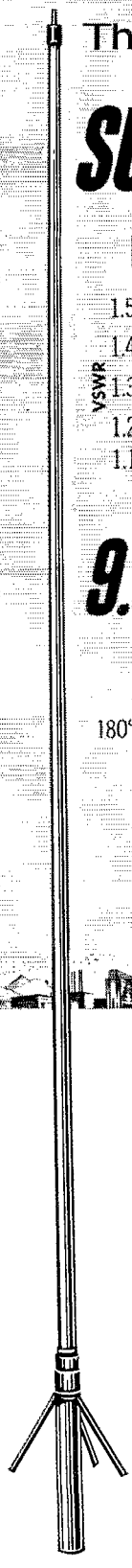

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A 10 db—10 Mc wide version, CAT. No. 455-509, is available to cover 450 to 470 Mc in two ranges.

Electrical Specifications

Nominal input impedance	50 ohms
VSWR	1.5:1
Bandwidth	9.0 MC
Maximum power input	500 Watts
Flexible terminal extension	18" of RG 8A/U
Terminations	Type UHF female and Type N male
Vertical beam width (½ power points)	18°
Lightning protection	Direct ground

Mechanical Specifications

Radiating elements	Copper
Element housing material	Fiberglass
Element housing length	20'
Support pipe	2¾" dia. 6061-T6 aluminum pipe
Rated wind velocity	100 MPH
Lateral thrust at rated wind	79 lbs.
Bending moment 1" below ground plane at rated wind	521 ft. lbs.
Weight	30 lbs.

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up. W6YRA is continuing experimental work on 420. W6QAE was on the air only two days in November because of vacation. W6QJW was active in the AREC nets. WB6KVA found out the hard way that n.m. was a gross waste of time during the SS. WB6BOW's shack was rain-flooded for two weeks. W6OI still is active with EC/AREC nets. WB6QEL is concentrating on getting his General. WB6AKZ says school is slowing up activity. W6SRE says K7RUR dropped in for a short visit. WB6AEL says the HT-18 works fine but doesn't help drag any traffic into San Pedro. WB6GHB is looking for hams with 432-Mc. walkie-talkie units to contact. K6KUQ was active in the SS. WB6MEQ tried for 75 sections in 75 contacts but got only 60 sections in 60 contacts. W6ORS is operating only mobile. WN6PAV monitors 7169 kc. every Sat. at 9 P.M. PDT looking for contacts at 13 w.p.m. W6PUZ is getting ready for Oscar IV. W6SD (San Fernando Valley Radio Club) received a civic award from the City of San Fernando for outstanding work in c.d. and public safety. The plaque was presented by the Mayor of San Fernando. WA6YMY informs us that the FD and SS bring out the bad signals like a swarm of locusts. K6LDM worked some DX on v.h.f. reporting good openings lately. W1KUX/6 still is active on ASTRONET. WB6BWZ has been under the Doctor's care but is back in circulation. Your SCM wants to thank the clubs who are sending bulletins to him on their activities. Let's not forget the ARPSC program and also the local nets. SCN meets daily at 0300Z on 3600 kc. for c.w. men and EBN meets Mon. through Fri. at 1515Z and Tue. through Sat. at 0130Z on 50.5 Mc. (for the phone men). Traffic: (Nov.) K6EPT 2034, W6WPF 1417, K6WAH 1143, WB6BBO 783, K6YVN 774, W6GYH 685, K6MDD 305, WA6MXM 180, W6TXJ 180, WB6GGL 133, WB6KGK 115, W6MLF 109, WB6QXY 106, WA6NUA 104, W6FD 102, WA6WKF 81, K6IOV 68, W6BNX 56, WB6BBH 26, W6BHG 24, W6USY 20, K6EA 19, WB6GXI 19, W6MLZ 14, W6PCP 13, W6NKR 12, WA6ZID 12, K6UMV 11, W6YRA 11, W6QAE 10, W6QJW 7, K2PHF/6 6, WB6KVA 4, WB6BOW 3, W6OI 3, WB6NCF 2, WB6QEL 2, W6VUZ 2, WB6AKZ 1, W6SRE 1. (Oct.) W6GYH 463, WB6KVA 100, K6LDM 34, W6MLZ 32, W1KUZ/6 29, WA6WOG 2.

ORANGE—SCM, Roy R. Maxson, W6DEY—Mary, WA6VDS, is new chief NCS of the 246 Net on 145.08 Mc. 0230Z daily. Nov. report: 722 check-ins, 415 traffic, per WA6CXB, secy. W6NJJ is doing an FB job with NARS cartoon bulletins. OO W6VOZ now is com. officer for Nav. Ord. Lab., Corona, moving to Riverside. Bill, of Independence, reports on AREC activities on 3965 kc. W6HAD 6, WA6ROF, WA6RND and WA6WDW operated in the SS Contest with good scores. Welcome to new AREC members W6QOK, WN6NFQ and WA6RKB. WB6OPA and WB6PRP, operators of K6MCA, advise they are getting the Collins S/Line and Henry 2KW linear for the station. K6DBG and his XYL have a new QTH in Desert Hot Springs. The Anaheim ARA and Fullerton RC both held new club officers installation dinners. W6JQB, Asst. SCM, is working 56 hours a week or more on the job with Edison Co. WB6OTL had a hot 2-meter receiver for a few minutes; it caught on fire then quit. Traffic: K6MCA 2412, W6ZJB 831, WA6ROF 279, W6DNA 74, W6WRJ 57, K6IME 27, WA6CXB 21, W6VOZ 16, WB6ASQ 14, WA6TAG 14, W6CK 8.

SAN DIEGO—SCM, Don Stansifer, W6LRU—The following are ARRL appointees in this section: Asst. SCM: W6EWU. SEC: W6SK. ECs: W6MHY, W6KSI, K6RYI. RMs: WB6BGF, W6EOT, WB6JUH. PAM: WB6GMM. OOs: K6EC, K6ENX, W6IAB, W6CAE, W6LRU, W6VNQ. OESs: W6IEY, WB6JLC, WA6TAD, K6BTO. OBSs: K6BPI, W6JVA, WA6QAY, K6YRF. ORSs: K6BPI, W6EOT, W6IAB, WB6KNN, K6LKD, WB6JUH, W6VNQ. OPS: W6CHV. W6EWU and his XYL have returned from a two-month tour of the Pacific including visits with ZL1FY and VK2TT. The San Diego County 2-Meter ARPSC Net now meets at 0900 Sun. WA6TAD is San Diego V.H.F. District Mgr. for Air Force MARS. K2UXY, recently an operator at W6IAB, has been discharged and has returned home to New Jersey. The December meeting of the San Diego DX Club was held at the home of W6CAE. Seven stations sent their SCM SS messages in Nov. Club secretaries, please notify your SCM of 1966 officers so your club officers' names can appear in this column. Many local DXers are looking forward to improved conditions and coming ARRL DX Test. Traffic: W6YDK 9168, K6BPI 5741, W6IAB 3055, WB6JUH 816, W6VNQ 652, WB6GMM 407, W6EOT 307, W6BGF 252; WA6UUO 40, W6BKZ 5.

SANTA BARBARA—SCM, Cecil D. Hinson, WA6OKN/WØCUG—SEC: WB6NDP. RM: W7WST/6. Reports reaching the writer would seem to indicate that the most activity in the section is at W6AB, the Satellite ARC of Vandenberg. I understand the fellows will

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be as active during Oscar 4 as they were during Oscar 3. W6DYQ reports that the new officers for the Satellite ARC are K6YHK, WA6VEF, WA6NPJ, WB6IPI and W6QMV. The 2-meter activity is growing in Santa Maria with a good group on RTTY. The Santa Barbara amateurs assisted in a search for a missing boy recently utilizing 147-Mc. portable t.m. equipment. WA6-IZI has been appointed EC for the city of Santa Barbara. Active during the recent Sweepstakes were K6CAA and WB6GEB. Newcomers to the area are invited to check in on 3895 kc. any day from 6 to 8 A.M.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. L. Harbin, W5BNG —SEC: W5PYI. PAM: W5BOO. RM: W5LR. The Terry County ARC held its Annual Free Swapfest in Brownfield Nov. 6-7. Registration was about 250, which was less than previous years. However, the lack in attendance was offset by the extra enthusiasm displayed by those attending. Because of doctor's orders I was not able to attend and, for the same reason, I was unable to mk a report of last month's activities. Many things have gone undone but the doctor has allowed me to return to work and I will try to make up for lost time. I hope you will have patience with me until I can get caught up with my duties. The Ft. Worth KC Club has changed its meeting night to the 3rd Tue., 7:30 P.M., at 4101 Morgan Circle in the North Richland Hills City Hall. The club has been holding auctions and reports much success. Bring your extra gear and come out and join the fun. The Tarrant County Disaster Net has changed its frequency from 3970 to 3920. All Tarrant County hams are invited to check in Sun. at 1300. The Arlington ARC took part in the Spook Patrol in cooperation with the police department. The Dallas ARC's new officers are W5EJV, pres.; WA5LMG, vice-pres.; WA5MYD, secy.-treas. Orchids and congratulations to Barbara Johnson for the fine job she did as secy.-treas. the past year. Traffic: (Nov.) K5DBJ 204, K5FLD 180, W5VFM 134, W4LR 15, K2EIU/5 11. (Oct.) K5DBJ 199.

OKLAHOMA—SCM, Daniel B. Prater, K5CAY— SEC: K5DLP. WA5KFT has accepted the EC post for Oklahoma County. WA5BTQ is PAM for 75 meters. W5QMJ has agreed to continue as RM for 80 meters, for which we are very grateful. Sweepstakes activity by Oklahoma amateurs was very impressive. We should have a few winners this time. The Swapfest held at Quartz State Park, Altus, by the Norfork group was a booming success. I want to thank all for their kind words of encouragement regarding the SCM position. I hope I don't disappoint too many and can continue the fine example set by my predecessors. I enjoyed visiting the Oklahoma V.H.F. Club for the first time. The clubs plans for a v.h.f. repeater are encouraging. Olen E. (Gene) Marshall, W5KYW, passed away last month and I want to express my sympathy to his wife and family. K5SKA has started a RACES net on 2 meters. The new Oklahoma County C.D. Communications Center is very impressive. Traffic: K5TEY 1694, K5MBK 272, K5CBG 75, W5NML 63, K5DLP 57, KO-BWN/5 38, WA5BTQ 33, K5CBA 20, W5MFX 14, W5-WDD 9, W5EHC 4, WA5FVJ 3, WA5QMJ 3.

SOUTHERN TEXAS—SCM, G. D. Jerry Sears, W5AIR—SEC: K5QQG. PAM: W5ZPD. RM: K5ANS. Several Sweepstakes reports were received here with some nice scores. The new EC for Montgomery County is WA5BUV. A new OBS for v.h.f. in the Houston area is WA5BTO, with schedules on 50.4 Mc. Mon. and Thurs. at 2000 CST and Sun. at 0840 CST. EC K5HZR reports the AREC group in San Antonio furnished communications for Boy Scouts Good Turn Day. W5-ABQ reports W5AQN, K5PEV and W5NNY/WA5IOQ all are going RTTY in addition to c.w. activities. WA5-AUZ made the BPL in Nov. with a traffic total of 594. W5GNW continues to lead South Texas in OO notices. Notice to Old-timers: *The Houston Amateur Radio Club Old Timers Night will be held Feb. 18, 1966.* Vice-Pres. Soupy Groves will be speaker along with other well known OTs. An old spark transmitter will be set up so the Young Squirts can get a look at it. Make your plans now for Old Timers Night. Speaking of old-timers, the following formed the Houston Chapter of the Quarter Century Wireless Association (QCWA) at the first meeting in Nov.: W5DB, W5HZ, K5JLQ, W5AIR, W5EFB, W5FJ, W5CE, W5MMK, W5PB, W5EYC, W5-WR, W5OP, W5CQI, W5LI, W5JT, W5HPB, W5OX, W5ETA, W5VW, W5IGJ, W5GPD, W5KLI, W5KTL, W5AF, W5ESV and W5PLE. Houston ARC has an excellent display of old ham gear in charge of W5ZPD and W5ITA. Southern Texas SEC K5QQG has started an EC call-up on 3940 kc. at 0900 CST the last Sun. in the month. Check in and get acquainted. All amateurs, check your emergency power units, don't let a blackout catch you with your unit out of order. The West Gulf

(*Continued on page 144*)

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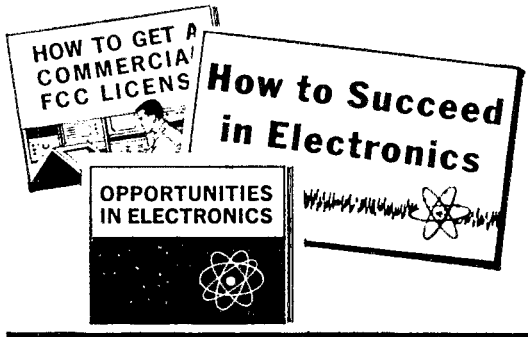

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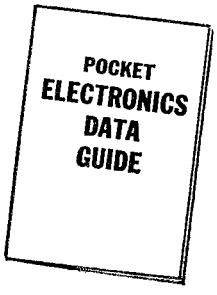

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Silent Keys

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

WA1BKP, Harold A. Ridings, Saugus, Mass.
WA1BSY, Joseph H. Lendall, Peabody, Mass.
K1CGW, James R. Walsh, Brockton, Mass.
W1GYT, Ernest L. Markham, Portland, Conn.
K1IKJ, John M. Grasso, Jr., New Britain, Conn.
K1JZT, Harold S. Hendrickson, Bloomfield, Conn.
W1NFQ, Ernest L. Maxey, Foxboro, Mass.
W1QPW, George L. Hadley, Mendon, Mass.
K1VJS, Irving Crocker, Lynn, Mass.
W1YGR, Hoban B. Sanford, Amesbury, Mass.
W2ALA, Nelson G. Stevens, Mount Holly, N. J.
K2BPN, Cyril A. Saxton, Fair Lawn, N. J.
WB2BPO, Fred Wylie, Syosset, N. Y.
W2EJI, Harry A. Link, New York, N. Y.
K2ESY, Theodore O. Braun, East Northport, N. Y.
W2IKO, Joseph C. Rile, Springfield, N. J.
WA2PDU, Stuart I. Kaplan, Beacon, N. Y.
W2ZSZ, Gilbert G. Reed, Binghamton, N. Y.
WN3EFL, Bert L. Thornley, Jr., Wheaton, Md.
K3ENF, John R. Paffrath, Ford City, Pa.
W3GOT, Zoltan B. Biro, Bethlehem, Pa.
K3MZN, Robert W. Cassey, Irwin, Pa.
W3NOY, Almon Q. Cotterman, Mountain Top, Pa.
W4BIZ, Jamie C. Duncan, Montgomery, Ala.
K4VRI, Claude H. Dearmin, Jacksonville, Fla.
WA5JGS, John E. Ward, Beaumont, Texas
W5KYW, O. Eugene Marshall, Ponca City, Okla.
K6CSR, John L. Webb, Los Gatos, Calif.
W6DHV, Mae E. Amarantes, San Jose, Calif.
WB6ERK, Margaret E. McCauslin, Venice, Calif.
K6GE, Frank M. O'Neill, Berkeley, Calif.
K6IKB, Herbert J. Eberhardt, Orange, Calif.
K6IS, Walter A. Koerber, Folsom, Calif.
K6MYU, John R. Martin, Santa Ana, Calif.
W6OOZ, Joe G. Hanzal, Burbank, Calif.
K6UAD, Ivan L. Foster, Palos Verdes Estates, Calif.
W6WKJ, Earl L. Young, Los Angeles, Calif.
ex-W7FYQ, Donald I. Phinney, Kalispell, Mont.
W7UOR, S. Paul Manross, Florence, Ariz.
K7YES, John M. Brazie, Salem, Oregon
K8AXJ, Willet J. Herrington, Bad Axe, Mich.
W8EON, Chester A. Hayes, Newark, Ohio
WA8FBE, William L. Miller, Ionia, Mich.
K8GHK, John P. Reynolds, Lennon, Mich.
K8GTS, Edward S. Mairs, Akron, Ohio
WA8KPF, Louis I. Sortman, Dayton, Ohio
W8PL, Frederick D. Gamble, Columbus, Ohio
W8QBI, Vaughan S. Fegley, Birmingham, Mich.
W8STF, William B. Carr, Sylvania, Ohio
K8ZCZ, Harold F. Gooding, Toledo, Ohio
W9BMV, Robert E. Montgomery, Du Quoin, Ill.
W9CBZ, Floyd L. Rowland, Oregon, Ill.
W9ENG, Robert H. Wright, Oaklawn, Ill.
W9FVU, William J. Gago, Broadview, Ill.
W9IN, John H. Lewis, Jr., Chicago, Ill.
ex-W9IRE, Joseph R. Berounsky, Dundee, Ill.
W9SME, Irvin L. Sparks, Charleston, Ill.
W9ZQB, Edward F. Madden, Ingleside, Ill.
WØLIX, Jerome C. Hill, Sr., Independence, Kans.
WØNAS, William F. Meckenstock, Sr., Wichita, Kans.
KØQVW, Roy J. Soutiea, St. Louis, Mo.
WØSLB, Phillips E. Lohr, Churdan, Iowa
WØVZG, Roger H. Boots, Leavenworth, Kans.
KL7BW, Gene A. West, Anchorage, Alaska
VE3ADA, L. A. Morley, Guelph, Ont.
VE3AYQ, D. C. O'Neill, Dunnville, Ont.
VE3CID, Howard F. Lemon, Scarborough, Ont.
VE3DMK, George E. Boydell, Toronto, Ont.
VE3FAC, Alex McGhee, Toronto, Ont.
VE3FLK, A. W. Kirk, Toronto, Ont.
VE3VY, Joseph A. Levett, Toronto, Ont.
VE4WL, W. P. Laidlaw, Norwood, Man.

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.

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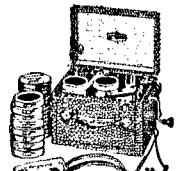

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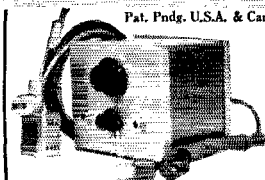

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Improving Your Receiver

(*Continued from page 25*)

discussed. How can I check my present receiver's performance? What improvements can be obtained with these frame-grid tubes? The first question was answered in the introduction to this article.

The noise figure which can be expected with the 6EHF at 30 Mc. is approximately 5 db. The improved HQ-120X was able to copy a c.w. 0.03-microvolt signal from a 50-ohm calibrated signal generator at 30 Mc. *before* the dual conversion was installed. This 0.03-μv. level was where the c.w. signal dropped into the noise. The narrow-band crystal filter was in use during the c.w. test. An a.m. signal, modulated 40 percent with 400 c.p.s., dropped into the noise at 0.06 microvolts without a crystal filter. The S-meter circuit in the receiver was rebuilt and calibrated for use at 15 Mc. with the 2-meter converter. Table II shows the a.m. test-signal levels present at the antenna jack of the HQ-120X from a 50-ohm generator operating at 15 Mc., which produced the various S-meter readings. These measurements were obtained *before* the dual conversion was installed.

Table II — S-Meter Readings at 15 Mc.

S-Unit	Input μv. 50-Ohm Source
9	50
8	25
7	10
6	3.5
5	1.2
4	0.5
3	0.2
2	0.1
1.5	0.05
1	noise

The Eddystone 888A ham-band receiver, modified by the author, was checked with the calibrated signal generator on c.w. at 29.5 Mc. The signal dropped into the noise at 0.01 microvolts. The Eddystone has dual conversion, a 1-kc. i.f. bandwidth and an 80-c.p.s. audio filter for use on c.w.

The author will be glad to answer general questions accompanied by a self-addressed stamped envelope, but specific requests to redesign particular receivers will have to be declined. QST

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432-Mc. Kilowatt Amplifier

(Continued from page 14)

should be regulated. The higher screen voltage is also desirable if the amplifier is to be operated on c.w. or f.m. with lower than optimum grid drive.

For full amplifier efficiency the driver output should be about 50 watts, but good operation under all conditions except plate-modulated Class C is possible with far less drive. At W1QWJ the amplifier is run at 1 kilowatt input on c.w., when conditions make the highest allowable power desirable. The output is in excess of 550 watts, and the amplifier operates stably without drifting of output or operating conditions.

If the driver power available is below that for maximum Class C efficiency, adjust the bias so that no-drive plate current is well below the rated plate dissipation for the tubes. Then apply whatever drive is obtainable, and adjust the screen voltage for maximum efficiency. Output up to within a few percent of the maximum obtainable will be possible with far below the rated grid drive, on f.m., c.w. or s.s.b. Operation as an a.m. linear may also be attractive, if one is satisfied with something less than the maximum obtainable output. The varactor multiplier is often a good solution to the driver problem in such circumstances. — *W1HDQ* QST

(Continued from page 138)

Emergency Net checks in stations on emergency power the first Sun. of each month for extra credit. Traffic: WA5AUZ 594, K5HZR 174, W5AC 130, W5ZPD 51, W5ABQ 33, W5AIR 27, K5LYO 22, K5HXR 13, K5-MWC 8.

CANADIAN DIVISION

ALBERTA—SCM, Harry Harrold, VE6TG—SEC: VE6FK. PAMs: APN—VE6ADS. Inter-Provincial S.S.B. Net—VE6FK. Asst.—VE6ALQ. ECs: VE6SA, VE6SS, VE6AFJ, VE6HB, VE6ALL, VE6XO. ORS: VE6BR. OPSs: VE6CA, VE6PV, VE6HM. VE6SS, VE6BA, VE6ADS. OOs: VE6HM, VE6NX, VE6TY. OBSs: VE6HM, VE6AKV. OESs: VE6DB, VE6AKV. VE6ADS and VE6FK report that both nets have changed time to 1800 MST to beat the blackouts. All ECs are urged not to forget their annual reports. VE6-TY took part in the Oct. CD Party. The CARA has a new class of 10: Vulcan has a class of 7. We have been told that VE6CA and VE6BC are moving to Edmonton. It is about time that we heard from the OESs. We understand that some of the Edmonton gang has started a DX club and has no time for local contacts. VE6AN is sporting a new rig and having his troubles. VE6ALL is trying to work all the bands with not much luck. VE6AAX is having good luck with his sons in Edmonton and Ottawa, the latter with RCMP, ex-VE6AHQ. Traffic: VE6HM 95, VE6FK 77, VE6XC 34, VE6ALQ 14, VE6TG 11, VE6TY 7, VE6BR 6, VE6ADS 4, VE6HS 1.

BRITISH COLUMBIA—SCM, H. E. Savage, VE7FB —November was the poorest month in years as to band conditions on 3755 kc. The BCARPSC Net has been an almost complete washout. VE7BJQ has the little vehicle well loaded for 75 and 2 meters and is trying hard for his Class A ticket. VE7SH and VE7FB have rebuilt the hamshack. WE7AC is now winterized. VE7BOS is look-

ing for an on-the-air game of chess. The East Kootenay ARC is twenty members strong and has a good code and theory class going. VE7ASY is the official recorder for BCEN and it's sure nice to receive the monthly reports again. VE7AAJ has a 40-ft. pole up and on top a "Gotham" vertical shorting relay for the coil and the coax is buried in the ground for neatness. VE7AMW mentioned his telephone number on the air and ended up into a tape recorder as interference. Burnaby ARC's officer are VE7FO, pres.; VE7BMC, vice-pres.; VE7-BGA, secy.-treas. VE7ASY has added a linear behind his DX-60. This has increased the number who can hear him, but the QRN from his generator outdoes his QRP. Chilliwack ARC's 2-meter mobiles are VE7AHN, VE7RS and VE7BBV and base stations are VE7AHN, VE7RS and VE7BBV. They can work most of the Valley. VE7BHW is busy telephone relaying messages from VE8-Land. VE7AHX is building an ARRL s.s.b. rig. Traffic: (Nov.) VE7BHH 91, VE7BQB 78, VE7BJA 26, VE7BLO 22, VE7AKY 12, VE7AC 11, VE7AMW 4, VE7BHW 4, (Oct.) VE7BDJ 373.

MANITOBA—SCM, John Thomas Stacey, VE4JT—Congratulations to VE4EF, at Margaret, on his appointment as OPS. The slow-speed c.w. net, MTNS, has ceased operation because of lack of support. Its manager, VE4EI, says it may be reactivated if enough interest is shown. VE4UM is on RTTY with a Model 19. VE4DQ and VE4XN are sporting new SWAN-350s. We regret to report the passing of VE4SR. Stu was well known in the fraternity and will be missed. MTN has completed its first year of operation and is now one of the most consistently represented sections at regional level. VE4RE reports some nice contacts on 6 meters. VE4HI has a group under instruction in code and theory and hopes to put Bossevain on the ham map. VE4HB also has a class going at the Tech-Voc, in Winnipeg. Our PAM, VE4JQ, reports 42 stations now part of the Evening Phone Net. VE4QZ is sporting a new rotor and has jacked the beam up to 40 feet. The MAARC is undertaking a newsletter for all hams in the section and hopes to have the first issue out shortly. New officers of the Brandon ARC are VE4DQ, pres.; VE4XN, vice-pres.; VE4KN, treas.; VE4EJ, secy. Traffic: VE4JT 154, VE4QX 101, VE4LG 90, VE4EI 45, VE4NE 39, VE4SC 20, VE4QD 18, VE4UM 11.

MARITIME—SCM, D. E. Weeks, VE1WB—Asst. SCMs: A. E. W. Street, VE1EK, and R. P. Thorne, VO1EI. SEC: VE1HJ. New appointments include VO1-DZ as Emergency Coordinator, Gander, Newfoundland. Deepest sympathy is extended to friends and relatives of VE1ALN, who has joined the ranks of Silent Keys. Newly-elected officers of the Halifax Club are VE1AI, pres.; VE1AIH and VE1ADH, vice-pres.; VE1AAC, treas.; VE1AFN, secy. VO1EI reports that the annual SONRA Fall Dance was highly successful and that VO1AW was presented with the coveted VO1BU Memorial Award at this event. WA2SDF/VO1 and XYL WB2ICO/VO1 have been transferred from Newfoundland. Clubs are reminded that their bulletins provide a vital source of information for this column. Unfortunately, *not a one* has been received this month. Perhaps all editors are on strike! A reminder also that traffic totals are not being received. As a result, the section gets little credit for the large amount of traffic handled. Send a note or message to this office if you do not know how to make up a traffic report. Traffic: VE1HE 29, VE1WB 20, VE1DB 18, VO2AW 15, VE1ABS 6, VE1OM 2.

ONTARIO—SCM, Richard W. Roberts, VE3NG—The Scarboro ARC elected VE3HR, pres.; VE3BBC, vice-pres.; VE3FOE, secy.; VE3FCE, treas. The mailing QTH still is 27 Whitefriars Dr., Don Mills. VE3-EAM earned a very fine letter of commendation from across the border. The Wisconsin Net "WIN" was having QRM and QRN troubles when Bert took over as NCS. W9KQB, ex-SCM for that area, reports that VE3EAM did a stellar job. Ottawa ARC elected VE3-CDG, pres.; VE3BYT, vice-pres.; VE3EWE, treas.; VE3FZY, secy. My thanks to K1CLM, who very kindly

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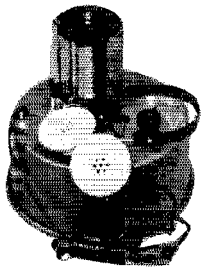

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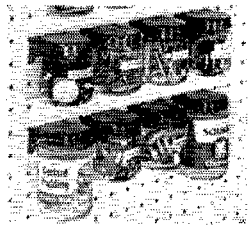

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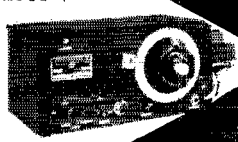

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took my traffic from Kennebunkport, Maine, for Ontario while on my vacation last summer. VE3BWM is pres. of the RCAF Clinton ARC. The mailing QTH is c/o RCAF Clinton (VE3CRW). The club will exchange bulletins. I am informed that the Peel ARC is now in operation from the EMO Hq., at Queen St., Brampton. VE3AZA is pres. and VE3FIX is vice-pres. VE3BOF, of Don Mills, is now a Class AA operator. The Skywide ARC is getting into high gear for the Sportsman Show next March in Toronto. The Niagara ARC is in session for the 1966 Ontario Division Convention in Niagara Falls Sept. 1966. Plans are in the making already. From a lot of reports from my OOs and what I have heard on the air, (we) amateurs in Ontario could use a code of ethics. The ARRL six points is a sound basis. *Read it.* Your comments on the air would make very good topics. VE3CJ was a visitor to the Windsor ARC. The Belleville ARC recently held elections. The Seaway ARC, whose QTH is 213 Pescod Ave., Cornwall, puts out an excellent bulletin. Thanks. VE3DJK. Traffic: (Nov.) VE3BII 163, VE3NG 144, VE3AWE 115, VE3-DPO 111, VE3CYR 110, VE3DRF 92, VE3DMU 87, VE3FJB 80, VE3BZB 73, VE3CFR 53, VE3NO 46, VE3-TT 41, VE3BUR 39, VE3BTV 36, VE3WW 28, VE3BLZ 26, VE3EAM 26, VE3HW 24, VE3EBC 20, VE3ETM 18, VE3CFI 17, VE3CQN 14, VE3BWM 13, VE3AUU 7, VE3AKQ 6, VE3VD 6. (Oct.) VE3AKQ 24.

QUEBEC—SCM, C. W. Skarstedt, VE2DR—Asst. SCM: Claude Duberger, VE2ALH. The 2-meter repeater station VE2MT (Mountain Top), located at a high level on Mount Royal, is now operating efficiently and successful tests have been made as far as Sherbrooke. Stations transmitting on 146.5 Mc. using the repeater are reminded to follow the DOT regulations, i.e., you must indicate VE2MT and your own call. This must be repeated on each transmission. VE2BYU (ex-VE4XA and VE8APH) now is located in Pte Claire. Both VE2BR and his XYL escaped with mendable fractures after a nasty car accident. VE2AP and VE2-ALE are new ECs. The 2-meter gang met twice during the fall at St. Anne de Bellevue at the Armoury. VE2-*ALE* operated regimental station VE2*BAR* which, needless to say, indicated a pleasant and liquid evening. As our province was not affected during the power blackout VE2s KM, AAU, FY, AYD, CP, AFM, ABV and BMS were able to render good assistance. It took 58 trailer loads when VE2AGK moved his mobile equipment from Morin Heights to Montreal. VE2QQ is building a 28-ft. craft for next summer's cruising. From St. Maurice Valley: Welcome to VE2AJN, who is well fixed and ready for traffic-handling. VE2AGI has been appointed Communications Officer. VE2ANK and VE2AJD are working much DX and VE2EC completes another full year of 100% reporting. Traffic: VE2DR 140, VE2BMS 130, VE2OJ 87, VE2BVY 52, VE2EC 25, VE2CP 21, VE2BRT 18, VE2WM 18, VE2BRD 11, VE2BG 9, VE2AE 7.

SASKATCHEWAN—SCM, Mel Mills, VE5QC—One of the things about radio amateurs that one discovers after becoming an amateur is the unadvertised fact that it is a true fraternity in the literal meaning of the word. I personally have discovered this in many visits away from my home call area, also in the many real close friendships that one strikes up all over this old globe of ours. This points out the fact that many of the troubles of our world could really be cleared up by true, close communications amongst all people. The story that brought up this fact is of a long-time air acquaintance of VE5GO. On David's 84th birthday he had surprise eyeball congratulations from his old air friend, K6BNU. This must have really warmed the heart of Canada's oldest active ham. K6BNU, thanks for a real warm feeling you left around these parts. Sorry to hear of the passing of VE5DN, and also the passing of a prospective ham, Vic Person. The Saskatoon Amateur Radio Club will hold its Annual Christmas Communications Ball Feb. 12. Start making plans *now* for the hamfest in Regina the July 1st week end. SARL memberships and car plate requests are almost due. Send them in now. Traffic: VE5HP 107, VE5LM 62, VE5OB 45, VE5BO 38, VE5LG 8, VE5HQ 4, VE5-PZ 3, VE5GX 2, VE5IR 2, VE5MS 1.

A.R.R.L. QSL BUREAU

The function of the ARRL QSL Bureau system is to facilitate delivery to amateurs in the United States, its possessions and Canada of those QSL cards which arrive from amateur stations in other parts of the world. All *you* have to do is send your QSL manager (see list below) a stamped self-addressed envelope about 4¼ by 9½ inches in size, with your name and address in the usual place on the front of the envelope and your call printed in capital letters in the upper left-hand corner. **Changes are shown in heavy type.**

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W2, K2, WA2, WB2 — North Jersey DX Assn., P.O. Box 303, Bradley Beach, N. J. 07720.
W3, K3, WA3 — Jesse Bieberman, W3KT, P.O. Box 204, Chalfont, Pa. 18914.
W4, K4, WA4, 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, Calif. 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, Minn. 55921.
VE1 — L. J. Fader, VE1FQ, P.O. Box 663, Halifax, N. S.
VE2 — John Ravenscroft, VE2NV, 135 Thorncrest Ave., Dorval, Quebec.
VE3 — R. H. Buckley, VE3UW, 20 Almont Road, Downsview, Ont.
VE4 — D. E. McVittie, VE4OX, 647 Academy Road, Winnipeg 9, Manitoba.
VE5 — Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Sask.
VE6 — Karel Tettelaar, VE6AAV, Sub. P.O. 55, N. Edmonton, Alberta.
VE7 — H. R. Hough, VE7HR, 1291 Simon Road, Victoria, B. C.
VE8 — George T. Kondo, VE8RX, c/o Dept. of Transport, P.O. Box 339, Forth 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.**
KG6 — Guam QSL Bureau, P.O. Box 445, Agana, Guam.
KH6 — John H. Oka, KH6DQ, P.O. Box 101, Aiea, Oahu, Hawaii 96701
KL7 — Alaska QSL Bureau, Box 6226, Airport Annex, Anchorage, Alaska 99502.
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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QSL, SWL, cards that are different. Quality card stock. Samples 10¢. Home Print, 2416 Elmo Ave., Hamilton, Ohio.

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.

QSLS 3-color glossy, 100, $4.50. Rutgers Vari-Typing Service. Free samples. Thomas St., Riegel Ridge, Milford, N.J.

QSLS Kromekote 2 & 3 colors, attractive, distinctive, different. Free ball point pen with order. Samples 15¢. Agent for Call-D-Cal decals K2VOB Press, 31 Argyle Terrace, Irvington, N.J.

QSLs. Free samples, fast service, customized cards. W7IJZ Press, Box 183, Springfield, Ore.

QSLS $2.50 per 100. Free samples and catalog. Garth, Box 51Q, Jutland, N.J.

3-D QSL Cards have that prestige look, with glittering colors and metallic in raised space-age designs fused to brilliant plastic finishes. Cost so little more than mere mediocrity! Samples 25¢ (refundable). 3-D QSL Co., Monson 2, Mass.

QSLS-100 3-color glossy $3.00; silver globe on front, report form on back. Free samples. Rusprint, Box 7575, Kansas City, Mo. 64116.

AT Last! Something new in Qsl cards! All original designs. Send 25¢ for samples to Yaraco, Box 307, Yorktown Heights 1, N.Y.

QSLS Stamp and call brings samples. Eddie Scott, W3CSX, Fairplay, Md.

QSL. 3-color glossy. Samples, 10¢. Gates Print Shop, 317-11th Ave., Juniata, Altoona, Penna. 16601.

1966 QSL Designs. Samples 10¢. Brigham, Colson St., No. Billerica, Mass.

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.

FINE Embossed QSL cards. Ace Printing Service, 3298 Fulton Road, Cleveland, Ohio 44109.

QSLQ-SWLs. 3&4 colors. 100 $2.00. Samples dime. Bob Garra, Lehighton, Penna.

QSLS. 18 samples, 10¢. Filmcrafters, Box 304, Martins Ferry, Ohio.

HUNDRED QSLS: $1.00 Samples, dime. Holland, R3, Box 649, Duluth, Minn. 55803 (formerly Meininger, Jesup, Iowa).

QSLS. Free offer with samples. 10¢. "Jack", W3PRU, Rice's Lane, Baltimore, Maryland 21207.

LOW Cost QSLS: 100 4-color glossy, $3.99. Free samples. Ed's Press, 3232 LeMoyne, Chicago, Ill. 60651.

RUBBER STAMPS $1.00. Call and address. Clint's Radio W2UDO, 32 Cumberland Ave., Verona, N.J.

DENVER Metropolitan Area only: QSLS by KØRRS (John Cox). Phone 934-4739 or come to 3624 West Kentucky, Denver evenings or Saturdays.

QSLS, Cartoons, colors, something different, samples 10¢. Chris, W9PPA, Route 1, Box 31, Crystal Lake, Ill.

NEW Plastic holder, frames and displays 5 certificates, 3 for $1.00, or 10 for $3.00 ppd. Regular 20-card holders, same price. Assorted if you wish. Tepabco, Box 193, Gallatin, Tenn.

HUNDRED QSLS, $1.00. Samples, dime. Holland, R3, Box 649, Duluth, Minn. 55803.

QSLS. Free samples. Radio Press, WA6QAY, Jule, Box 17112, San Diego, Calif.

QUALITY QSLs. Samples dime (ex-W3QCC). Ted Besesparis, WA4WVK, Box 1275, Lake Worth, Fla.

QSLS, finest. YLRL's, OM's, samples 10¢ W2DJH Press, Warrensburg, N.Y. 12885.

QSLS. Large selection, including photos, rainbows, glossy stocks, cuts, etc. Fast service. Samples, 25¢. Ray, K7HLR, Box 1176, Twin Falls, Idaho, 83301.

QSLS, Crafted by Samco. The "Proto-Call" for '66. Samples 10¢. Stamp-ett Cards, $1.00. Hundred, ppd. Samco, Box 203, Wynantskill, N.Y. 12198.

QSLS. Pappy's got them. Samples dime. K3YQP Press, 1039 Lankley, Chester, Penna.

CANADIANS: Apache TX-1, little used, well constructed. Quitting hamming. One hundred seventy-five dollars plus freight. Walter, VE7XX, Box 75, Virden, Manitoba P., Canada.

CANADIANS: Heath HX-10 Marauder, $350.00; HA-10 Warrior, $225.00; RX-1 Mohawk, $200. All three, $700.00, F.o.b. Toronto. All FB condx. VE3UC, A. Cumming, 5 Bayview Wood, Toronto 12, Canada.

CANADIANS Sacrifice SX-100 receiver and VHF152A converter 10, 6, 2. Best offer on either. R. Rotenberg, 14 Shelborne Ave., Toronto 12, Canada.

CANADIANS: HW-12 modified for 20M plus all parts for Triband transceiver Excellent condx, $210.00. VE3EGO, 2444 Rector Ave., Ottawa 5, Ont, Can.

CANADIANS: For sale: Hammarlund HQ-170, like new, no modifications, etc. Manuals, $385.00, Viking Pacemaker, SSB, A.M., C.W. All bands modifications. 2-6146B in final, silicon rectifiers in all power supplies, Manuals included. $170.00. H. G. Mitchell, VE5CT, P.O. Box 312, Moosomin, Sask. P., Can.

CANADIANS: Hammarlund HQ-145XC receiver with Hammarlund SP-100 speaker, Clock, Hammarlund XC100P crystal calibrator, Hammarlund HC-10 SSB adapter, complete, in perf. condition: $350.00; Heath DX-100 transmitter converted to grid block keying, fully shielded, low-pass filter and Heath SB-10 SSB converter, complete, $225.00. Hart, VE3TA, 4 Navy St., Oakville, Ont. Tel: 844-9817.

CANADIANS: Selling National receiver Two Seventy. Wanted; Gonset G66-B power supply and Hallicrafters SX-62A. VE2OU, Box 355, Riviere du Loup, Quebec P. Can.

TUBES Wanted. All types, highest prices paid. Write or phone Lou-Tronics, Inc., 120 West 18th St., N.Y. 11, N.Y.

WANTED: For personal collection: OST, May 1916, WICUT, 18 Mohawk Dr., Unionville, Conn.

NOVICE Xtals: 80-40M. $1.05 each, others 75¢. Free list. Nat Stinnette, W4AYV, Umatilla, Fla. 32784.

TELETYPE Model 15 in mint condx with table, power supply, manual, auto-unshift-on-space, copy light, worked 20 countries, $129.00; with converter built into table, ready to go on air, plugs into phone jack, and mic jack of ssb xmtr: $395; usable with any rig. K2DCY, Tom Perera, 410 Riverside Drive, New York City, N.Y. 10025.

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 WIMPP, 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.

FOR Sale: Plate transformers, 3600-0-3600 VAC @ 1000 ma. CCS, with 120/240 VAC primary. Commercial-quality units carry one year unconditional guarantee. Price $35.00. Peter W. Dahl Co., 401 4th St., S.E., Minneapolis, Minn. 55414. Tel: 338-9077.

POSI-CHECK Extra Class Amateur Extra and General Class FCC type exams, complete in detail and style even to the IBM type answer sheets! A must for checking before taking an exam. General Posi-Check consists of 297 questions and explained answers for only $2.98—Extra Class, 115 questions and diagrams with explained answers, $2.00. A very good aid to learning and a Must in preparation for FCC exams. 138 questions of the 297 in the General Posi-Check apply directly to Extra Class also. Get both for only $4.50 postpaid, Posi-Check, P.O. Box 3564, Urbandale Station, Des Moines, Iowa, 50322.

RTTY Channel Filters, octal mounted, specify frequency, $3.00 each. Zack, WA6JGI, 3232 Selby Avenue, Los Angeles, California 90034.

TOOOOBES: 6146B, $4.00; 6360, $3.45; 6CW4, $1.40; 8058, $8.55; 6146, $2.55; 717A, $3.95; Brand new, boxed, guaranteed. No pulls, seconds or JAN. Free catalog of others. Vanbar Distr., Box 444Z, Stirling, N. J. 07980

WANTED: Tubes, all types, write or phone W2ONV, Bill Salerno, 243 Harrison Avenue, Garfield, N.J., Tel. GArfield Area code 201-471-2020.

WANTED: FR-2409 bandpass filter. State price. Pete Chamalian, W1BGD, 111 Buena Vista Road, West Hartford, Conn. 06107.

BELOW Distributor cost: SR-150 with P-150 AC, P-150-DC, MR-150, $550; SR-160 with P-150-AC, $335.00; CDR TR-44, $47.50 F.o.b. Stamford, Conn. Send certified check or m.o. HDH Sales Co., 170 Lockwood Ave., Stamford, Conn. 06902.

TELETYPE Machines, converters, R-388, 51J3 and 51J4, R-390; R-390A receivers, mechanical filters for R-390A (455 IF) Want; TS-382 audio sig. CV89/URA8A converter. Alltronics-Howard Co., Box 19, Boston, Mass. 02101. Tel: 617-742-0048.

RTTY Gear for sale. List issued monthly. 88 or 44 mhy toroids, five for $1.75 postpaid. Eliott Buchanan, W6VPC, 1067 Mandana Blvd., Oakland, Calif. 94610.

WANTED: QSTs 1916 to 1920 inclusive. Government Callbooks, Fleming, de Forest, Moorehead, Audiotron tubes. Marconi and Wireless Specialty receivers. Private collection. Top prices. John Cain, 1101 Belle-Meade Blvd., Nashville, Tenn. 37205.

4000 Radiowords for hams, German-English. Send one dollar bill to Christian Zangerl, OE9CZI, Dornbirn, Austria.

HOUSE, Custom-built estate home, ideal ham location. 400 ft. high point in Stamford ridges 35 miles from NYC, 3 bedrooms, den, 2 full baths, solarium, terrace, 2-car garage, sundeck, large kitchen, privacy. On landscaped acre: $46,000. Two adjoining acres available. Financing arranged. WITZX Erich Quast, Skymeadow Drive, Stamford, Conn. 06903.

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.

DRAKE 2B, 2AC, 2BQ, $220.00; Heathkit Marauder HX-10 with stand, SSB mike, $30.00 or all for $434.00. Like new. WA4UET, Jackson, 1106 E. College, Griffin, Ga.

SELL: Collins 30/S1, $700.00; Swan SW-117AC supply, $45.00; QSTs 1932 to date, four for $1.00. Arthur A. Jablonsky, W8MCX, 1022 N. Rockhill Road, St. Louis, Mo. 63119.

COUPON Book. Special offers from various firms for members of Electronic Experimenters' Club. Dues: $2.00 or write for further information. Box 5332-W, Inglewood, Calif. 90310.

SELL: 2-meter Nuvistor Ameco converter, with power supply, $35.00; Eico 723, $35.00; Drake 2B with L. F. converter, $190.00. Cash and carry deal only. Write G. Hertsch, 400 W. 119th St., N.Y., N.Y. 10027.

HIGHLY Effective home-study review for FCC commercial phone exam preparation. Free literature. Cook's School of Electronics, Box 747, Riveread, N.Y. 11902.

Gi-50, latest Double Conversion Model. $250.00: D-104 mike with UG8 stand, $25.00. WA6HXM, Von Hagen, 26019 Oak St., Apt. 50, Lomita, Calif. 90717. Tel: 325-3760 or 271-4280 before 10 PM.

TELEPRINTER parts—Fast service. Schmidt, W4NYF.

MULLARD VT13 and other rare tubes for sale. W2EZM, 431 Oakland, Maple Shade, N.J.

SELL: QST, CQ, Radio, Modern Electrics and Handbooks, any quantity. Buy; old radio gear and publications. Erv Rasmussen, 164 Lowell, Redwood City, Calif.

20-A, $109.00; de luxe all-band VFO 160-10, Globe King 500-B, $165.00. (Excellent 600 watt linear). Dr. W. F. O'Rourke, 102 East 23rd, Scottsbluff, Nebraska 69361.

COLLINS 32V3, $250.00: National NC-300, $150.00. In excint condx. Each used approx 50 hours. Original cartons. Charles McNulty, W5LDK, 2928 Florida NE, Albuquerque, New Mexico.

SELL Collins 32V3, $225.00; SX-117, $285.00; Lysco 600, $25.00. W8VPC.

GALAXY 300, $188.00: Galaxy V, $399.95; top trades on towers, parts, new and reconditioned equipment. Write today! Electronic Sales, Executive House #15, Lewisburg, Tenn. 37091.

SELL: Eico 720 and 730, also Globe VFO 755A, all for $110.00 Richard Arensmeyer, Choteau, Montana.

WANTED: Atwater-Kent "Open Face" sets, units, parts for former A-K employee's collection. Describe and quote price. Atlee, K2PI, 1011 Eldridge Ave., W. Collingswood 6, N.J.

SELL: SR-150 plus PS-150 AC power supply, Instruction manual. Original cartons. Never mobile. Magnificent DX record. 111 countries worked 10 days! Peak condition. Firm $435.00. K3HGX. P.O. Box 8873, Elkins Park, Penna. 19117.

CHRISTIAN Ham Fellowship being organized for Christian hams for fellowship, tract ministry, missionary efforts among hams. Christian Ham Callbooks, $1.00. Write for free details from Christian Ham Fellowship, 5857 Lakeshore Drive, Holland, Michigan 49424.

BEAM TA-33 Triband, new, never assembled: $65.00. Xmtr AF-67, with dynamotor, $50. W1YOU.

APACHE: Perfect, only $135. K2EGI.

HAVE VHF Power tubes, 4CX250B, 4X500s, etc. Will swap for old toy trains. W3SYT.

GLOBE Champion 350 good, $200.00. Globe Scout, $30.00; Hallicrafters SX-100, like-new, $150, Philmore CR-5AC, $25.00; 912 Precision tube-tester, $15.00; model 77 Superior VTVM, $25.00 and large quantity of miscellaneous ham gear. Mrs. George H. Phillips, XYL of late K4AJX, Rte. 1, Box 253, Lithia, Florida 33547.

FOR Sale: Apache, $100.00; SX-100, $100; SB-10, $30. All in excellent condx gone transceive. Pick up deal only. M. Samuels, N. Country Road, Miller, L.I. N.Y.

COLLEGE Bound, must sell for best offer: 2-meter FM (3 base, 3 mobile), will tune. Ranger, Knight T-150A, Wollensack T-1600 and misc. Stamp gets list and description. K7KAE, 300 Riverside Drive, Mount Vernon, Washington.

BARGAIN: Complete shack—Hallicrafters SX-101A, Heath Apache with SSB SB-10, Heath SWR Bridge, electronic antenna change-over, BC-221AH freq. meter with spare tubes, Dumont oscilloscope 224A, antenna tuner with two RF ammeters. Station now in operation. All excellent. All for only $450.00. Bill, 31 Lafayette St., Milford, Conn. 06460. Tel: 874-3306.

COLLINS 75A4, 3 filters, $425.00; 32S2 with power supply, $400; 75A3, 2 filters, $250.00. Gonset GSB 201 linear, $225. Home brew 10-15-20 linear PR 4-125-A with power supply, $95.00. Ernest Cheslow, 895 East 54 St., Brooklyn, N.Y. 11234.

FULL Size beams: new, all ⅝" and 1" aluminum tubing; absolutely complete with boom and hardware; easily handles five KW; SWR 1:1; adjustable entire band: three-element 20-meter $22.00; two-element, $16.00; three-element 15-meter, $16.00; two-element $12.00; four-element 10-meter $18.00; four-element 6-meter, $15.00. Remit with order, express collect shipment; all orders honored. Gotham, 1805 Purdy, Miami Beach, Fla. 33139.

SELL: Four months old SBE-34, in new condition: $325.00. W1IOW, 115 Aaron Drive, Bristol, R.I.

COLLINS 75S1 with notch-filter, $300.00; Collins 30K1 with VFO, $395.00, both very clean; Heathkit Q-multiplier, new, $14.00. W2FLK, 22 Elm St., Woodbury, L.I., N.Y., 516. Tel: My 2-6435.

SR-150, AC-supply, $500. EE student needs cash. Rig never mobile and hardly used on SSB, cw only! Frederick S. Macary, K2NVY/3, 105 Llantair Rd., Bala-Cynwyd, Penna. (nr. Philadelphia). Tel: MO-45087.

COLLINS 75A3 receiver-speaker, $250.00; Viking II xmtr, VFO, $95.00. Excellent condition, both $320.00. Anderson, W6TME, 3655 Homeway Drive, Los Angeles, Calif. 90006.

CAN'T use beam at new QTH. Trade Hy-Gain 2-el. Tribander and homebrew rotator for commercial multiband vertical. Write K3BYJ, 1211 Virginia Rd., Wilmington, Delaware 19809.

FOR Sale: Hallicrafters SX-96, very clean: $125.00. Viking II with 122 VFO, $115.00. Gonset 6M Communicator IIA, 12-volt, $115.00. Heath SB-10, $70.00. Donald Conley, 18 Lodge St., Manchester, N.H. 03104.

WANTED: Collins S/Line 1 KW transmitter. Must be in mint condx and complete. State lowest price in first letter. Sid Tritsch, RD #1, Box 64, Lockwood, N.Y. 14859.

HAMMARLUND HQ-170A VHF with clock, like new, $299.00; Heathkit Mohican, $59.00; Gonset Twins, G-77, with 3-way supply, G-66B, 12v supply, complete, $99.00. All with manuals. F.o.b. Herman Zachry, 3232 Selby Ave., Los Angeles, California 90034.

COMMUNICATOR IV, 6 meters, excellent condition, $225.00. Noel O. Hoglund, W3CPQ, 112 Conneaut Drive, Pittsburgh, Penna. 15239. Tel: 327-1346.

HALLICRAFTERS SX-100 and R-46A speaker, $140.00. F.o.b., W5EDX, 645 East Woodlawn, San Antonio, Texas.

NC-190 Gen. purpose receiver, little used, like-new condx, orig. carton, manual. For quick sale: $100. SX-101A with Johnson 6 & 2 converter, perfect condx. $225.00. Telrex 6-meter 6-el. beam. Cost $75.00, for $25.00. K2ZEX, Ben Sherman, Tel: DE-2-2339, 2243 E. 26th St., Brooklyn 29, N.Y.

WANTED Alive: Heath XC-6 converter. State wampum desired. Frank Williams, WA1CRK, Graduate House, Box 406B, 305 Memorial Drive, Cambridge, Mass. 02139.

COMPLETE Station for sale: Gonset GSB-100 exciter, Gonset GSB-101 linear, Drake 2B receiver with extra 10M crystals, 2BQ, mike, Waters Compreamp, Ameco SWR indicator and 2 inline bridges, FS meter, on-air sign, and all cables, wires, and books: $625.00; Eico 720 with Dow-Key relay and Blitz Bug, $60.00; Heath tunnel dipper, $22.00; Heath Signal Gen, $15.00; Heath sig. tracer $15.00; Simpson Model 373 current meter, $18.00, all with book. Prefer you pick up but will ship collect for shipping charges on clearance of your check. Bruce Baskin, 612 E. Tallmadge Ave., Akron, Ohio 44310. WA8PGD.

WANTED: Radio News magazine, with both covers, before 1928, for personal collection. Jose Garcia, 243 W. 109th St., New York, N.Y. 10025.

HEATH HW-29A 6 mtr. xcvr, mike, xtal, ant., $40.00, perf. B. E. Nelson, A402 Univ. Vill., Salt Lake City, Utah.

TR-4, $480.00, AC-3, $66.00, DC-3, $108.00; all factory sealed, never opened. Warranty, naturally; sell separately. Palmer, K4LGR, Box 10021, Greensboro, N.C.

SELL: Gonset Communicator, 2 M, w/crystals and JT-30 mike, $145.00. Also R-46B spkr. WA2PRM, 76 Glenview Rd., South Orange, N.J.

BRAND New SB-300 with SSB filter, professionally wired, $245.00. Used but in excellent condx, Challenger 80, 6 mtr. transmitter, $70.00, matching 80-6 mtr. rock stable VFO, $25.00; Johnson 275 Matchbox with SWR, $65.00. Write WA2SIZ, R. J. Christie, Box 18, Queens Village Station, Jamaica, L.I., N.Y.

SALE: One Hallicrafters 101 receiver, in good condition: $200.00; Instructograph, new, $40.00. Ed Duy, Maple Park, Illinois.

GOING S/Line, new HT-37 in factory-sealed carton $275.00. Also factory sealed HT-41 linear, $250.00. Both for $500.00. Received as Christmas gifts. Also NCX-3 w/D.C. p/s. calibrator & antenna, $325; Heath XC-6 and XC-2 converter, $35 ea. WA2LIM. Tel: 212-461-1779.

2 KW Linear, reliable Hallicrafters HT-33A, all modifications, new ceramic tube, spare glass tube. Excellent condition, works with the best of them in pile-ups. $325.00. S. D. Cowan, W1RST, 62 Woodcliff Road, Wellesley Hills, Mass.

75A4, like new condition. Include 3" Panadaptor, matching speaker, three filters; 800 cy, 1.5 kc., 3.1 kc. Instruction book, vernier knob, shipping carton. Serial 23497. All modifications made before purchase. No alterations. May be seen in operation. Prefer not to ship. Deliver 100 mile radius. $450.00. Price firm, no trades! Certified check or M.O. W3CLP, Wilmington, Del. 302-P04-1660. 5 PM or after 10 PM.

HEATH DX-60, mint condx, new final, osc. driver, $65.00, WB2OKS, 25 Meadow Woods Rd., Great Neck, L.I., N.Y.

INVADER 2000 with new pair 4-400A included, $750.00. Also Mohawk RX-1 receiver, $150.00. Both in excellent condx. K8VWX, 136 South Vine St., Columbiana, Ohio 44408.

HAMMARLUND HQ-170C in excellent condition, $200.00. F. Thiede, W2EC, Nathan Hale Drive, Setauket, L.I., N.Y.

WANTED: Electronics Instructors. General indispensable. Theory and workshops. Science Camp, Lake Placid, N.Y. Write Eppstein, 440 West End Ave., N.Y. 24, N.Y.

NCL 2000 plus one unused 8122. $450.00. Condition perfect. W. Sabin, 1400 Harold Dr., S.E. Cedar Rapids, Iowa.

JOHNSON K.W. Matchbox, SWR Bridge and meter. Self-contained. In exc. condx. W1CPI, Box 423, Wakefield, R.I.

SELL: OST 9-39 thru 9-40; 3-46 thru 1961, $20.00; CQ, 8-48 thru 1954, $5.00. F.o.b. W. R. Hatchard, 800 S. Broom, Wilmington, Del. 1985.

2-EL. Triband quad, only $29.95; brand new, pre-tuned, weather-proofed bamboo spreaders, very sturdy. Guaranteed. WA8MQE, 3645 Tolland, Cleveland, Ohio.

WANTED: Counselor for summer camp. College student general license and equipment necessary. Contact W2GQN, Shelly Weil, 114 Phylis Court, Elmont, N.Y. 516-HU-8-3555.

WRL Blue Book prices save money on used gear. Take 10% without trades: NCX-3, $219.00; SB-33, $209.00; Galaxy III, $219.00; Galaxy 300, $199.00; SX-101A, $209.00; Apache, $129.00; AR-88, $88.50; AR-67, $59.00; Communicator III, 6M, $159.00; Ranger, $109.00; NC-270, $149.00; Loudenboomer and PS, $279.00; NC-300, $169.00; NC-303, $249.00; RME6900, $179.00, hundreds more. Free list. Leo, W0GFQ, Box 919, Council Bluffs, Iowa.

COLLINS S/Line AM adapter, $5.00! Install five minutes! Switching! Kit Kraft, B-763, Harlan, Kentucky.

TWOER For sale. Excellent condition. F/W es 3 pos. xtal switch. $45.00. Write Zach Bruce, WA4TJS, Box 387, Morehead. Kentucky 40351.

ANTENNA Guy cable. Plastic covered 7X7 galvanized steel cable 1200# strength. .04 ft. 500 and 1000 spools. Freight paid if cash with order. American Superior Products, Inc., Box 177, Sarasota, Fla.

SELLING: HE-29C, walkie-talkie, $11.95; E-V 727 microphone, $9.95, transistor tape-recorder, $7.95. Tony Cinquini, 6917 Chester Ave., Phila., Penna.

PRACTICALLY New Johnson Signal Entry c.w. fone monitor #25025, reasonable offer accepted. W6NQI, 1051 Justin Ave., Glendale, Calif. 91201.

HALLICRAFTERS SX-111, excellent condition, $140.00; Eico 723 mint condition, $50.00; Dow-Key relay and three crystals, $10.00; all for $175.00. Mike Benioff, WA3BZX, 2850 Livingston Street, Allentown, Penna. 18104.

SELL: Morrow MB-560 5-band 65-watt mobile transmitter (See Nov. 1956 QST, p. 40) w/12 to 625 volt dynamotor, $80.00; matching Morrow 5BR/FTR 12-tube mobile receiver, 12-volt power supply, $40.00; NC-300 with xtal calibrator and speaker, 2nd conv. osc. xtal controlled with USB/LSB xtals, $150.00. Ranger I, factory-wired, $100. All instruction manuals. R. Markel, W2IVS, 1435 Lexington Ave., New York 10028.

MARAUDER HX-100, professionally tuned, $250.00; Drake 2-B, 2-BQ, 2-AC, $210.00; Dow-Key TRP T/R switch ($27.00 new), $15.00; Heath HM-11 power meter, $10.00. Will sell separate, prefer New England area; SASE for info and photo. K1SCQ, Ralph McClintock, 44 Parkway Crescent, Milton, Mass. Call 617-696-2575.

TOROIDS, Uncased 88mh, 5/$2.50 ppd U.S.A. Humphrey, WA6FKN, Box 34, Dixon, Calif.

SELL: HQ-140X with Q-mult., DX-100, with time-sequencing, and Apache TX-1. All in excellent condition. Priced at $100 each for quick sales. No shipping, sry, but will deliver 50 miles radius of Philadelphia. W2HDW, 26 Nokomis Road, Somerdale, N.J. Call 783-4343.

HEATHKIT Shawnee HW-10 in good condition with 3 element beam. Would like to trade for Heathkit HX-20. Will sell for $145.00. Will deliver within 100 miles. K8JRO, 3412 Benmarks, Flint, Michigan. Tel: 743-6391.

FOR Sale: NCX-3, Heath A.C. and D.C. power supplies, mike, Hustler antenna with 80 and 20 meter resonators, bumper mount, motor noise kit and speaker. All for $325.00. K3DHM, Lawrenceville, Penna. 16929.

DRAKE 2-B, 2-BQ, 2-AC, excellent condition, one owner, unmodified, with manual, $180.00 (firm). (I want to buy matching SB-300 and need the money). D. Rudisill, Tel: (504)-361-4474, 3221 Plymouth, New Orleans, Louisiana 70114.

COLLINS 30K-1 xmtr with transformer for 500 watts; and prop-pitch motor and indicator. Best offer. H. H. Johnson, K3ZLF, Box 78, Blue Ridge Summit, Penna. 17214.

QST—May 1937 to August 1947, less 10 issues in 1942 and 1943. Good condition. Best offer takes lot. Wilson, 2703 So. Washington, Marion, Indiana.

VALIANT I, $160.00; D-104, with stand, $20.00; DX-35, $20.00; Model 15, sync. motor, perf. condx, $100. WA9ESG, 4410 Woods End, Madison, Wis. 53711.

FOR Sale: Johnson Mobile transmitter, $30.00; DB-23 Preselector, $15.00, BC-459, $10. Charles Copp, W2ZSD, 337 Jamaica Blvd., Carle Place, N.Y.

WANTED: HT-44 or SR-150 with A.C. P.S. or HT-37. Have new HT-45. K1PNL, Tel: 203-583-5433.

CRYSTALS Airmailed: MARS, SSB, Nest, Novice, Marine, etc. Custom finished etch stabilized FT-243, .01% any kilocycle 3500 to 8600 $1.90. (Five or more same or mixed frequencies $1.70) (Ten or more same frequency $1.35) (1700 to 3499 and 8601 to 20,000 $2.50). Overtones supplied above 10,000 kilocycles. Add 50¢ each for .005% into 32 pf. HC-6/u metal miniatures above 2000 add 75¢ each. ARRL Kits: FT-243; "DCS-500", "IMP" $9.95. Other filter and oscillator crystals available. Write for price-order sheet. Add 10¢/crystal airmail. 5¢ surface. Crystals since 1933. C-W Crystals, Route 2, Box 22-B, Marshfield, Missouri 65706.

FOR Sale: New condition NC-303 with xtal calibrator, manual. Price: $250.00. L. W. Stietz, WA2TAA, 203-9 St. Hicksville, L.I., N.Y. Tel: 516 WElls 1-6033 evenings, week-ends.

BARGAIN: National NC-173, $130.00; SX-99, $75.00; Heath QF-1, $10.00; Eico 720, $85.00; Eico 730, $35.00; Heath HX-11, $35.00. WA9BCC, Phil Dickey, 1014 South Twyckenham, South Bend, Indiana 46617.

WANTED: Good used HA-5 Hallicrafters VFO. State price. Nicholas E. Basil, WA9MOU, 301 Grace Avenue, Rock Falls, Illinois.

CERTIFICATE Hunters: Work five members, get free award. Ti-Boro Radio Club, Inc. W2BMW, 104-19 127 St., Richmond Hill, N.Y. 11419.

FOR Sale: One NCX-5 AC/PS, used 20 hours, $530.00 or trade for NCX-3 or HW12. Solomon Hofer, Spencer, So. Dakota.

SELLING: Heath HW-32, 20M transceiver, in excint condx, 6 months old, with good hb p.s. Cash: $125.00. WB2OQK, Schwartz, 1129 Astor Ave., Bronx, N.Y. 10469.

WANTED: Many types Military or Commercial surplus . . . Airborne, Ground, also test sets. Try the Big Boys then write or call Collect Area code 703-560-5480 and give us your price. We pay cash and freight. Dun & Bradstreet rated. Ritco, P.O. Box 156, Annandale, Va.

MOHAWK rcvr, Seneca xmtr, HO-10 'scope, JT-40 mike, Dow-Key relay, SWR meter, 10-meter 4-element beam, disk. Harold Medley, 528 E. Hendrix, Brazil, Indiana. Tel: 20465.

SALE: HW12, SB-200, SB-100, SB-300, SB-400, HR-10, SX-101, GR-64. Name the kit you want. Wired or repaired. Lan Richter, 131 Florence Dr., Harrisburg, Penna. 17112.

HEATH DX-60, HG-10-VFO, $75.00; HR-10, receiver, $50.00. New condition. WA1DLL, Addison E. Wilson, Box 392, Pineland Park, East Brewster, Cape Cod, Mass.

SELL: Heath DX-40 and VF-1, National NC-270. Best offer. Dick Kramer, K1ZVJ, 63 Kipling St., Springfield, Mass. 01118.

SELL: HQ-170AC. Top shape, $250.00. Heath Cheyenne xmtr, $35.00; Heath O-11 'scope, $30.00. Swan 240 with mobile supply, $235.00. WA0HTC/4, 103 Pineview St., Havelock, N.C.

SONY "Voice Command" portable tape recorder, excellent condition. Runs on rechargeable batteries or 110 AC. With mike, case, manual, $100. K9KTL, 3514 N. Riley, Indianapolis, Ind. 46218.

HALLICRAFTERS HT-33 amplifier, 8 watts P.E.P. will drive this unit to the legal limit. Will meet or exceed manufacturer's specifications. Unmodified with manual. Excellent condition. $225.00. Rubin L. Hughes, WA6AHF, 17494 Via Alamitos, San Lorenzo, Calif. 94580.

FREE Love is yours in fine equipment pampered by me, B&W 5100, NC-300, $350.00 complete. Contact WA2JSF, Ron, 47 Ivy St., Newark, N.J. Telephone 373-5375.

FOR Sale: Johnson Invader 200; Hammarlund HQ-180 receiver with clock, E-V mike, Johnson TR switch, R48 speaker, new B&W 5-pole coax switch, new Hammarlund HK-1B keyer, Echo 4-band trap dipole antenna, manuals and schematics for all. First certified check for $495.00 takes all. Henry Miller, W4VGJ, Hudson, Florida.

SALE: RME-45 receiver with speaker, $80; DX-20 transmitter with DK-60 antenna relay, $35.00; Hy-Gain 14AVS 10-40 meters, $20.00. All in excellent condition. Jim Mlnarik, 521 Chippewa Dr., Fremont, Mich. Tel: 924-3312.

MILLEN Exciter, speech amplifier, modulator and 500 watt final without power supplies, 100 dollars. PP250TH 1 KW 80 mtr. final 35 dollars. PP-813 1 KW 20 mtr. final 2 5dollars. You pay shipping. Southeastern Mass. Amateur Radio Assn., 54 Donald St., South Dartmouth, Mass.

HQ-100C like new, $95.00; Johnson Viking II, exclnt, $75.00; Heath HG-10 VFO exclnt. $25.00. WA9FTH, 4506 Keating Ter., Madison, Wis. 53711.

COLLINS 32S-3, new in Nov.: $675.00 or 32S-1, $400. Good TV camera, B-T observer with control unit, $350.00. Trade on KWM-2, 312B-5, WA4LXX, 251 Collier Ave., Nashville, Tenn. 37211.

WANTED: Code machine with tapes. Send complete particulars first letter. Carsner, 1532 N.E. 1st Ave., Miami, Florida 33132.

WANTED: BC-610 transmitter. W5PJN, 5844 Argonne, New Orleans, Louisiana.

WANTED: Mechanical filters 800 cy. 2 Kc, 75A-4. Beryl Snyder, 513 Phillipi St., Clarksburg, W.Va.

RANGER I, $130.00. RME 6900, $270.00. Mike Bellinger, 2110 Lincoln Way, Ames, Iowa.

FOR Sale: Swan 400, 406, 12 volts p.s. $400. F.o.b. Hartford, Conn. Tel: (203)521-2856, Dr. C. A. Weed, WA1BDJ, 42 Waterside Lane, West Hfd., Conn.

TRADE: 1961 Imperial 4-door hardtop sedan, all power-equipped, air-conditioning, new premium tires. Excellent, want: 32S-3, 75S3-B (or KWM-2 and accessories), and 30S-1. For sale: KWM-1, 516E-1, 516F-1, 312B-2, 351D-1, $400, KWS-1, 75A-4 with speaker and three filters, $1000. Maj. James W. Craig, 172 White Birch Dr., Pease AFB, N.H. 03803. Tel: 603-436-9062.

SELL: Marauder; NC-183-D, Vibroplex; Mon-Key; D-104; Heath GDO, Q-Multiplier, condenser checker; hi-fi gear. Thurber, 2971 Portsmouth, Rancho Cordova, Calif.

QSTS wanted: March, April, May and June 1916. W2DYU, 360 Marlboro Road, Englewood, N.J.

FOR Sale: NC-183-D with matching speaker, good condition. $125.00. WAØFRT, Box 33, Loomis, Nebraska.

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GLOBE Champ 300; 160-10 meters; 275 watts fone, 350 c.w., 500 P.E.P. with adapter. $150.00 or offer. WA8MZK. Hilton Muntz, 417 Norway St., Norway, Michigan.

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SELL: Eico 753 xcvr, $180, plus postage. Very gud condition. SB-10 with manual, unmodified, neat, gud condition. $45.00, plus postage. K3JML, 142 South St., Nanticoke, Penna.

HALLICRAFTERS DC Power supply and mobile mounting bracket for SR-150, perfect. WA5IZP.

DX-100B for sale, with two extra 6146's. Like-new condition. No scratches. $125.00. WA2OWM, Edward Dague, Woodside Drive, Elma, New York.

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FOR Sale: Collins 75A2, plus A2-3 SSB, $199.00; Heathkit DX-100 professionally wired with Heathkit MK-1, SSB, $99.00; both mint condition. Chris Vinson, W2GJJ, 2796 Larkspur St., Yorktown Heights, N.Y.

SELL: Drake 2B w/spkr and xtal calibr., $200.00; Ameco Nuvistor converter, $25.00; SB-33 with DC supply, $260.00. Dan Coder, WB6CBK, 5580 Moreno #83, Montclair, Calif.

HY-GAIN 40 meter DX beam, model 402B, new, in original carton, half-price $49.87. Alan Kehr, W3UZF, 1209 Dixon Lane, Rydal, Penna. 19046, Philadelphia suburb.

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FOR Sale: Very nice KWM-2 with noise-blanker and 516F-2 power supply and MP-1 power supply, quitting the road. All very good condition. Package deal on 3 items, $900.00 and Hustler antenna thrown in. Contact Jake Phares, K5WYJ, 445 Jay St., Beaumont, Texas.

COLLINS VFOs, new, unopened cartons for direct replacement, 70E-23 for KWS-1, $39.00; 70E-12 for 75A-2-3, $39.00; 70K-1 for KWM-1, $29.00; 70J-3 for R-390AB/FO, $29.00; 399B-1 DX adaptor for KWM-1, $10.00; 399B-3 Novice adaptor, $9.00. Richard E. Mann, 7205 Center Dr., Des Moines, Iowa 50312.

SELL: 1,500 V. or 2,000 V., 400 Ma. power supply with 38 mfd. filter, $18.00; Mohican transistor receiver, 550 Kc to 32 Mc., $55.00; R.F. signal generator, $9.00; 5 in. oscilloscope, $45.00; unused tubes—pair TZ40's, $3.00; pair 832A's, $5.00; pair 807's, $1.50; slightly used pair TW75's, $2.00. Milliameters, transformers and other parts at bargain prices. R. H. Beers, 33 Sterling Drive, Livingston, N.J. Phone 201-992-1421.

OK, I give up! 75A-4, 3.1 mech. filter Ser. No. 4527. Best offer over $300.00. Johnson Invader 200. Best offer over $200. Offer good for two weeks from 1st of month following this issue. Will ship to highest bidder collect upon receipt of certified check or m.o. Chuck Camp, Box 40, Peyton, Colorado.

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VALENTINE For the technically-inclined ham should include a copy of "Radio-Electronic Transmission Fundamentals" by Griffith, W5CSU. McGraw-Hill, $10.75. Griffith, Box 798, Garland, Texas.

DRAKE 2B, Hallicrafters HT-37, extra crystals, calibrator, manuals, in mint condition; $495.00. WA6SCA, 9833 Richeon Ave., Downey, Calif.

VACUUM Variable capacitors Jennings type UCSV250; 125-250 mmfd at 10 KV; type UCSA525, 250-525 mmfd at 10 KV. Either type, $39.95, Postpaid. Electronic Surplus Co., Box 1225, Boston, Mass. 02104.

COLLINS KWS-1, #1087, all new tubes, IREC tube shields, two new spare Eimac 4CX250Bs, hook, cables, antenna relay, condition excellent, $650.00. KWM-1, $1050, excellent, $250.00; 516E-1, excellent, $65.00. Dr. Roland B. Webster, K4CVT, 4401 Sunset Rd., Knoxville 14, Tenn.

FOR Sale: NCX-3 xcvr and NCXA A.C. power supply. Used very little. Excellent condition. Asking $300.00. K1LNM, 1295 Bay Street, Springfield, Mass.

PITTSBURGH Area, no shipping: 1500 and 2500 v power supplies, $25.00 5½ ft. Par-Metal cabinet, $25.00. 1 KW powerstat, $10.00; misc. mod. and pwr. transf. meters, etc. Ferguson (412) TE-59548.

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FOR Sale: Swan 350, Model 117C power supply, and Shure 444 mike for $395.00. All used less than 10 hours. MSG Charles A. Griggs, K5MIA, 683 AC&W Squadron, Sweetwater AFS, Texas.

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KWM-1, Power supplies 516F1, 516F1, matching speaker, Mobile mount, cables. Exceptional condition. $425.00. WØZHJ, 2444 D, Lincoln, Nebr.

FOR Sale: Johnson Ranger, $125.00; Gonset Communicator III, 6M, $130.00; GR RF-VTVM, 726A, $35.00; TS34AP oscilloscope, broadcast band R22, make offer. Nagle, 40 Whittier, Severna Park, Maryland.

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HT-37, $240; Drake 2B-2BQ, $225.00; Warrior, $180; HA-4 keyer, key, $60. Also tower and TA-33. WA6ZJZ. Tel: 982-6759.

WANTED: Collins 32S-1 and 516F-2. George Conn, 412 Old Boonton Rd., Boonton, N.J.

ATTENTION So. California Generals! Tri-Ex 54 foot tower, CDR rotator, and Mosley TA-33 in good condition, all for $197.00. You haul. Bill Edmunds, K6RIP, 522 South Milliken, Whittier, Calif. Tel: OX-8-6446.

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HW-12-22-32 Owners, inexpensive Triband conversion. Complete plans, $4.00 postpaid. Plans, Box 17, West Bend, Wis.

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HQ-110AC receiver, $210.00; HA-90 VFO, $20.00. Going SSB. Both only 7 months old, and in perfect condition. WB2RJJ, Robert Schenck, 22 Greenwich St., Bergenfield, N.J. 07621.

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ELDICO EE3-A keyer, $50.00; S-85, T-50 Knight, etc., etc., $100.00. K8CCV, Dick, 5471 Norquest, Youngstown, Ohio.

TELETYPE Wanted: Model 28KSR or 28ASR. Can do own repair so condition need not be perfect. Fred Peterson, KØJVC, RR #2, Iowa City, Iowa.

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SELL: Brand new Eico 753 Triband SSB transceiver, $179.95; new A. C. or D.C. supply, $79.95 each. All wired and tested by Amateur Extra Class licensee. Gerald Williamson, P.O. Box 203, Williamston, N.C.

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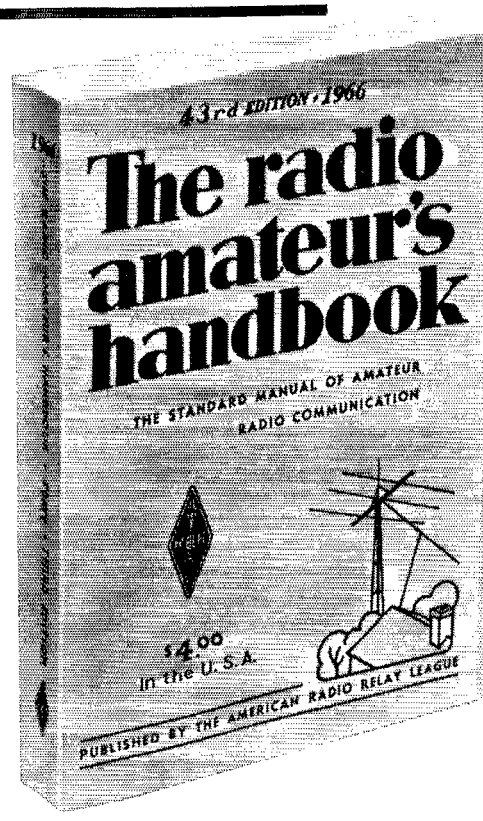

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You can get more detailed information from the RCA Top-of-the-Line Semiconductor Replacement Guide. It contains sections on application and operating considerations. Contact your local RCA Distributor for a copy, or write Commercial Engineering, Sect. B37SD and request SPG-202.

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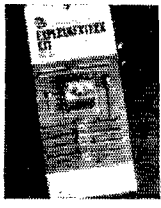
Spark an interest in electronics for those young future hams with the new RCA Experimenter's Kits. Whether you work side-by-side with youngsters, or do it yourself, you'll find building these circuits fun, as well as practical, with dozens of useful applications.

Here is what you can make...

1. Electronic Timer. 2. Electronic Time Delay Switch. 3. Electronic Flasher. 4. Battery Charger (12 volts). 5. Battery Charger (6 volts). 6. Model Race Car and Railroad Speed Control. 7. Light-operated Switch (Turn-On). 8. Light-operated Switch (Turn-Off). 9. Electronic Heat Control (Turn-On). 10. Electronic Heat Control (Turn-Off). 11. Universal Motor Speed Control. 12. Overload Switch. 13. Electronic Synchronous Switch. 14. Lamp Dimmer.

Here's all you need...



- RCA Basic Experimenter's Kit (KD2105); Contains one silicon controlled-rectifier, two transistors, five rectifiers.
- RCA Experimenter's Manual (KM-70) 80 illustrated pages; 14 circuits and how to build them.
- RCA Add-On Light Sensor Kit (KD2106); Contains one photocell for light-operated switches.
- RCA Add-On Heat Sensor Kit (KD2110); Contains three thermistors and special solder for heat-control circuits.
- Plus readily available standard components.

Pick up a copy of the RCA EXPERIMENTER'S MANUAL (KM-70) from your local RCA Distributor, or write Commercial Engineering, Sect. B37SD and enclose 95¢. It contains complete construction and operating information on 14 circuits for dozens of control applications that you can build using RCA basic EXPERIMENTER'S KITS.

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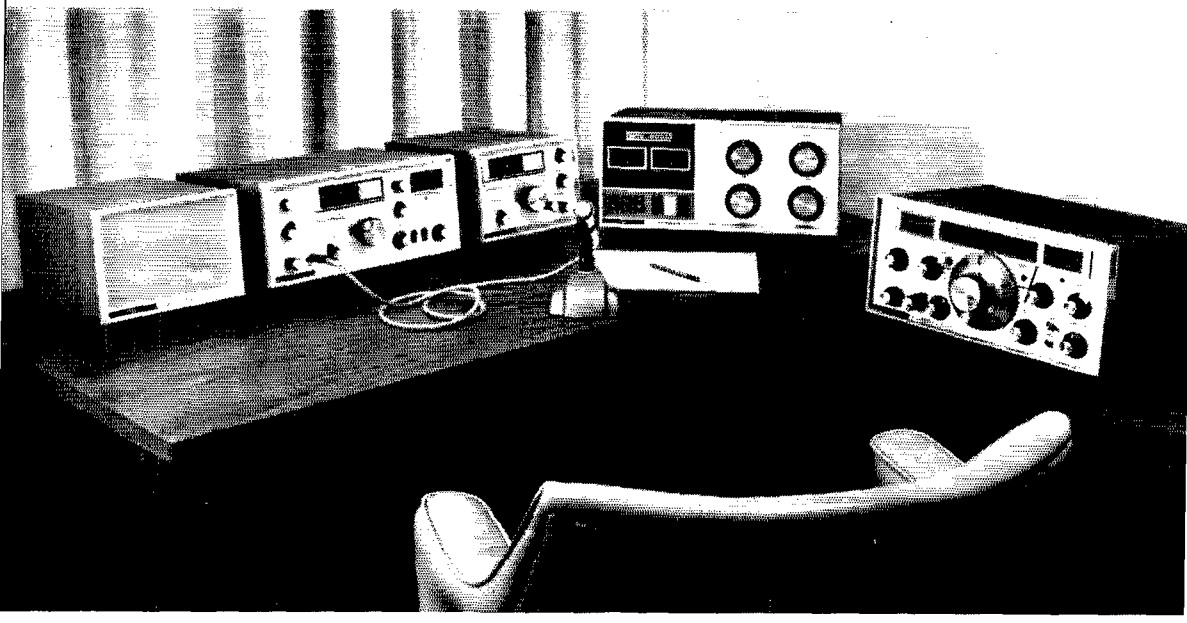

This desk-top amateur station by National includes the NCX-5 all-band transceiver, with digital counter read-out accurate to 1 Kc on each band and **Transceive Vernier** control to provide up to ±5 Kc separation of receive and transmit frequencies. Transmit-receive selectivity is provided by National's 8-pole crystal filter with greater skirt selectivity than any filter ever manufactured for amateur equipment. The NCX-5 provides operation on upper or lower sideband, compatible AM, or break-in CW. $685 ■ The NCX-A power supply/speaker console operates from either 115/230 V.A.C. and provides all operating voltages for the NCX-5. $110 ■ The VX-501 VFO console provides choice of completely independent transmit-receive frequency control of the NCX-5, as well as transceive operation from either VX-501 or NCX-5, and also offers five crystal channel positions for net or novice use. **$249.95** ■ The NCL-2000 is a completely self-contained 2 Kw SSB PEP linear amplifier for the 80 through 10 meter bands, with minimum peak output of 1300 watts. It may also be operated for CW, AM, or RTTY at 1000 watts DC input. $685 ■ The HRO-500 is a frequency synthesized and phase-locked solid state receiver covering the five kilocycle through 30 Mc frequency range with identical 1 Kc calibration, high stability from turn-on, and 10 Kc per turn tuning rate throughout. **Passband Tuning** is offered for SSB and CW operation, and IF bandwidths up to 8 Kc are included. Operates from either 115/230 V.A.C. or 12 V.D.C. sources. Power drain from a 12 V. battery (with pilot lamps switched off) is 200 Ma. $1295 ■ Not pictured is the popular NCX-3 tri-band transceiver, at $369.

NATIONAL RADIO COMPANY, INC. 37 WASHINGTON STREET, MELROSE, MASS. 02176

World Wide Export Sales: Auriema International Group, 85 Broad St., N. Y. C.