Season's Greetings to All

H. R. Hick
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This series provides virtually all the characteristics of the Linear Standard group in a more compact and lighter structure. The frequency response is within 1 db. from 30 to 20,000 cycles. Hipermalloy nickel iron cores and hum balanced core structures provide minimum distortion and low hum pickup. Input transformers, maximum level +10db. Circular terminal layout and top and bottom mounting.

ULTRA COMPACT series
UTC Ultra Compact audio units are small and light in weight, ideally suited to remote amplifier and similar compact equipment. The frequency response is within 1 db. from 30 to 20,000 cycles. Hum balanced coil structure plus high conductivity die cast case provides good inductive shielding. Maximum operating level is +7db. Top and bottom mounting as well as circular terminal layout are used in this series as well as the ones described above.

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CQ... CQ... Have you nominated your Edison Award candidate?

Letters must be postmarked not later than January 3, 1955. If you haven’t selected your candidate, please do so soon—then prepare and mail in your nominating letter. Instructions were given on this page in September. Trophy, gift, and national acclaim will go to the amateur who has rendered outstanding public service in 1954!
The actual generation of the single sideband signal is perhaps the most important part of a SSB transmitter. In designing this part of the circuit, careful consideration should be given to the bandwidth of the signal generated. Without careful design, this bandwidth can be much greater than would be expected and can cause considerable adjacent channel interference on both sides of the desired signal. The most desirable performance characteristics of an SSB generator would be the ability to generate the desired sideband, completely suppress the undesired sideband and suppress the carrier. Practical design permits suppressing the undesired sideband and carrier by more than 40 db. Following is a discussion of one way that these performance characteristics may be obtained.

The block diagram below shows a "filter" type single sideband generator.

It shows how the audio and RF signals are combined in the balanced modulator and how the filter removes one sideband. If the balanced modulator is properly adjusted, the carrier can be reduced 40 db or more. Care must be taken in the design of any balanced modulator in order to prevent the RF output from coupling around the balanced modulator and being re-inserted in a later stage. This undesired coupling can be caused by stray capacitive coupling or by coupling through common power leads. Unwanted coupling around the balanced modulator will not allow complete suppression of the carrier.

The output of the balanced modulator contains both sidebands and has the RF carrier suppressed. All the modulation components passed by the audio amplifier will appear as sidebands in the output of the balanced modulator. In order to limit the transmitted bandwidth to only that required for a satisfactory communications circuit, it is necessary to restrict the passband at some point in the transmitter circuitry. This is most easily done by the filter following the balanced modulator. This filter is required to do several things. (1) It should pass the desired sideband. (2) It should limit the bandwidth of the desired sideband to that required for an intelligible communications circuit. (3) It should provide adequate suppression to the undesired sideband. (4) It should provide some attenuation to the carrier frequency. The Collins Mechanical Filter Type 455C-31 will satisfy the above requirements. It provides a transmitted bandwidth of 3100 cps. It does not require the use of any additional audio bandpass filters. It provides at least 60 db of attenuation to the undesired sideband. No manual adjustments are required to maintain this attenuation. It will provide between 12 and 18 db of attenuation to the carrier frequency, thereby reducing the requirement for a high degree of carrier balance in the balanced modulator.

The principal advantages of the filter type single sideband generator are its ability to maintain its performance characteristics indefinitely; there are no controls, such as the critical ones required by some systems for RF and audio phasing, to get out of adjustment, and there are no critical phase shifting or audio bandpass networks required. Optimum performance can be easily provided with a Mechanical Filter exciter. When operating SSSC, we should make sure that we are utilizing the advantages offered by the system and that we are operating with a single sideband, with the carrier suppressed.
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INDEXED BY
INDUSTRIAL ARTS INDEX
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Now is the time for all good Hams to have the pleasure of receiving one of the world’s finest gifts—a genuine Hallicrafters.
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<tr>
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**Reports Invited.** All amateurs, especially League members, are invited to report station activities on the first day of each month (for preceding month) to the SCM, the administrative ARRL official elected by members in each Section. Reports are also designated by SCM and are published in Feature and QST. Lists of ARRL Field Organization stations are available in many areas to qualified League members. These include OXs, F6S, OPS, WO and OBS, SCMs also desire applications for W7C, EC, RM and PAM, where vacancies exist. All amateurs in the United States and Canada are invited to join the Amateur Radio Emergency Corps (ask for Form 7).

### Atlantic Division
- **Eastern Pennsylvania**
  - **3020**
  - **3040**
  - **3060**
  - **3080**
  - **3100**
- **Maryland-Delaware-D.C.**
  - **3120**
  - **3140**
  - **3160**
  - **3180**
  - **3200**
- **Southern New Jersey**
  - **3220**
  - **3240**
- **Western New York**
  - **3260**
  - **3280**
  - **3300**
  - **3320**
- **Northern New Jersey**
  - **3340**
  - **3360**
  - **3380**
  - **3390**
  - **3391**

### Central Division
- **Illinois**
  - **3400**
- **Indiana**
  - **3420**
- **Wisconsin**
  - **3440**
- **Wisconsin**
  - **3460**

### DAKOTA DIVISION
- **North Dakota**
  - **3480**
  - **3500**
- **South Dakota**
  - **3520**
  - **3540**
- **Minnesota**
  - **3560**

### Delaware Division
- **Arkansas**
  - **3600**
- **Louisiana**
  - **3620**
  - **3640**
- **Mississippi**
  - **3660**
  - **3680**
  - **3700**
- **Tennessee**
  - **3720**
  - **3740**

### Great Lakes Division
- **Kentucky**
  - **3800**
  - **3820**
  - **3840**
  - **3860**
- **Michigan**
  - **3880**
  - **3900**
  - **3920**
  - **3940**
- **Ohio**
  - **3960**
  - **3980**
  - **4000**
  - **4020**
- **Indiana**
  - **4040**
  - **4060**
  - **4080**
  - **4100**

### Hudson Division
- **New York**
  - **4120**
  - **4140**
  - **4160**
  - **4180**
- **Connecticut**
  - **4200**
  - **4220**
  - **4240**
- **Maine**
  - **4260**
  - **4280**
  - **4300**
  - **4320**
- **Massachusetts**
  - **4340**
  - **4360**
  - **4380**
- **Rhode Island**
  - **4400**
  - **4420**
  - **4440**
- **Vermont**
  - **4460**
  - **4480**
  - **4500**

### New England Division
- **Alaska**
  - **4520**
  - **4540**
  - **4560**
- **Idaho**
  - **4580**
  - **4600**
  - **4620**
- **Montana**
  - **4640**
  - **4660**
  - **4680**
- **Oregon**
  - **4700**
  - **4720**
  - **4740**
- **Washington**
  - **4760**
  - **4780**
  - **4800**

### Pacific Division
- **Hawaii**
  - **4820**
  - **4840**
  - **4860**
  - **4880**
- **Nebraska**
  - **4900**
  - **4920**
  - **4940**
  - **4960**
- **South Dakota**
  - **4980**
  - **5000**
  - **5020**
- **Minnesota**
  - **5040**
  - **5060**
  - **5080**
  - **5100**

### Rocky Mountain Division
- **North Carolina**
  - **5120**
  - **5140**
  - **5160**
- **South Carolina**
  - **5180**
  - **5200**
  - **5220**
- **Virginia**
  - **5240**
  - **5260**
  - **5280**
- **West Virginia**
  - **5300**
  - **5320**
  - **5340**

### Southwestern Division
- **Colorado**
  - **5360**
  - **5380**
  - **5400**
- **Utah**
  - **5420**
  - **5440**
  - **5460**
- **Wyoming**
  - **5480**
  - **5500**
  - **5520**

### Southeastern Division
- **Alabama**
  - **5540**
  - **5560**
  - **5580**
- **Georgia**
  - **5600**
  - **5620**
  - **5640**
  - **5660**
- **South Carolina (Cuba-P.R.-V.I.)**
  - **5680**
  - **5700**

### Canal Zone
- **3000**
- **3200**

### Los Angeles Division
- **5720**
- **5740**
- **5760**

### San Diego Division
- **5780**
- **5800**

### Santa Barbara Division
- **5820**
- **5840**

### Northern Texas Division
- **5900**
- **5920**
- **5940**

### Oklahoma Division
- **5960**
- **5980**

### Southern Texas Division
- **6000**
- **6020**

### New Mexico Division
- **6040**
- **6060**

### Maritime Division
- **6080**
- **6100**

### Canadian Division
- **6120**
- **6140**

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*Official appointed to act temporarily in the absence of a regular official.*
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For many happy years
is a noncommercial association of radio amateurs, banded for the promotion of interest in amateur radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio art, and of the public welfare, for the representation of the radio amateur in legislative matters, and for the maintenance of fraternalism and a high standard of conduct.

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 prerequisites, although full voting membership is granted only to licensed amateurs.

All general correspondence should be addressed to the administrative headquarters at West Hartford, Connecticut.
"It Seems to Us..."

TECHNICIAN PRIVILEGES

By decision of the ARRL Board of Directors, the League has filed with the Federal Communications Commission an endorsement of its proposal to open the 50-Mc. band to Technicians, and opposition to its proposal to open the 144-Mc. band to those licensees. Our correspondence indicates a lack of understanding on the part of many amateurs as to why the League has assumed what appears to them to be contradictory viewpoints.

We think the difficulty arises from a misunderstanding of the Board’s basic objective in this whole matter. The objective is increased occupancy of the 50-Mc. band — especially by newcomers. Two years ago the Board, in the course of its annual survey of our affairs, noted with concern a decreasing interest on the part of newcomers in the 50-Mc. band, potentially one of our most valuable. At that time, in an endeavor to correct the situation, the Board voted to ask FCC to permit Novice licensees to operate on 50 Mc., in addition to the other Novice bands. It was hoped this would result in the desired newcomer interest in a mighty fine, but lately neglected, segment of our amateur territory.

However, this year FCC turned down this proposal, basing its decision largely on concern that because of the adjacency of the band to TV channels, serious TVI problems might result, inasmuch as FCC felt the Novice could not be expected to have experience and technique to cope successfully with such problems. The problem of 50-Mc. occupancy still remains, however, and continues very much in the minds of many amateurs, both on the Board and in the field. Recently, as a result of suggestions by Directors Crossley and Middelton, based on a petition filed with FCC by W5FXN, the Executive Committee carefully examined the possibility of the League also proposing to FCC the opening of the 50-Mc. band to Technicians, on the basis the Technician licensee meets the standards which FCC had indicated it felt the Novice did not. Again, the objective was primarily one of increased occupancy of that band, and the League agreed the proposal was a wise one in the long-term interests of the amateur service. During this process FCC separately initiated action on the W5FXN petition. The League’s established view, then, was in support of the Commission proposal.

But the Commission additionally proposed that 144 Mc. be also opened to Technicians. This matter the Executive Committee then also examined carefully. The Committee could not agree to the Commission’s supporting statement that “The Technician’s value to, and participation in, civil defense communications through the Radio Amateur Civil Emergency Service would be considerably enhanced...” This is for the reason that under the rules Technicians holding RACES permits can already operate in the 50-Mc. civil defense segments (or such segments on any amateur band), under RACES licensing. The Commission’s proposal therefore does not appear to offer any practical advantage over present rules in extending the privileges of Technicians for civil defense participation.

More important, it was felt that opening 144 Mc. to Technicians would completely negate the action in opening 50 Mc. for their use. If both proposals are adopted, where will the Technicians drift? Why to 144 Mc., of course, where there is considerably greater occupancy and considerably greater variety of available equipment, both ready-made and surplus. There are on 144 Mc. more people to talk with, and the gear for that band is a simpler matter. (Under the same circumstances, isn’t that where you would go?)

The fact is that the League’s aim in proposing 50 Mc. for Technicians, and in opposing 144 Mc. is to accomplish, by regulation, greater occupancy of the 6-meter band. Amateurs of other classes simply have not made anywhere near as much use of 50 Mc. as can be made. While the League and QST have used every means we can think of to promote and encourage occupancy there, it hasn’t worked out to the extent it should in our long-term interests. Particularly since the advent of the Novice Class license, which allows the newcomer to use part of the 144-Mc. band, use of 50 Mc. has been declining steadily. This, we believe, is largely due to the absence of beginners on the lower frequency. Thousands of Novices have broken into the game on 144 Mc. When they graduate to General Class the great majority of them stick with 144 Mc. for their v.h.f. work. To maintain its position, or to
develop more occupancy, any band must have a steady influx of beginners. The 50-Mc. band has gotten almost no new blood in the last few years. To open it to Technicians would almost surely help correct this situation.

For these reasons, then, the League view is that Technicians should be permitted on 50-Mc., as a means of obtaining greater occupancy and contributing to knowledge of propagation techniques at that order of frequency, but that Technicians should not be permitted simultaneous use of 144 Mc, because it would completely nullify the primary 50-Mc. objective.

OUR COVER

Almost four decades of good-fellowship has been written into the logs of amateur stations around the world since Harry R. Hick, 1ESS, a young but enterprising “sporic” ham, created the cover design for May, 1916, QST (see reproduction on page 42 of our October, 1954, issue). Since that time, “HRR” has been QST’s senior draftsman and illustrator. We think it especially fitting, therefore, that during this holiday season Harry once more give of his talents, to help all of us at Hq. wish all of you...

A VERY MERRY CHRISTMAS!

25 Years Ago

December 1929

QST now is fourteen years old and ARRL President Mauer’s editorial looks back over the bustling years as well as forward to a bright future for amateur radio.

...“The Single-Control Transmitter,” by George Grammer, is an encouragingly simple and effective one-tube set employing the Tyne UX-210...incorporating several new and novel ideas. “The Receiver at W1AOE,” by H. C. Wing and QST Assistant Editor Clark C. Rodmon, is of universal interest...

...ARRL Secretary Warner defines the scope and activities of the newly formed international technical consulting committee in “The Amateur and the C.C.I.R.”

...“Amateur Radio and the National Air Races,” by Harry A. Tunnemors, W8JAK—recognizes hamdom’s contribution to the recent Cleveland classic’s success...

...W1AZO’s closing station was the occasion for “Seventy-One Rounds,” a farewell-party rag chew which lasted thirteen hours and included 71 stations...

...Coming Operating Activities,” enumerated by F. E. Handy, includes announcements of two upcoming international message-handling contests...

...In addition to overseas society reports, in IARU News and GOZIR’s interesting tabulation of “best times” for Europe-U. S. A. 20- and 40-meter QSOs...

...Among the usual voluminous information to be found in Communications Department pages is a listing of reported “high-quality” and “prehistoric” signals heard.

Since the war many countries of the world have set up currency restrictions which either prohibit the sending of money outside their boundaries or make it practically impossible. This has meant that hundreds of amateurs in other lands do not normally have the opportunity to renew their ARRL memberships and receive QST regularly. The situation is made even more acute by the devaluation of many foreign currencies, for many of those who formerly were just barely able to get together the necessary American dollars now find it utterly impossible to do so.

At the end of the war ARRL did in numerous instances grant membership and QST to persons overseas on a direct basis, but of course we couldn’t carry membership-subscriptions on that basis indefinitely and, in practical cases, we have been necessarily obliged to discontinue such arrangements. It occurs to us that perhaps American amateurs and clubs might again this year wish to make a “care” package gift in the form of QST for Christmas, as many have done regularly in recent years. If it’s something you’d do, we’d be glad to make necessary arrangements. The foreign membership dues are $5. If you have a particular DX buddy in mind, give us his name — and complete address. If you have no special name, we can arrange to apply your remittance to a membership-subscription for a foreign amateur who cannot send his own money but wishes to renew. We’ll let you know what amateur we select. And of course we’ll send the recipient of your gift an appropriate note to tell him who his American patron is. Address ARRL, 38 La Salle Road, West Hartford 7, Connecticut.

QST for
40 Watts on the 7- and 21-Mc. Bands

A Two-Band Rig with a Two-Band Antenna

BY LEWIS G. McCoy, W11CP

- A simple 7- and 21-Mc. combination makes real good sense for the Novice when it is combined with a two-band antenna for the same range. Here is a 40-watt transmitter for these two bands, using inexpensive components and a method of construction that should avoid any TVI troubles.

The problem of TVI is not usually very serious when one is operating in the 3.5- and 7-Mc. bands, but on any of the higher bands it cannot be disregarded except in a few rare cases. Anyone planning to operate in the 21-Mc. band should realize that the 3rd and 4th harmonics from his transmitter fall in Channels 3 and 6, respectively. The transmitter should be enclosed in a shielded box to keep these harmonics from being radiated. The transmitter described here is built on a chassis bottom plate, and the chassis proper is used as a shielding case. This is an extremely simple method of construction and affords easy access to all of the parts.

As indicated by the title of the article, the transmitter operates on the 40- and 15-meter bands. An output circuit is provided that will work into any low-impedance line or into an antenna coupler, but we recommend using a half-wave 7-Mc. antenna fed with coaxial line. The transmitter will work nicely into this antenna system on either 7 or 21 Mc., without any additional coupling circuits.

The Circuit

The circuit diagram of the transmitter is shown in Fig. 1. A 6C6G grid-plate type oscillator drives a 6BQ6-GA amplifier. Either 80- or 40-meter crystals can be used in the oscillator. If 3.5-Mc. crystals are used for 21-Mc. operation, the oscillator output will be on 7 Mc. and the amplifier must triple in frequency to give output in the 21-Mc. band. This will result in considerably less output than if 7-Mc. crystals were used and the tripling took place in the oscillator. However, it should be pointed out that excellent contacts can be made with low power when the band is "open."

To change bands from 7 to 21 Mc., turns on the oscillator plate coil and the amplifier plate coil are shorted out by small jumper plugs.

A 0-1 milliammeter is connected as a voltmeter and the grid and cathode currents of the 6BQ6-GA are checked by measuring the voltage drop across R4 in the grid circuit and R5 in the cathode circuit. The double-pole double-throw toggle switch, S1, is used to switch the meter to either circuit. When R4 is in the meter circuit, the full scale reading is approximately 10 ma.; when R5 is switched in, full scale reading is about 200 ma.

In addition to the shielding, extra TVI precautions were taken by installing C19 and C20 to by-pass the power supply leads and C4 at the key jack to by-pass the key leads. On-the-air tests
showed that these precautions were sufficient for even weak-signal areas.

A single-pole double-throw switch, \( S_2 \), is used to ground the screen of the amplifier tube during tune up, protecting the tube against damage.

**Construction**

It may be that local suppliers don’t stock aluminum bottom plates. If such is the case, most of the larger mail-order houses carry them as regular stock. Another source is a local sheet-metal dealer. A 7 \( \times \) 12-inch aluminum plate is obtainable for less than one dollar.

The various components are laid out on the plate as shown in the photograph. There is nothing critical about the layout, but remember to provide a half inch of clearance around the edge so that the completed unit will fit into the chassis box. Mounting holes for the tube socket brackets should be measured with the tubes in the sockets to take care of the clearance problem.

The 54-inch stand-offs that support the coils are mounted exactly two inches apart. The crystal sockets, \( J_3 \) and \( J_4 \), which accommodate the 300-ohm line shorting plugs, are mounted between the coil stand-offs.

Four holes, large enough to take No. 6 sheet-metal screws, are drilled at the four corners of the plate and in the chassis box. In areas where one is likely to encounter TVI, the plate should be fastened to the box with screws set not more than three inches apart, to insure tight shielding.

The power supply is mounted on a 3 \( \times \) 5 \( \times \) 7-inch chassis which can be bolted to the back of the chassis box. Leads from the power supply are brought through the box wall to a two-terminal tie point.

**Wiring**

The power supply is wired first. In the supply shown in the photographs, the transformer power leads come off the bottom of the transformer. A 1/2-inch hole will be large enough to pass all the leads. The two by-pass condensers, \( C_{21} \) and \( C_{20} \), should be mounted at the point where the 115-volt a.c. line enters the supply. Two leads are brought through the tie point mounted inside the chassis box. One lead is the B-plus and the other the “hot” side of the 6.3-volt heater line. Both of these leads are by-passed to chassis ground at the two-terminal tie point by \( C_{19} \) and \( C_{20} \). B-minus and the other side of the 6.3-volt line is the common ground connection obtained.
by bolting the two chassis together. However, three leads are brought from the two-terminal tie point to the transmitter bottom plate, the B-plus leads, the 6.3-volt lead, and a ground lead which connects the chassis box to the plate.

After the heater and dial light circuit is wired, the rest of the transmitter, starting with the oscillator circuits, is wired.

The oscillator and amplifier plate coils, $L_1$ and $L_2$, consist of 22 turns of Barker & Williamson No. 3015 Miniductor stock. These coils are available in three-inch lengths and one length will be sufficient for both $L_1$ and $L_2$. The output link, is 21 turns of No. 3011 Miniductor stock.

The coils $L_1$ and $L_2$ are mounted in the following manner: A coating of Duco cement is applied to the ends of one of the coils' insulating strips. A soldering lug is then laid in the cement, with the large hole of the lug beyond the end of the insulating strip. The cement is allowed to dry and another coat is applied.

The coils can then be mounted with ¼-inch 6-32 screws on the ⅜-inch stand-offs. The oscillator plate coil is tapped down 4 turns from one end. The 3rd and 5th turns are bent in to allow access to the 4th turn. The tap is connected to one side of the two-prong socket and the other side of the socket is grounded. The same procedure is followed with $L_2$ except that the tap is on the 6th turn. The 300-ohm line plugs are used for shorting the unused sections of the coils when operating on 21 Mc. The plugs are made up by simply inserting a piece of bare wire through one pin of the plug and out the other and then soldering.

The link $L_1$ is slid inside $L_2$ and held in place by a small piece of cardboard or paper. Be sure the link is positioned so that it doesn’t short to $L_2$.

**Operation**

Before turning the transmitter on, carefully check the wiring job to make sure no mistakes were made. Plug a key into the key jack, leaving

This view shows the completed transmitter. The two-terminal tie point for the leads from the power supply is seen on the left side, inside the chassis box. The metal shield for the oscillator tube is not shown but should be put over the tube for actual operation.

The input circuit of the 6BQ6-GA is shielded from the output side by means of a metal plate which can be made from a piece of tin or aluminum. The piece of metal is formed as shown in the photograph and held in place by one of the tube-socket screws.
the key open. Turn the amplifier screen grounding switch, S₈, to the position that grounds the screen. This renders the amplifier inoperable and provides protection for the amplifier tube during tune-up. A 25-watt lamp bulb can be used as a dummy antenna. It should be connected between the output jack, J₅, and ground.

With a crystal in J₃ and the key open, the 115-volt switch is turned on. Allow a few minutes for the tubes to warm up. Switch the meter to read the grid current in the 6BQ6-GA, keeping S₂ set to ground the screen grid. On 40 meters, using either a 3.5- or 7.1-Mc. crystal, the meter should read 6 or 7 ma, when the key is closed and C₉ is tuned to resonance. Tune for maximum reading, open the key, and then switch the meter to read the plate current of the final amplifier. Set S₂ to its “operate” position, close the key and tune C₁₈ for minimum current reading. This point will be resonance in the final amplifier tank circuit. The dummy antenna should show some light. If it doesn’t, tune C₁₈ until the lamp lights up. The plate current can be brought up to read 100 ma., or approximately half scale. Be sure to have C₁₂ tuned to show minimum current or “dipped.”

The same procedure can be followed for 15 meters. It may be necessary to adjust C₁₈ to obtain the maximum amount of grid current for a particular crystal. Some crystals oscillate better than

(Continued on page 138)

<table>
<thead>
<tr>
<th>Shopping List for Novice Transmitter</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 0.001-mf disk ceramic condensers (C₆, C₇, C₈, C₉, C₁₀, C₁₁, C₁₂, C₁₃)</td>
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<tr>
<td>3 0.01-mf disk ceramic condensers (C₇, C₁₁, C₁₄)</td>
</tr>
<tr>
<td>1 0.002-mf mica condenser (C₉)</td>
</tr>
<tr>
<td>3 220-mf mica condensers (C₆, C₇, C₁₀)</td>
</tr>
<tr>
<td>1 3-50-mf trimmer condenser, compression type (C₅)</td>
</tr>
<tr>
<td>1 100-mf variable condenser (C₆) (Hammarlund HF1100)</td>
</tr>
<tr>
<td>2 140-mf variable condensers (C₁₁, C₁₃) (Hammarlund MC1405)</td>
</tr>
<tr>
<td>2 8-mf, 450-volt paper electrolytic condensers (C₁₇, C₁₈)</td>
</tr>
<tr>
<td>1 0.1-megohm resistor, ½ watt (R₆)</td>
</tr>
<tr>
<td>1 15,000-ohm resistor, 1 watt (R₇)</td>
</tr>
<tr>
<td>1 5000-ohm resistor, 10 watts (R₈)</td>
</tr>
<tr>
<td>1 500-ohm resistor, ½ watt (R₉)</td>
</tr>
<tr>
<td>1 27,000-ohm resistor, ½ watt (R₊)</td>
</tr>
<tr>
<td>1 27-ohm resistor, ½ watt (R₁₀)</td>
</tr>
<tr>
<td>1 4700-ohm resistor, 1 watt (R₇)</td>
</tr>
<tr>
<td>1 50,000-ohm resistor, 10 watts (R₈)</td>
</tr>
<tr>
<td>1 4700-ohm resistor, ½ watt (R₉)</td>
</tr>
<tr>
<td>1 3-inch length of B &amp; W Miniductor stock No. 3015 (L₃, L₄; see text)</td>
</tr>
<tr>
<td>1 3-inch length of B &amp; W Miniductor stock No. 3011 (L₅; see text)</td>
</tr>
<tr>
<td>1 10.5-by-110-ma. filter choke (L₄) (Stancor C1001)</td>
</tr>
<tr>
<td>1 6.3-volt panel indicator assembly (J₃)</td>
</tr>
<tr>
<td>1 6.3-volt bulb No. 47 or equivalent</td>
</tr>
<tr>
<td>3 Crystal sockets (J₁, J₃, J₄) (Millen 33102)</td>
</tr>
<tr>
<td>1 Open-circuit jack (J₄)</td>
</tr>
<tr>
<td>3 2.5-ohm, r.f. chokes (RFC₁, RFC₃, RFC₄) (Millen 34102, National R100a)</td>
</tr>
<tr>
<td>1 2.5-mh, r.f. choke (RFC₅) (Millen 34300)</td>
</tr>
<tr>
<td>1 D.p.d.t. toggle switch (S₈)</td>
</tr>
<tr>
<td>1 S.p.d.t. toggle switch (S₉)</td>
</tr>
<tr>
<td>1 S.p.s.t. toggle switch (S₆)</td>
</tr>
<tr>
<td>1 0-1-millionmeter (MA)</td>
</tr>
<tr>
<td>1 Power transformer, 360 v. each side 60a., 110 ma.; 6.5 v.; 3.5 amp.; 5 vac. (R₇) (Stancor IFS1000)</td>
</tr>
<tr>
<td>1 Nine-pin miniature socket with shield</td>
</tr>
<tr>
<td>2 Octal sockets, one isolantite, one bakelite</td>
</tr>
<tr>
<td>1 6CT6 tube</td>
</tr>
<tr>
<td>1 6BQ6-GA tube</td>
</tr>
<tr>
<td>1 5X3 tube</td>
</tr>
<tr>
<td>4 One-inch right-angle shelf brackets (for mounting tube sockets)</td>
</tr>
<tr>
<td>1 Plate cap, ½ inch (Millen 36004)</td>
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<tr>
<td>2 Transmission-line plugs (Millen 37412)</td>
</tr>
<tr>
<td>1 Phone jack (J₃) (RCA type)</td>
</tr>
<tr>
<td>4 Isolantite stand-offs, ½ inch</td>
</tr>
<tr>
<td>3 One-terminal tie points</td>
</tr>
<tr>
<td>3 Two-terminal tie points</td>
</tr>
<tr>
<td>24 6-32 ½-inch screws</td>
</tr>
<tr>
<td>24 6-32 nuts and lockwashers</td>
</tr>
<tr>
<td>6 4-40, ½-inch screws</td>
</tr>
<tr>
<td>6 4-40 nuts and lockwashers</td>
</tr>
<tr>
<td>6 Soldering lugs</td>
</tr>
<tr>
<td>1 3 X 7 X 12-inch aluminum chassis</td>
</tr>
<tr>
<td>1 7 X 12-inch aluminum bottom plate</td>
</tr>
<tr>
<td>1 3 X 5 X 7-inch chassis</td>
</tr>
<tr>
<td>10 feet of hook-up wire</td>
</tr>
<tr>
<td>3 Knobs for C₁₂, C₁₈ and C₁₉</td>
</tr>
<tr>
<td>12 No. 6 self-tapping screws</td>
</tr>
</tbody>
</table>

QST for
This Class AB modulator is complete with all supplies, ready to be hooked to a Class C r.f. amplifier. Using two 6146s, it is capable of audio outputs up to 120 watts, depending on the plate voltage selected. The first two stages of speech amplification are built into a small box that may be used at the operating position while the main chassis is installed in any convenient location.

Components on the chassis are, left to right, power transformer and 816 rectifiers, filament transformer and plate filter choke, 6146s and VR tubes, modulation transformer and, in the right foreground, the 6C4 final speech amplifier stage.

120 Watts of Audio Without Driving Power

Class AB1 Modulator with 6146s

BY GEORGE GRAMMER,* WIDF

Unlike most tubes, the 6146 will develop almost as much power output without driving power as with it. This article describes a complete modulator unit that takes advantage of this characteristic. Various power levels can be obtained, depending on the choice of power supply components.

The modulator includes a splatter filter, made from inexpensive components, that can be applied to practically any 'phone transmitter where the Class C plate current does not exceed about 300 ma.

The rather interesting capabilities of the 6146 as a Class AB1 audio amplifier do not seem to have attracted much attention in amateur circles, although it is a fact that a pair of tubes is capable of delivering practically the same audio power in AB1 as in AB2. Either way, it is possible to get enough power to modulate a Class C input of a quarter kilowatt. When a choice is available, it is hardly likely that anyone would select AB2, with its driver regulation problems, in preference to AB1—especially when no-driving-power operation usually means that one less speech amplifier stage will be needed for the same over-all gain.

The modulator shown in the accompanying photographs uses a pair of the tubes in AB1 and, with the exception of the preamplifier unit (which could easily have been included on the same chassis if it had been desired) is complete with power and bias supplies on a 7 × 17 × 3-inch chassis. The preamplifier was deliberately made into a separate unit in the thought that, while it is highly desirable to have the microphone input and gain control within easy reach at the operating position, there is no reason at all why the rest of the audio equipment should be in the same vicinity. The modulator and power supply have no controls that need be manipulated, nor do any of the tubes or components require watching during transmitting periods. This section can simply be tucked away in some spot where it won’t take up room that might be used more profitably for other purposes.

The modulator-power supply unit includes one stage of speech amplification, and also is equipped with a splatter filter and an audio take-off for scope monitoring. It is easy to build in the latter two at the start, but somewhat messy to add them externally after it becomes appreciated that they should be classed as necessities rather than accessories.

**Tube Capabilities**

The audio power that can be obtained from a pair of tubes is, of course, a function of the plate voltage used on them. The following table is illustrative:

<table>
<thead>
<tr>
<th>Plate Voltage</th>
<th>Power Output</th>
<th>Plate-to-Plate Load Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>500 volts</td>
<td>84 watts</td>
<td>4200 ohms</td>
</tr>
<tr>
<td>600 volts</td>
<td>104 watts</td>
<td>5000 ohms</td>
</tr>
<tr>
<td>750 volts</td>
<td>134 watts</td>
<td>6700 ohms</td>
</tr>
</tbody>
</table>

The power output figures are calculated from data taken from the published tube curves, using a screen voltage of 200, and the actual outputs will be somewhat lower because of losses in the output transformer. These “theoretical” output figures cannot be compared directly with those given by the tube manufacturers in tables of typical operating conditions, partly because of somewhat different choice of load resistance and partly because the manufacturers’ figures usually are based on the fundamental-frequency component of power output, with distortion components given separately as a percentage. The figures in the table above are more properly described as the average power in a sine wave having the same instantaneous power at the peak

*Technical Editor, QST

December 1954
Bottom view of the modulator and power supply. The sockets at the upper left are for the 816s. The splatter-filter choke is mounted on the left-hand chassis wall, using small cone stand-offs as tie points for the high-voltage connections. The large resistor to the left of the filter condenser is the dropping resistor for the low-voltage circuit; the filter condenser is supported from the rear (lower, in this picture) chassis wall. The 6C4 speech amplifier circuit is at the upper right, with a shielded lead carrying the audio input to it from the four-prong socket, J2, mounted on the rear wall of the chassis. T1, the interstage audio transformer, is to the left of the 6C4 socket.

Bias-supply components, with the exception of the output potentiometer, R6, are mounted on the right-hand chassis wall. R1 is on the rear wall, near the lowest of the four sockets in a vertical line. The 'scope take-off circuit is at the lower right.

of an a.f. cycle as the waveshape actually considered — or, for short, "equivalent sine-wave power output." Since it is the peak power that counts in determining the modulation percentage, and all our discussions of modulator power use this same "equivalent sine-wave power" as a basis, we believe this kind of figure to be more useful in modulation calculations with voice waveforms.

Suitable sets of components for all three of the voltages listed above are readily available, so the power level can be selected to suit the Class C amplifier to be modulated. For purposes of estimating, measurements have shown that the actual power outputs to be expected are approximately 75, 95, and 120 watts for the 500-, 600-, and 750-volt conditions, respectively. The modulator shown in the photographs is set up for 600-volt operation, but sufficient chassis area has been assigned to the power and modulation transformers to accommodate the next larger size of the same style. Other than these two transformers, all other components are the same regardless of the voltage level.

The Preamplifier

The preamplifier circuit, shown in Fig. 1, is built in a 2 by 4 by 4 aluminum box. It uses a 12AX7 for two resistance-coupled triode stages. The circuit is quite straightforward, except for the fact that a 0.003-μf condenser is used for coupling between the first and second stage. The object of this is to help taper the low-frequency response for more effective speech work. Comparatively, the time constant of the input grid circuit seems quite large, but the effective resistance from grid to cathode is much lower than the 2.2-megohm resistor would indicate because of the flow of "initial velocity" electrons in this circuit. This current flow provides the operating bias of about 1 volt. (It should not be confused with the grid current that results from rectification of an applied signal; there is no rectification of the latter type in this case.)

The 12AX7 is mounted on a small bracket fastened to one removable side of the box, as shown in one of the photographs. With the
exception of the microphone connector and gain control, which are on one edge of the box, and the connector, J5, on the opposite edge, all components are on this same plate, mounted between appropriate tube-socket pins and tie-point strips. Enough lead length is allowed from the components on the box itself to permit taking off the plate to get at the wiring. Rubber feet are mounted on the other removable side of the box, which becomes the bottom when the unit is in use.

The preamplifier is connected to the modulator through a 10-foot length of cable (Alpha Wire Co. No. 1222) having one shielded and two unshielded conductors. The shielded wire, connected to Pin 3 of J3 in Fig. 1, is used for the audio output. The shield is the common ground connection through the cable. One of the other two wires is used for plate current and the last for filament current. The shielded wire in this length of cable has a capacitance of about 500 µµµ, and since this capacitance shunts the output circuit, there is considerable reduction of high-frequency response in the cable — about 4 db. per octave above 1000 cycles. This is compensated for in the modulator unit.

**Modulator and Power Supply**

The circuit diagram of the modulator and power supply section is given in Fig. 2. The "high-boost" circuit, consisting of the two resistors and 270-µµµ condenser associated with the grid of the 6146 speech amplifier, compensates for the drop in highs in the cable coming from the preamplifier. Since low-frequency attenuation is desirable, an inexpensive interstage audio transformer is used for coupling the speech amplifier and modulator. The modulation transformer is a mult匝match type delivering output to the load through a splitter filter, about which more later. The three 1-megohm resistors form a voltage divider for delivering about ½ of the total audio output voltage direct to the horizontal plates of a monitoring 'scope for forming a trapezoidal pattern without amplifiers in the 'scope. The resistor values can be varied, if necessary, to

![Circuit Diagram](image)

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*R C1, C2 — 1600-volt paper. See Fig. 3 for values.*

*R1 — (Bias control) 50,000-ohm potentiometer, preferably wire-wound.*

*R2 — 10,000 ohms, 50 watts, adjustable.*

*L1 — See Fig. 3 and Table I for values.*

*CR — Selenium rectifier, 20 ma. or larger, for 115-volt operation.*

*J3 — Four-prong connector, chassis mounting, female.*

*J4 — Phone connector.*

*J5 — 115-volt connector, chassis mounting, male.*

*S1, S2 — S.p.a.t toggle switch.*

*T1 — Interstage audio, ratio 3:1, push-pull secondary (Thordarson T20A19).*

*T2 — Mult匝match modulation transformer (UTC CVM-2 or CVM-3, depending on audio output power level).*

*T3 — Filament transformer, 6.3 volts at 8 amp.; 5 volts at 3 amp. (Triad F-30A).*

*T4 — Filament transformer, 6.3 volts at ½ amp. (Triad F-14X).*

*T5 — Plate transformer. For 500 volts d.c.: 1235 v. c.t., 310 ma. (Triad P-2A); for 600 volts d.c.: 1455 v. c.t., 310 ma. (Triad P-11A); for 750 volts d.c.: 1780 volts c.t., 310 ma. (Triad type P-13A).*

*Fig. 2 — Modulator and power supply. Capacitances in µµµ, unless otherwise specified. Fixed resistors are ½ watt except as noted.*

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*December 1954*
secure the proper pattern width, although the total resistance should be maintained in the neighborhood of 3 megs for a 0.005-mfd coupling condenser. This condenser should have a voltage rating equal to at least twice the d.c. plate voltage on the modulated amplifier; 6000-volt paper condensers in this capacitance are readily available and inexpensive.

Plate power for all tubes is supplied from one transformer. A single-section choke-input filter is used for the high voltage applied to the plates of the 6146s. This is dropped through a resistor and a pair of VR-105s (UC3) in series to provide a regulated voltage of 210 for the 6146 screens. This voltage also is applied to the plate of the 6C4 speech amplifier and, with further filtering by the 4700-ohm resistor and 8-mfd condenser, to the preamplifier tube plates through Pin 2 of J3. The dropping resistor, R60, should be adjusted to approximately 5000 ohms with a 500-volt supply, 7000 ohms for 600 volts, and 10,000 ohms for 750 volts. This adjustment can be checked when the modulator is in operation by observing whether the VR tubes go out on voice peaks. Enough current should be bled through the regulators so that they stay ignited at all voice levels.

A pair of terminals is provided for connecting a milliammeter in series with the plate lead to the 6146s. The meter itself can be placed in any convenient spot. If it is not used, a jumper must be connected across the terminals. This circuit is fused to protect the meter.

The bias supply uses a small filament transformer, T4, operating from the regular filament transformer, T5, to provide 115 volts for the bias rectifier and filter. Bias is adjusted to the proper value by means of R1. This supply does not have to be “stiff” since no rectified grid current flows through it in normal Class A2 operation, but the resistance should be moderately low. If too much resistance is used in R1, occasional peaks that do go into the grid-current region will cause a temporary change in bias through charging the bias filter condenser, which then cannot discharge rapidly enough through R3. The values indicated have worked out well in practice.

Separate a.c. input connectors are used for the filament and plate supplies; when S1 and S2 are closed these can be controlled by remote switches. The bias supply goes on with the filaments, and since there is no time lag on the selenium rectifier the 6146s are always protected.

Clipping and Filtering

A high-level splatter filter can be built from parts that can be obtained quite inexpensively from practically any supply house that handles service components. The cost of the one incorporated in this modulator is only a little over three dollars.

The application of the filter is based on principles outlined in QST some time ago.1 In brief, its purpose is to suppress audio components beyond about 3 kc in the modulator output, particularly those generated by clipping that may take place, either intentionally or unintentionally, in the modulator. The legitimate high-frequency components of the average voice are seldom of any real consequence in causing unnecessary interference; the bothersome “splatter” is practically always the result of clipping, either in the modulator because of insufficient power output capability or overdriving, or in the Class C stage modulated stage itself. In the latter stage, the usual cause is overmodulation on down peaks, but improper operating conditions resulting in poor linearity also will result in splatter. No splatter filter can overcome imperfections in the Class C stage, nor can it compensate for the clipping that takes place when the plate voltage “hits bottom” on the down peaks of modulation.

In other words, the first step in splatter elimination is to adjust the modulated Class C amplifier for good linearity — that is, make sure that it is really capable of 100 per cent modulation. Next, steps must be taken to ensure that the

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1 Bruno, “High Level Clipping and Filtering,” QST, November, 1951.
applied modulation cannot exceed 100 per cent in the downward direction; this is the function of clipping. With a Class AB modulator, the clipping can take place either in the plate circuit, by adjustment of the load resistance as described by Breune; or in the grid circuit by driving the modulator grids positive during the peak of the audio cycle. When the modulator grids are driven positive by a Class A voltage amplifier such as the 6C4 in this unit, the clipping is quite effective because of the poor voltage regulation of the driver when it is called upon to deliver power. Preferably, the modulator load resistance should be adjusted so that clipping in the plate circuit occurs simultaneously with clipping in the grid circuit, since if clipping occurs in one circuit before the other the power output is reduced below the maximum obtainable. However, the loss in output is negligible if the load resistance does not depart more than 10 per cent from the optimum value, so exact adjustment is not really necessary. In practice, grid-circuit clipping is likely to predominate, and the output amplitude will almost automatically be at the right level if the Class C plate input is adjusted to be at least twice the audio output of the modulator (assuming the modulator load resistance is near the optimum value). The system should be adjusted so that clipping occurs at a modulation level of 90 to 95 per cent; this ensures that the clipping will be done only in the modulator and not in the modulated amplifier where the splatter filter can do nothing about it.

This modulator was not designed particularly for intentional clipping, although there is nothing to prevent its being used that way to the degree permitted by the signal-handling capability of the circuits up to the grid of the 6C4. However, clipping is bound to occur in any modulation system unless special means such as automatic gain control are included for preventing it. Lacking such means, steps should be taken to prevent clipping from causing splatter. A splatter filter, plus the adjustment precautions outlined above, will do a good job of keeping the transmitted signal clean.

**Filter Design**

The filter used in this modulator is a simple one of the constant-  \( k \) type. The inductance and capacitance required will depend on the Class C load resistance and therefore cannot be given in a single specification. The chart of Fig. 3 gives the design values for various loads from 1000 to 10,000 ohms, for three cut-off frequencies, 2500, 3000, and 3500 cycles. While a cut-off frequency of 3000 cycles is probably optimum, the additional curves are given for the purpose of estimating the effect of having to use available values of components, particularly fixed condensers. For example, if the Class C load resistance (plate voltage divided by plate current in amperes) is 4000 ohms, the chart shows that approximately 0.012 \( \mu \)f. should be used at \( C_1 \) and \( C_2 \). The nearest standard value in a single unit is 0.01 \( \mu \)f., and the chart shows that this is the proper value for a cut-off frequency of 3500 cycles. The inductance could be chosen accordingly (0.5 henry, from the chart) or, as an alternative, 0.01 and 0.002 units could be connected in parallel. Neither approach is quite as clean-cut as it

(Continued on page 118)

### TABLE I

<table>
<thead>
<tr>
<th>Air gap, inches</th>
<th>Inductance, henrys</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.003</td>
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<td>0.26</td>
</tr>
<tr>
<td>0.15</td>
<td>0.21</td>
</tr>
</tbody>
</table>

Dec 54
Dual Regulated General-Purpose Power Supply

A Useful Adjunct to Any Station

BY VINCENT W. HANSEN,* W6RVD

- If you do any building or testing around the shack or workshop, there have undoubtedly been dozens of times when you could have used a versatile power supply. If you build a unit like the one described here by W6RVD, your troubles will be over. No more scouring around for power supplies and dropping resistors—just twist a knob and set the supply at the output voltage you want.

Many years of constructing experimental circuits and then finding it necessary to steal power for them from other equipment led to the conclusion that a good general-purpose power supply would be a valuable asset on our shelf of test equipment. Preliminary thinking on the subject indicated several basic requirements which such a supply should be capable of fulfilling. Perhaps the most important of these is that it should be extremely versatile. It might be desirable on one occasion to have a d.c. filament supply for a high-gain low-level preamplifier, and on another a husky bias supply might be required for a high-power r.f. amplifier. Generally, however, the supply would be used for the voltages and currents normally encountered with receiving tubes. In addition, it should be capable of supplying more than one output voltage at any time. In line with the modern trend, it should be as compact as practicable. With these requirements in mind, the dual regulated power supply to be described in this article was designed and constructed.

The Basic Principle

In order to understand the capabilities and limitations of the unit, a brief review of the operating characteristics of electronic voltage regulators is in order. A simple regulator of this type is shown in Fig. 1. The supply voltage, which comes from an ordinary power supply, is delivered to its load through a series tube, $V_1$, which is made to act like a variable resistor whose resistance is controlled by the voltage appearing at its output. $V_2$ and its associated circuitry constitute a high-gain d.c. amplifier to accomplish this. Resistors $R_1$ and $R_2$ are simply a screen voltage divider used to supply proper operating potentials to the screen. $R_3$ is the plate load for $V_2$, and the potentiometer, $R_4$, sets the operating point. The battery in the cathode circuit provides a constant reference for comparison with that portion of the regulated output voltage appearing between the tap of $R_4$ and ground.

The plate of the amplifier tube is tied directly to the grid of the series tube, and the amplifier’s plate voltage appears as bias on $V_1$. Since $R_4$ sets the operating point of $V_2$ and the plate voltage of $V_2$ appears as bias on $V_1$, $R_4$ will control the effective resistance of $V_1$ and thus the output voltage of the regulated supply. If, for any reason, the output voltage attempts to increase from this value there will be a proportionate increase in the voltage at the grid of $V_2$. Because the cathode voltage of this tube remains constant, this in-

![Fig. 1 -- The basic circuit of a voltage-regulated power supply.](image)

A regulated power supply is a handy thing to have around the shack or workshop. This unit is complete with meters, and can supply two different regulated voltages at any time.
Fig. 2 — Wiring diagram of the dual regulated power supply.

R₁ — 200-ma. shunt for MA.
R₂ — 100-ma. shunt for MA.
R₃ — 10-ma. shunt for MA.

An increase in grid voltage will cause V₂ to conduct more heavily, resulting in a greater voltage drop across R₃ and an increase in the effective resistance of V₁, which will tend to return the output voltage to its original value. If the output voltage should drop, the opposite action takes place and again the voltage will be returned to its original value.

It is interesting to note that the regulator will compensate for practically any change in output voltage. Thus the circuit will tend to cancel out ripple as well as changes due to variation in load or supply voltage.

The Circuit

The supply shown in Fig. 2 was evolved from this basic regulator circuit. A standard condenser-input power supply delivers voltage to the two outputs through the 6L6 series tubes. To make the supply regulate down to zero output voltage, it is necessary to supply negative bias potentials on the 6L6 series tubes. To satisfy this requirement a negative source consisting of a 6X4 rectifier and an RC filter was incorporated. With the cathodes of the 6AU6 control tubes 300 volts negative the plate voltage swing can reach a point far enough negative to cut off completely the series tubes, resulting in zero output voltage from the regulator. VR tubes replace the battery in Fig. 1 as a means of supplying the constant reference voltages required. The small ceramic capacitors across these tubes prevent a tendency toward oscillation in this circuit. The regulated output voltages can be set from zero to 450 volts by adjustment of the 0.5-megohm controls. The 0.05-pf. condensers from the cathode of the series tubes to the grids of the control tubes provide a low impedance to any ripple voltage that may be present, resulting in even greater ripple reduction. Switch S₁ permits two modes of operation. In the position shown, two independent outputs are available. In the other position, the two series tubes are in parallel and both are controlled by the 6AU6 at the left. This makes one output of doubled current capacity available.

The —C output can be set between the limits of zero and —300 volts. This output is intended only for Class A bias applications, and has a capacity of about 5 ma. with poor voltage regula-
tion. At some settings of this control the current drawn by the meter circuit will cause a noticeable change in output voltage, so a 0.51-megohm resistor was added on the meter switch to replace the meter when it is switched to a different output.

A direct connection to the filter bypasses the regulators to the “Unreg” binding post. This can be used where high voltage is desirable or in conjunction with a series resistor to supply part of the current to a load that exceeds the capabilities of the regulator section. A 6.3-volt 8-amp. filament circuit and a floating ground binding post complete the outputs. Two chassis ground binding posts are also mounted on the panel. For the supply itself, two separate filament circuits are required to keep the filament-cathode potentials from exceeding the rated values by too great a margin. One of these circuits supplies the series tubes and the other the control tubes and negative rectifier. There should be no grounds on either of these circuits. A relay is used to switch the high voltage and to light a second pilot light when the power switch is closed.

Complete metering is provided by means of a 0 to 500 volt meter and a 0 to 1 milliammeter with appropriate shunts. The meter shunts are connected permanently in their respective leads and the meter is switched across them. All outputs are brought out to binding posts on the front panel and also to an octal socket (not shown in Fig. 2) on the rear drop of the chassis. Use of the floating-negative arrangement makes it possible to ground either the plus or minus terminal of the supply, permitting its use as a high-current negative source as well as in the usual manner.

Construction

The supply is built on a 7 X 9 X 2-inch chassis mounted in a standard 7 X 8 X 10-inch utility box. While this is extremely compact for the amount of circuitry involved, sufficient clearances have been maintained to permit reasonable ease of construction and maintenance. The chassis is fastened to the panel by four 1-inch brass spacers. This brings the back of the chassis flush with the rear of the cabinet and allows clearance for the panel-mounted components in front of the chassis. Because the unit will be too heavy to be supported entirely by the panel, two 7/16-inch spacers are fastened to the bottom lip near the rear of the chassis, as can be seen in one of the photographs. The bottom of the cabinet has a row of seven 3/8-inch holes on a centerline one half inch back from the front edge. These permit circulation of air to dissipate the heat generated. A 3 X 8-inch cutout on the rear wall is also provided for ventilation. The back wall has another cutout to provide access to the plugs and fuse on the chassis rear drop. Adding a pair of chrome-plated kitchen-cabinet handles completes the cabinet work.

Wiring

With the exception of the grid circuits of the 6AU6 control tubes, wiring is not critical and no special precautions are necessary. However, these two tubes are very high gain amplifiers and any hum pick-up by their grids will appear, greatly amplified, at the supply outputs. For this reason caution should be exercised in placement of these leads, or shielded wires should be used. Cabling is employed throughout to make a neater looking package and to keep the large number of wires from getting out of hand. The meter shunts are wound with resistance wire on forms removed from small r.f. chokes. High-value one-watt resistors could also have been used. They should be wound originally with an excess of wire so that they can be trimmed to their correct values after the rest of the supply is complete. These shunts and the 0.51-megohm resistor should be mounted directly across the meter switch, Si. A small resistor board mounted on the front drop of the chassis holds the 0.27- and 0.11-megohm resistors. The rest of the resistors and tubular condensers are mounted where convenient on the tube sockets, with the aid of a few small stand-off insulators. The relay and the filament transformer are mounted along the left side of the chassis.

The panel should be removed from the chassis and its wiring done first. When the wiring is complete, the chassis leads should be fed through the hole provided on the front drop and the panel secured to the chassis. The chassis cable lays along the front and left side with break-offs as required to pick up all components. A little study of the bottom-view photograph will suggest the best wiring procedure.

When the wiring has been completed and checked, the a.c. should be turned on and the
Components for the dual regulated power supply fit nicely on a 7 x 9 x 2-inch chassis.

1500-ohm resistor adjusted for about 20 ma. through the VR tubes. After this adjustment has been made, the high voltage can be turned on and the operation of the supply checked. If it appears normal, the shunts can be trimmed to their correct values. This can be conveniently done by using the supply as follows: With the meter switch, S1, in the "A" position and S2 in the parallel position, connect a 750-ohm resistor in series with a multimeter across the "A" output terminals. Then adjust the "A" voltage control to give a reading of 200 ma. on the multimeter. If a little extra resistance wire is wound on the form, the meter on the supply will read high, and the extra wire can be removed a bit at a time until the readings of the two meters coincide. The same procedure can be used with suitable resistors to adjust the "B" and "C" shunts to 100 and 10 ma. full scale, respectively. When this is done, the supply should be complete and ready for operation.

A voltage-current graph for the main supply section is shown in Fig. 3A, and an over-all performance curve of the regulated outputs in Fig. 3B. The latter is derived from Fig. 3A and the 6L6 plate curves with the maximum current set at 100 ma. per tube and the maximum plate dissipation set at 25 watts. This may seem a bit high for the 6L6s, but it appears to be quite common practice when they are used for this purpose.

Referring to Fig. 3B, the drop-off at the low-voltage end is the result of the current being limited by the maximum plate dissipation of the tubes. The drop-off at the high-voltage end is dependent upon the supply voltage and the minimum voltage required across the series tubes to force the desired current through them. For the parallel mode of operation, use the 200-ma. scale on Fig. 3B.

The area of regulation will be under the solid line, and the regulator will maintain control for any combination of voltage and current that lies in this area. For either the A or B output independently, use the 100-ma. scale and the area of regulation will lie under the dashed curve. When both outputs are supplying power, the upper limit of regulation is determined primarily by the gain of the d.c. amplifier. For this unit it is about 2 volts between the limits of 0 and 200 ma. when using the parallel mode of operation.

Fig. 3 — Regulation of the unregulated power supply (A), and the area of regulation of the regulated supply (B).
A Thyratron-Controlled Electronic Key

Simple Systems for Use with a Standard Bug

BY JACK D. GALLAGHER,* WSHZB

In building the keyer shown in the photographs, the writer has incorporated some desirable features not usually found in electronic keying units. Although the photographs show a special key mechanism which was constructed beneath the bug base in an effort to reduce the space consumed by the switching lever and associated contacts, an ordinary bug (with the connection between dot and dash contacts broken) can be used. The key lever and contacts pictured were added as the result of conversations with other amateurs who had made their own switching assemblies. Either polar or nonpolar relays, adjustable or nonadjustable, may be used with equally good results. This feature is not usually found in the ordinary type of keyer.

Circuit Operation

The operation of the keyer to be described can be followed easily by referring to the circuit diagram of Fig. 1. The pulse circuit consists of a 2D21 thyratron gas tube connected to a voltage-regulated timing circuit consist-

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ing of \( C_1 \), \( R_3 \), \( R_4 \), and \( R_5 \), and the grid of a 6AQ5. When the key is in the neutral position, the timing circuit is kept charged by the supply voltage to a value equal to the 6AQ5 cathode voltage. In this idle condition, the weight control, \( R_5 \), is adjusted for zero voltage across the relay winding. Operating the bug lever to the normal dial position causes the following:

1) The supply voltage on the timing circuit fires the 2D21 and reduces the voltage to \( C_1 \) and the grid of the 6AQ5.

2) As the timing condenser is discharged, the voltage across the 2D21 decreases to the extinguishing point.

3) As the grid voltage of the 6AQ5 is momentarily reduced, the plate current is also reduced, causing the plate voltage to rise.

4) This change in voltage across the relay winding causes it to operate. As soon as the voltage across the 2D21 reaches the extinguishing point, the circuit tends to revert to its normal idle condition.

As long as the dash or dot contacts are closed, the 2D21 will continue to fire and repeat the operation. The same action takes place when dots are being made, except that the voltage discharged from the timing condenser is a different value because of the voltage drop across the ratio resistor, \( R_7 \). Since the timing condenser is not discharged as completely as it was in the case for producing dashes, the condenser recharges in a shorter interval of time.

The OB2 regulator serves two purposes. First, it provides the timing circuit with a nearly constant voltage during key-down conditions. Secondly, it regulates the voltage changes in the 6AQ5 which results in better relay action.

**Construction**

The photographs show the general construction of the keyer. In the front view, the weight control, \( R_5 \), is mounted in the top center of the 3 \( \times \) 5 \( \times \) 7-inch aluminum chassis which serves as an enclosure. The speed control, \( R_3 \), is mounted on the left side, at the front, and to the right of a tune-up switch. This switch is not shown in the diagram, but it is merely an on-off switch connected across the relay contacts as an aid in tuning the transmitter.

In the photograph showing the interior view of the keyer, the weight control, \( R_5 \), can be seen at the upper left. The tube sockets were mounted along with the relay and \( R_7 \) on a sub-chassis which was made to fit inside the aluminum enclosure. The 2D21 is at the extreme left, with the OB2 regulator and the 6AQ5 to the right. The screwdriver-adjusted potentiometer, \( R_7 \), can be seen to the right of the 6AQ5 and to the left of the 80-uf 150-volt filter condenser. The relay is mounted directly behind the 6AQ5. The power transformer is mounted upside down in the upper right corner of the cabinet.

The bottom view of the keyer shows the simplicity of the key mechanism and the location of the ratio resistor, \( R_7 \). The dash and dot contact springs were taken from an old lever switch and mounted beneath the bug base as shown. A small piece of aluminum angle holds the end of the L-shaped paddle which was cut from a piece of fiberboard. The contacts mounted on the paddle were taken from an old relay. The swing of the paddle is limited by the two stops made from solder lugs mounted on the right end of the base. The contact spacing is about 0.004 inch.

**Adjustment**

A v.t.v.m. and an ohmmeter, or combination test instrument, can be used to advantage in adjusting the circuit for proper operation. First, the speed control, \( R_5 \), the weight control, \( R_8 \), and the cathode resistor, \( R_7 \), should be set about midway in their respective ranges. Connect the v.t.v.m. across the cathode of the 6AQ5 and ground, and adjust this voltage to 30 volts by the aid of \( R_7 \). Remove the v.t.v.m. and connect an ohmmeter across the keying contacts of the relay and ground, and adjust the weight control, \( R_5 \), so that the average fluctuations of the meter when making dashes is about 78 per cent “make,” or 78 per cent toward the zero-resistance end of...
the meter scale. When making dots, the ohmmeter should average between 54 per cent and 60 per cent "make." However, when the keyer is connected to the transmitter, the weight control should be adjusted for the proper signal characteristic.

As a matter of interest, with 39,000 ohms in the grid of the 2D21, the current with the key closed before pulses start is about 31 microamperes. Without this resistor, or if a resistor of lower value is used, the nonpulsing current through the 2D21 will be higher. This will limit the lowest speed obtainable where plate voltages of 140 to 150 volts are used. The approximate resistance of the 2D21 in this circuit before pulses start is about 0.71 megohm.

Even though the circuit shown in Fig. 1 can be used with either polar- or nonpolar-type relays, Fig. 2 shows a circuit in which only the usual open-close, or nonpolar, type of relay can be used. The current drain in this circuit is about 15 ma., or the current through the relay tube and cathode resistor. In the idle condition, the plate current of the second triode section is cut off, because the regulator tube holds the bias voltage on its cathode. The only adjustment required in this circuit is setting $R_p$, so that the relay remains open in the idle condition. This potentiometer is also the weight control and can be adjusted easily to provide the proper relay action during sending. With some relays, a 0.1-$\mu$F condenser will be required across $R_7$.

**Relays**

In searching for a good relay to use with the circuit shown in Fig. 1, the writer has found a good, sealed, nonadjustable relay which is excellent for use in this type of circuit. It is a Western Electric type 276-G, and it is partly visible behind the 6AQ5 in the photograph showing the side view of the keyer. This is a sealed-in-glass mercury-contact relay. It is mounted on a small wafer-type octal base and housed in a metal shell about the size of a metal 6L6. It has a single armature, two separate back contacts and two separate front, or open, contacts. All contact surfaces are covered with a thin film of mercury. The pin connections from the bottom are as follows: Pins 1 and 2 are the normally open contacts; Pin 3 is the armature; Pins 4 and 5 are the back contacts. A 3300-ohm coil is connected between Pins 7 and 8, and a 700-ohm coil is connected between Pins 6 and 8. Thus, a 4000-ohm winding is available by using Pins 6 and 8. Pin 6 is positive with respect to Pin 6, and it is connected correctly in the keyer circuit with Pin 8 to the plate of the 6AQ5. The normal operating current is from 5 to 6 ma. The relay can be purchased from the Graybar Electric Company.

Of course, other relays can be used in lieu of the expensive model described above, but they should be sensitive plate relays with a coil resistance of from 2000 to 12,000 ohms. All of the major relay manufacturers make relays which are suitable for either of the two circuits and, from the information given, it is an easy matter to select a relay which will be satisfactory.

Both of the circuits shown were designed for ease of adjustment and economy. Either should prove to be a valuable piece of equipment for the amateur.

The writer wishes to thank W5PRE for his cooperation in the design of the two circuits presented as well as in the construction of the electronic key shown.

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Although a standard bug can be used, this view shows a homemade paddle assembled underneath an old bug mounting base. $R_8$ is across the stationary contacts.
The simple transmitter for 220 and 420 Mc. is made in two parts. The modulator, left, may be retained for use with more advanced r.f. sections than the simple oscillator shown at the right. The two units may be plugged together or connected by a cable.

Technician Rig for 220 and 420 Mc.

A Two-Band Oscillator and Handy Matching Modulator

BY MASON P. SOUTHWORTH,* W1VLH

• "Those crystal-controlled dream rigs with the 25-dollar tubes are beautiful, but they scare me. How about something I can build for a few bucks to get some experience on 220 and 420 Mc.?" Here's an answer to this question, so often posed by v.h.f.-minded newcomers: a rig for both bands that is both simple and economical to build. The modulator portion can be used with any rig of similar power that you may build later on, after you've learned some of the ropes with the simple oscillator.

This rig was designed to make getting started on the two highest amateur bands now in regular use as simple as possible. It is thus made to order for the Technician licensee who wants to make use of his ticket. Even if you have more advanced equipment for 220 and 420 Mc., or expect to build it eventually, a rig like this is mighty handy to have around the shack. It will be useful in many ways, for antenna and receiver testing, and for local communication when you don't want to fire up those twenty-five-dollar bottles.

Although the serious work on 220 and 420 Mc. is being done with stabilized transmitters, there is still plenty of room for the modulated oscillator, so long as it is designed and operated with some care. In many sections of the country, development of activity is more important than getting stations on with the ultimate in quality gear. Crystal-controlled equipment described in recent years for these frequencies is fine for the fellow with some construction know-how, but its complexity tends to scare off those who are short on cash or experience.

This transmitter will never set any DX records, but it can be used for interesting short-range work. Its signal may not justify glowing reports of "broadcast quality," but if you keep the modulation level low it can be copied, even on the more selective receivers. Stability is better than with v.h.f. oscillators of bygone years, thanks to today's improved tubes and components. What's more important, building the rig is simple enough so that even the beginner should have no qualms about trying it.

The modulator portion of the rig can be considered as a long-term investment. Built as a completely separate unit from the oscillator, it can be plugged into any r.f. section of similar or somewhat higher power that you may want to build in the future. Only two tubes are used, but it has ample gain for a crystal microphone. It thus delivers good quality speech, with an output of 3 to 10 watts of audio, depending on the choice of modulator tube and the plate voltage available. It can be used to modulate equipment like the 2E26 rigs described recently, for example, in either home-station or mobile service. With minor changes it could serve for control-grid or screen modulation of higher-powered stages.

To minimize the cost of getting started, a single oscillator is used for both bands. To change bands it is merely necessary to replace one jumpered plug with another, making the tank circuit either a quarter-wave line for 220 Mc. or a half-wave line for 420 Mc. The unit may be set up so that no retuning or frequency measuring is necessary in the band-changing process. Two 6AF4s or 6AT4s are used in push-pull. These tubes are cheap and readily available, and they are relatively efficient, having been designed for u.h.f. TV converter service. An input of up to 8 watts can be run on either band. A single 200-volt

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* Laboratory Assistant, QST.

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plate supply is required, and it can be built from inexpensive power supply replacement parts. Total drain of the transmitter, with modulator, is about 75 ma., at 200 volts, so it can be run easily from a small vibrator-type power supply for portable use if desired.

**How the Tank Circuits Work**

A while back we mentioned "quarter-wave" and "half-wave" lines. These terms may be so much double talk to anyone not familiar with v.h.f. circuitry, so let's see what they represent. We know, of course, that any transmitter output circuit consists of inductance and capacitance in the proper amounts so that it will "tune" to the frequency we're interested in. Schematically, it looks something like Fig. 1A. This is the sort of thing we find in circuits for our lower amateur bands. The basic elements are there for all to see: a pair of tubes, a plate tank coil, $L_1$, and tuning condenser, $C_1$, and an output coupling coil, $L_2$. The tube capacitance and stray circuit inductance and capacitance are not important factors at frequencies up to 14 Mc. or so.

But as we go higher in frequency the coils and condensers get smaller and smaller, until the tube and circuit capacitances become an appreciable part of the total circuit. The limit of the coil-and-condenser approach is seen at B. Here $L_1$ has been reduced to a short loop between the terminals of $C_1$. The output coupling is also a loop. We can make $C_1$ the smallest practical device for varying capacitance, and make $L_1$ a direct short across its terminals, but we still may not be able to get up to 420 Mc. because of the effect of the tubes’ output capacitance, shown as $C_2$ in dotted lines. Tube designers can keep this small, but it's still a capacitive load across our tuned circuit.

We can connect $C_1$ part way down our tuned circuit to lessen its effect, and this is done in our tank circuit for 220 Mc. We can also eliminate $C_1$ entirely, as in the quarter-wave line, Fig. 1C. Here we adjust the tuned circuit by means of a shorting strap, leaving only the tubes’ capacitance loading the line. This will get us a little higher in frequency, but it has the disadvantage of being rather difficult to handle, mechanically and electrically.

The upper limit of frequency is reached when $L_1$ is a direct short between the tube plates. The circuit may still work after a fashion, but it will be inefficient and difficult to couple to after $L_2$ ceases to have a loop form. We have one more trick, however, before we give up trying to go higher in frequency: the half-wave line, shown in Fig. 1D.

Here plate voltage is fed to the line at the point where the short was connected in C, but we use r.f. chokes so they do not load the line down ap-
probably. We continue the line out to the next r.f. voltage peak, and put our tuning capacitor there. Only the tubes' output capacitance loads the portion of the line between the tube plates and the r.f. chokes. The chokes are connected at the point of minimum r.f. voltage, so the line is effectively a quarter-wave long from tube plates to r.f. chokes, and another quarter-wave from r.f. chokes to tuning capacitance. We couple to the line with $L_0$, at the r.f. chokes, with the loop as shown, or on the other side of the chokes, with the open end of $L_2$ toward the tube plates.

This half-wave line also gives us a tank circuit that can be tuned conveniently and safely, yet its top frequency is considerably higher than is possible with preceding circuits. It works up to the point where the r.f. voltage null is right at the tube plate terminals, or even when it is part way down inside the tubes themselves. With the half-wave line, operation on 420 Mc. is possible with many tubes that will not go that high in frequency with the other circuits shown in Fig. 1. Keeping this explanation of the tank circuit techniques in mind will make the schematic diagram, Fig. 2, easier to interpret.

Other Circuit Features

The interesting part of our push-pull oscillator is the method by which the tank circuit is shifted from one type of line to the other. The line itself is made of two pieces of No. 12 wire, running from the tube plate pins to Pins 1 and 5 of a standard 5-prong ceramic tube socket, $J_2$. The line terminations, $P_1$ and $P_2$, are 5-pin cable connectors, with their pins connected as shown at the right of the schematic diagram. For 220 Mc., Pins 1 and 5 are joined, to short the end of the plate line. The plate voltage is fed to this short through an isolating resistor. This plug is seen at the left of the bottom-view photograph. At the right of the same view is the 420-Mc. termination. In this one, Pins 2 and 4 are joined and plate voltage goes to this junction from Pin 3. Looking at the schematic diagram, we see that this leaves the end of the line open, applying the plate voltage through the two r.f. chokes, as in Fig. 1D. A common coupling loop, $L_2$, serves for both bands.

The circuit is made to oscillate by keeping the heaters and cathodes of the tubes isolated from ground for r.f. by means of small hand-made r.f. chokes. Six of these are required. They are made by winding 12 turns of No. 28 enameled wire on 1-watt resistors of 10,000 ohms or more. The bottom view shows how they are placed.

The modulator uses a 12AX7 dual triode as a two-stage speech amplifier. The cathode of the second stage is left unby-passed, to introduce some negative feed-back. The extra gain obtainable by by-passing the cathode resistor is not needed. This stage is resistance-coupled to the 6V6GT modulator. The modulator is operated Class A, and is capable of up to 3.5 watts output.

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C1 = 10.5-pf, per-section butterfly variable (Johnson 10LB15).
L1 = 2 3½ inch pieces No. 32 tinned, spaced 1½ inch. Bend down 3½ inch at tube end and 3½ inch at socket end. R.f. chokes connect 3½ inch from bend at tube end. Connect C1 at 1 inch from bend at socket end.
L2 = Hairpin loop 2½ inches long and 1½ inch wide, No. 16, covered with insulating sleeving.
J1 = Crystal socket used for antenna terminal.
J2 = 5-contact ceramic socket (Amphenol 49-RSS5).
J3, J5 = 4-contact male chassis fitting (Amphenol 86-RFC4).
J4 = 4-contact female chassis fitting (Amphenol 78-S4 or RS4).
P1 = Microphone connector (Amphenol 75-PC1BM).
P2 = Same as P1, but with Pins 1 and 5 joined. Connect 100-ohm resistor between these and Pin 3.
RFC (6 required) = 12 turns No. 28 enamel close-wound on high-value 1-watt resistor.

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Fig. 2 — Schematic diagram and parts information for the two-band oscillator and modulator.
with the 6V6GT. A 6L6 may be substituted to raise the output to about 10 watts, if the modulator is to be used with a higher-powered r.f. section.

**Construction**

Both the oscillator and the modulator are built on and inside a 6 x 7 x 2-inch aluminum chassis (Bud, AC-102). The input power fitting of the modulator is mounted on the rear edge of the chassis and the output fitting is on the right side. This is placed so as to plug directly into the input fitting on the oscillator and thus eliminate a connecting cable. The same pin connections are used for each fitting, allowing a power supply cable to be plugged into either unit. The blank pin (No. 2) may be used to supply unmodulated high voltage in case the modulator is used with a multistage rig.

The oscillator tuning condenser is centered on the chassis, and the tube sockets are mounted 1 ¾ inches away and 1 inch apart. The band-changing socket and the crystal socket which serves as an antenna fitting are 1 ½ and 3 inches from the condenser, respectively.

The plate lines are made from 3/4-inch pieces of No. 12 tinned wire. They are bent down 3/4 inch at the tube end and ½ inch at the socket end. The r.f. chokes are connected to the line about ½ inch from the bend at the tube end, and the tuning condenser is connected at a point 1 inch from the bend at the socket end.

The antenna coupling loop is 2 ½ inches long and ½ inch wide. It is made of No. 16 tinned wire covered with insulating sleeving, and fastened to soldering lugs which are mounted on ¾-inch high ceramic pillars. A short piece of 300-ohm line, or a pair of stiff wires of similar spacing, is used to connect the loop to the antenna terminal. The heater and cathode r.f. chokes should be mounted as close as possible to the socket terminals. The jumper plugs are made from Amphenol power connectors. They are shown in [1].

[1] Construction and operation of Lecher wires are also detailed in QST for November, 1953, page 38.

Looking at the under side of the modulator.

The bottom view of the oscillator, with the 220-Mc. plug on the left.

The modulator layout is not particularly critical, and exact duplication is not necessary. The gain control and microphone connector are mounted on the front, and the 12AX7, 6V6, and modulation transformer are laid out down the center of the top. Shielded wire should be used for the filament and 12AX7 grid leads to prevent hum pick-up. Two tie points are used to support the decoupling resistors for the speech amplifier stages. Any small modulation transformer having primary and secondary windings of about 5000 ohms will be satisfactory. If you get a multi-match unit like the one shown, the extra leads may be cut off short or curled up for future use.

**Adjustment and Operation**

The oscillator should be checked out first. Apply 6.3 volts and see that the 6AF4s light. Now connect a No. 47 (brown bead) pilot lamp across the antenna terminals, and insert the 220-Mc. plug. Apply 100 to 200 volts to the oscillator through a 50- or 100-ma. meter if one is available. The lamp should light if the unit is oscillating. Another check is to touch a pencil lead to the tube end of the plate line. (Use a wooden pencil!) If there is oscillation, the plate current will fluctuate as this is done. The frequency may be measured with an accurately calibrated grid-dip meter or wave-meter, or with a Lecher-wire system as described in the Measurements chapter of the Handbook. The center of the band should fall near the middle of the tuning range. If it does not, bend the lines closer together to raise the frequency or farther apart to lower it.

Now operation on 420 Mc. should be checked. Insert the proper plug and again check for oscillation. The point of connection for the r.f. chokes should also be checked. Move a pencil lead along the line until the least effect on output and plate current is observed. This is the low r.f. voltage point, and the correct place for the chokes. Lecher wires will probably be necessary for frequency measurement on this band, since suitable wave-meters are not common. The frequency should be near the middle of the band with the same condenser setting as for 220. If not, the “tracking” may be adjusted by changing the point at which the condenser is tapped on the line. This should be set so that it is only necessary to switch plugs to change bands.

Now connect the power cable to the modulator unit, and plug the two chassis together. Connect

(Continued on page 188)
Using the B.F.O. as an Interpolation Oscillator

An Inexpensive Method of Checking Between 10-Kc. Points

BY R. R. CAMPBELL,* W4DFR

While the idea of using the receiver b.f.o., or a similar substitute, for measuring frequencies in between 10-kc. multivibrator points is not new, it is a system that is too frequently neglected. It provides a means, at little expense, for the ham who does not need or have interest in measurement down to the last cycle.

In making accurate measurement of frequencies in the amateur bands, serious difficulty is seldom encountered in getting down to 10-kc. intervals, employing the usual 100-kc. crystal oscillator, and a 10-kc. multivibrator. It is only when an attempt is made to interpolate between 10-kc. points that high accuracy becomes hard and expensive to attain. A good audio-frequency oscillator covering a range of 5 or 10 kc. is both costly and difficult to build and calibrate. So, the average ham builds a VFO in the h.f. range, calibrating it at 10-kc. points with the multivibrator and interpolating between points. But it is seldom that high accuracy can be assured with this system because of the difficulty encountered in reading the dial accurately.

A much better interpolation oscillator, often overlooked, is the b.f.o. in the communications receiver. Most of the better present-day manufactured receivers can be depended upon to maintain good stability for a period of at least a minute or two, even without voltage regulation. To use the b.f.o. for interpolation purposes, the b.f.o. is set in the middle of its tuning range. The receiver is then tuned to the signal whose frequency is to be measured. At this point, there should be three signals well within the audible range — the signal of unknown frequency, and a 10-kc. multivibrator signal on either side of it. Without touching the b.f.o. tuning, the receiver should be tuned to zero-beat the unknown frequency. Then, without touching the receiver tuning, the b.f.o. should be adjusted to bring the nearest multivibrator signal to zero beat. The change in b.f.o. frequency necessary to bring the multivibrator signal to zero is the difference between the standard and unknown frequencies.

As an example, suppose the unknown frequency is found between the 3550- and 3560-kc. multivibrator points. The unknown frequency can be compared with either of these two points, but usually the one having the lower beat note will be chosen because it will be stronger on a selective receiver and more easily identified. After tuning the unknown to zero beat with the receiver tuning control, the b.f.o. is adjusted to bring the nearest multivibrator signal to zero. If we find that it has been necessary to change the b.f.o. frequency by 3.27 kc., this will be the difference between the unknown frequency and the frequency of the nearest multivibrator signal. If the signal is found closer to 3550 kc., the unknown will be $3550 + 3.27 = 3553.27$ kc. If it is closer to 3560 kc., the unknown will be $3560 - 3.27 = 3556.73$ kc. It will usually be less confusing if, as soon as the unknown has been zeroed, it is cut off (by disconnecting the antenna, or turning off the unknown if it is locally-generated), and then zeroing the nearest m.v. signal.

To make such a reading, it is only necessary that the b.f.o. be tuned over a range slightly exceeding 10 kc., centered on the receiver’s i.f. frequency, and be fitted with a good vernier dial accurately calibrated. The signal will always be within plus or minus 5 kc. of the nearest 10-kc. point.

Lacking other means, the b.f.o. can be calibrated from WWV’s tone-modulated signal (see schedule in November, 1954, QST). First, with the b.f.o. dial set at the center-zero point, tune in WWV to zero beat with the 440-cycle sideband. (It is easier to do this if a crystal filter in the sharp position is used.) After marking this calibration on the b.f.o. dial, it should be possible to find a second weaker zero beat at 880 cycles, and perhaps a third, at 1320 cycles. When these points have been calibrated, the b.f.o. should be tuned to the other side of the carrier, and similar calibrations made against the opposite set of sidebands. Other points out to 1800 cycles either side

* Grand Theatre Bldg., Lenoir City, Tenn. (Continued on page 124)
Double Conversion Attachment for 2-Meter Receivers

Outboard Modification for Improved Selectivity and Signal-to-Noise Ratio

BY M. K. BRETZFELDER,™ W2IPX

Many of the two-meter receivers available in the open market are being used under conditions for which they were never designed, to the detriment of good communications. A mobile v.h.f. receiver can well stand being unselective, in the interest of both easy tuning and the holding of a station under road shock conditions. The receivers in mind are those using single conversion and with a reasonably high intermediate frequency with the Sonar SR-9 and the Eldico MR2, both of which were designed for mobile use. He has examined the Robert Dollar 226 and suspects that it will perform similarly to the aforementioned sets. Using a Sonar SR-9 at Larchmont, overlooking the busy Boston Post Road, communication with County Control at White Plains, only 5 miles distant, was impossible except with a beam antenna and even then signals were washed out when the traffic lights changed. White Plains, using an Eldico MR2, could not operate generally around the county unless a near-by flashing neon sign was shut down. At both locations, a sharp receiver insured one hundred per cent communication.

Of course, the answer to adequate sharpness is a low intermediate frequency. This leads to image trouble so double conversion is required. A minimal change within the receiver to be improved is desirable. Putting most of the added parts and circuitry in an outboard box will simplify the job. An example of how this can be done is the following conversion of a Sonar SR-9.

Changes in the Receiver

The original circuit of the i.f. stages of the several converted Sonar receivers is shown in Fig. 1. Incidentally, this circuit is at some variance with the one shown in the Sonar Technical Manual. It was decided to keep one stage of i.f. at the original 10.7 Mc, and transform one stage to 455 kc. The converter circuits were built into a Bud CU 3002 Minibox, 4 by 2½ by 1½ inches in size, hung on the side of the receiver.

The last i.f. transformer was removed from the receiver and replaced with a similar-sized unit for 455 kc. Then the interstage coupler, consisting of $L_1$, $C_1$ and $C_2$, was removed. The resistors in the grid circuit of the second i.f. tube were left in the circuit so as to simplify the a.v.e. wiring. Except for the voltage-dropping resistor on the VR tube and a possible cathode resistor referred to in later remarks on stabilization, this constitutes the entire modification to be made inside the receiver.

Building the Conversion Unit

All of the components were mounted on one lip of the U-shaped section of the Minibox. The center section of the box goes against the left side of the receiver. The 10.7-Mc. i.f. can that was removed from the receiver was mounted toward the front end of this lip with the grid and B+ terminals next to the converter tube.

The double-conversion unit mounted on the side of a Sonar SR-9 144-Mc. receiver.

* Glen Eagles Drive, Larchmont, N. Y.

1 The author's statement seemingly is at variance with the well-known fact that noise limiters are less effective with selective receivers than with broad ones. However, a noise limiter can be effective only if the noise consists of short pulses, comprising only a minor part of the total reception time. When noise pulses become so closely spaced that they lose their impulse character and become a solid blanket of noise, as can happen when the ignition noise from many vehicles is picked up at once, a selective receiver will show a better signal-to-noise ratio than a broad one. —Es.

32 QST for
Next in line toward the rear comes the socket for the 6BE6 converter tube. Mount this so that Pin 7 can be soldered directly to the grid pin of the i.f. can. Next in line comes a 455-ke. i.f. can with the plate and B+ pins nearest to the tube. Beyond this is mounted the slug-tuned oscillating coil. In mounting all of these components be sure to allow clearance for the lips on the cover of the box. On the opposite lip of the box, drill a pair of \( \frac{3}{4} \) -inch holes in line with the centers of the two i.f. cans to accommodate an alignment tool for the bottom adjustments. The small parts can now be wired in place.

Two No. 38 holes can be drilled in the bottom of the U section to mate with the present chassis supporting screws on the left side of the receiver case. Locate these holes sufficiently far from the bottom edge so that there is room for the interconnecting wires to go into the set below the chassis lip. The outboard unit is now mounted and is right alongside the receiver i.f. amplifiers for short interconnecting leads. Through both boxes, drill five holes, about \( \frac{3}{6} \) -inch diameter, to accommodate the interconnecting leads. These should have protectors of spaghetti where they pass through the walls of the boxes.

The plate lead from the 10.7-Mc. transformer goes nearest the front and connects to Pin 5 of the first i.f. tube. Then bring the B+ lead from this transformer to the terminal strip lug from which \( L_1 \) was removed. Then the grid lead from the 455-ke. transformer, with the coupling condenser in series, is brought to the grid. Pin 1 of the second i.f. tube. Keep the coupling condenser within the converter box. Inside the receiver dress this lead away from the leads to the 10.7-Mc. can. Farther rear, the hot heater lead

(Continued on page 184)
Simple Crystal-Controlled Converters

Compact Units for Mobile or Fixed Stations

BY W. W. DEANE,* W6RET/KR6MO

In the issue of OST for November, 1952, the author described a simple crystal-controlled converter for 10 meters. In response to many requests, this article tells how the converter can be altered to cover other bands.

In the November, 1952, OST an article was presented by the writer pertaining to a crystal-controlled 10-meter converter. The 10-meter band leaves much to be desired these days and, in response to many inquiries, it was decided to expand the original unit to cover any band from 75 to 10 meters.

Circuit

The circuit diagram is shown in Fig. 1. A 6AK5 operates as an r.f. amplifier, and a 6J6 serves as an oscillator-mixer. There are no tuning controls and, after initial adjustment has been completed, the converter can be mounted out of the way.

The original circuit has been modified slightly to improve the oscillator action (C5) and eliminate some occasional oscillations generally resulting from high 6AK5 screen voltage (R2). The layout of the components and general construction remain the same as originally presented, and as shown in the accompanying photographs. The converter is constructed on a 21/4 x 21/4 x 5-inch chassis-type box. The power is taken from the car or home-station receiver. The power-supply voltage should be limited to 175 volts by means of a series resistor in the high-voltage lead. The unit draws approximately 20 ma. RFC1 and RFC2 are made by breaking the leads between the second and third pies of a four-pie 2.5-mh. r.f. choke. This center-tap lead is connected to B-plus, and each end of the choke

Fig. 1 — Circuit of the simple crystal-controlled converter. C5 is a 30-muf. mica trimmer, used only with the coils indicated in Table 1. All other capacitors are disk ceramic. Capacitance values below 0.001 μf. are marked in μuf. All resistors are 1/2 watt unless otherwise indicated. RFC1 and RFC2 are described in the text and in Fig. 2. Coil dimensions are given in Table 1.

This bottom view of the crystal-controlled converter shows the distribution of small components.

Top view of the simple crystal-controlled converter, showing tubes and crystal.

* 4524 Fountain Ave., Los Angeles, Calif.

† Deane, "Simplifying the 10-Meter Crystal-Controlled Converter," QST, Nov., 1952.
Table I

<table>
<thead>
<tr>
<th>Mc</th>
<th>L1 t</th>
<th>L2 t</th>
<th>L3 t</th>
<th>L4 t</th>
<th>C A</th>
<th>Wire</th>
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<tr>
<td>28</td>
<td>2 t</td>
<td>20 t</td>
<td>22 t</td>
<td>26 t</td>
<td>no</td>
<td>22 enam.</td>
</tr>
<tr>
<td>27</td>
<td>2 t</td>
<td>22 t</td>
<td>21 t</td>
<td>25 t</td>
<td>no</td>
<td>22 enam.</td>
</tr>
<tr>
<td>21</td>
<td>2 t</td>
<td>22 t</td>
<td>21 t</td>
<td>22 t</td>
<td>yes</td>
<td>22 enam.</td>
</tr>
<tr>
<td>14</td>
<td>4 t</td>
<td>25 t</td>
<td>25 t</td>
<td>28 t</td>
<td>yes</td>
<td>30 enam.</td>
</tr>
<tr>
<td>7</td>
<td>7 t</td>
<td>45 t</td>
<td>45 t</td>
<td>none*</td>
<td>no</td>
<td>36 enam.</td>
</tr>
<tr>
<td>4</td>
<td>13 t</td>
<td>100 t</td>
<td>100 t</td>
<td>none*</td>
<td>no</td>
<td>36 enam.</td>
</tr>
</tbody>
</table>

Notes: All coils are wound on 1/4-inch iron-slug form (CTC LS-3). *Crystal connected directly to plate.

Table II

<table>
<thead>
<tr>
<th>Xtal (Kc.)</th>
<th>Osc. (Mc.)</th>
<th>Rear. (Kc.)</th>
<th>Band (Mc.)</th>
</tr>
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<tr>
<td>7000</td>
<td>28.01</td>
<td>550-1500</td>
<td>28.55-29.55</td>
</tr>
<tr>
<td>6600</td>
<td>26.42</td>
<td>550-1000</td>
<td>26.95-27.4</td>
</tr>
<tr>
<td>6800</td>
<td>20.42</td>
<td>600-1100</td>
<td>21.0-21.5</td>
</tr>
<tr>
<td>6700</td>
<td>13.42</td>
<td>600-1000</td>
<td>14.0-14.4</td>
</tr>
<tr>
<td>6400</td>
<td>6.4</td>
<td>600-500</td>
<td>7.0-7.3</td>
</tr>
<tr>
<td>3200</td>
<td>3.2</td>
<td>550-800</td>
<td>2.75-4.0</td>
</tr>
</tbody>
</table>

1 Fourth harmonic of crystal frequency.
2 Third harmonic of crystal frequency.
3 Second harmonic of crystal frequency.

Alignment

Alignment is quite simple. The oscillator can be checked on any communications receiver covering the band selected. Plug in the crystal, and tune the receiver to the frequency listed in the second column of Table II, and adjust the slug of L4 and C A (when required) for maximum indication on the receiver S-meter. Inductances L2 and L3 can be adjusted for maximum noise or, if a signal is available, L2 may be adjusted for maximum signal on the low end of the band, and L3 for the high end.

Don’t confine the unit strictly to mobile use. When operated with a surplus ARC-5 broadcast receiver, this makes a satisfactory unit for fixed-station operation.

Major Flint Becomes Chief, MARS (Army)

Major Willard Flint (A4BNY), U. S. Army Signal Corps, has been assigned Chief, Military Affiliate Radio System (Army), with headquarters in Washington, D. C. Major Flint previously was assigned in the Communications Planning Branch of Army Communications Service Division, Office of the Chief Signal Officer.

A native of South Yarmouth, Mass., the new Chief, MARS, is a licensed amateur radio operator, W4BNY; he is also custodian of station KAUSA, located on the concourse of the Pentagon Building, Washington, D. C.

Major Flint served during World War II as a Signal liaison officer with the Chinese Army. Assignments since the war have included such diverse duty as Signal Corps instructor, Reserve Officers Training Corps, at Oklahoma A. and M. College, Stillwater, Oklahoma, and Signal Corps liaison officer with the Turkish Army, with headquarters at Ankara.

As Chief, MARS (Army), Major Flint is responsible for the establishment and control of the Army program for training U. S. amateur radio operators who are interested in military radio communication, and in furnishing policy guidance for military commanders in the establishment and use of MARS radio nets for disaster or emergency communications.

Major Flint also will serve as Secretary of the MARS Advisory Committee, a policy-recommending body with representation from the Armed Services, Federal Communications Commission, Federal Civil Defense Administration, American National Red Cross and the American Radio Relay League.

December 1954
Notes on Grounded-Grid R.F. Power Amplifiers

Circuit Details, Operating Conditions and Linearity

BY T. H. PUCKETT,* WSJXM/1

• The grounded-grid or cathode-driven amplifier is a useful type for triodes because it can be used without neutralization. Because the circuit has had relatively little use in amateur transmitters, most of us are not familiar with its other features—some of which differ greatly from what we are used to in conventional amplifier operation.

Quite a few grounded-grid linear amplifiers are in use in single-sideband circles these days, but practically no information is available as to the operating conditions used and the circuit peculiarities observed. It was therefore decided to run some tests on a few tube types that seemed fitted for the purpose and see just what could be done, particularly among the high-power line. The four types tested were the 4-125A, 4-250A, 813 and 301-TL.

The Basic Circuit

For those unfamiliar with the grounded-grid circuit, the basic arrangement is given in Fig. 1A.

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Fig. 1 — The grounded-grid amplifier circuit (A) and its small-signal equivalent circuit (B).
```

and the small signal equivalent circuit in B. The form of A is suitable for r.f. amplification. (The input circuit is not shown, but will come in for discussion later.) The driving signal is applied to the cathode of the tube, the grid terminal is grounded for a.c., and the output is taken from the plate circuit in the usual fashion. This may be compared with the conventional grounded-cathode circuit shown in Fig. 2. The primary advantage to be gained by using the grounded-grid circuit is that the grid acts as a shield between the input and output terminals of the amplifier (the cathode and plate of the tube, respectively) making the neutralization and stabilization problems much easier to handle. This may be seen by noting in the grounded-grid circuit that the primary coupling between the input and output is only the relatively small cathode-plate capacitance $C_{pk}$ while in the grounded-cathode arrangement the coupling is through the usually much larger (in triodes) grid-plate capacitance $C_{gp}$.

As a confirmation of the expected improved shielding, none of the tubes tested required any neutralization at all. It was necessary to eliminate the usual v.h.f. parasitic, but even this was easy, probably for the same reason. The methods of parasitic suppression are exactly the same as for grounded-cathode amplifiers.

Fed-Through Power

A feature of the grounded-grid circuit is that the output load current, which is also the tube current, must flow through the input signal source. This current is indicated as $I_p$ in Fig. 1. It may be shown that this results in more power being required from the driver than for a comparable grounded-cathode amplifier. The driving power required commonly ranges from about one-tenth to one-half of the output power. However, there is some compensation in that most of the extra power from the driver simply passes through the amplifier and appears as useful power in the load.

This may be seen from Fig. 1B, if it is taken that the $\mu E_k$ voltage is not present, which corresponds to the tube being present but having no

*Technical Department, ARRL.
amplifying action for some reason, such as reducing the plate voltage to zero, but leaving a continuous path for plate current to flow. The input voltage \( E_i \) will then act as plate supply of sorts, causing a current flow in the plate circuit even though the d.c. plate-to-ground voltage is zero. This current will act as a regular tube current, and give an output signal. Some of the input power will be dissipated in the equivalent plate resistance \( r_p \), but the effective load resistance \( R_L \) is usually much larger than \( r_p \) and so will receive most of the input power. This of course neglects the losses at the grid of the tube, but these are usually small with respect to the amount of power fed through the tube, particularly for high-amplification tubes such as tetrodes which normally require only a small driving power as compared with their output power.

**Input Coupling**

In the practical application of the grounded-grid circuit, one other matter sometimes gives difficulty — just how to couple the driver power into the cathode. A simple cathode is indicated in Fig. 1, but in higher-power tubes this would actually be the filament. Or, if there is a separate heater, the heater-cathode capacitance would cause the heater to be at practically the same r.f. potential as the cathode. If the heater is to be supplied from a grounded source such as the regular 115-volt a.c. line, it is necessary to isolate it so that the driving source will not be grounded through the heater supply.

Probably the most obvious solution is that indicated in A of Fig. 3, in which the filament power is fed through r.f. chokes. (The tank circuit shown for coupling in the input signal is a common circuit, but any of the ordinary coupling methods, properly applied, should be satisfactory.) In this case, things are fine so long as not too much filament current is required. However, for the tubes under consideration here the filament current is large, and the wire size required to avoid excessive losses is embarrassingly big. The situation may be alleviated somewhat by using the filament chokes as the cathode tank inductor, but when using a tube such as the 301-TL, which requires 12.5 amperes, things may still be a little tough.

Another possibility is to use a filament transformer with a low interwinding capacitance, as indicated in B. The interwinding capacitance is shown as \( C_1 \). So long as this is less than the required tank capacitance, things will be fine. There were some of these transformers kicking around in surplus, from radar sets.

A third possibility is indicated in C. Here regular chokes are used, but in the input side of the transformer. The current will be stepped down in the same ratio that the voltage is stepped up, so a much smaller wire size may be used for the chokes. Of course, the transformer must be mounted so that its frame is insulated from ground. The capacitance of the transformer to ground will be added across the input, but this is usually pretty small. A filament transformer measuring about 3 by 3 by 4 inches was mounted \( \frac{3}{4} \) inch off a large metal plate, and the measured capacitance was about 25 \( \mu \)fd. This method was used for these tests.

Although the data to be presented were taken on 80 meters, one run was made on 20 meters to see if anything unexpected would occur. In this case it was particularly desired to check if the method of driver coupling would be satisfactory on the higher band. The driver had a pi-network tank and was coupled to the grounded-grid amplifier by simply feeding the output of the pi tank directly into the cathode of the grounded-grid amplifier without a separate cathode tank of any kind.

This was initially tried as the simplest possible scheme, and worked beautifully. The impedance looking into the cathode seems to be in the vicinity of 50 to 100 ohms, since several lengths of 72-ohm coax were inserted between the driver and the amplifier without causing the least difficulty in loading the driver. This and the other features of the grounded-grid amplifier showed no particular change when the shift was made from 80 to 20 meters.

**Tetrodes**

The question arises as to what to do when the tube is not a triode as indicated in Fig. 1. In all cases, the extra grids were grounded for r.f., the same as the control grid, with any necessary bias fed in separately. Thus the extra grids of the
tube are driven along with the control grid.

If it is attempted to use a tetrode in the normal fashion, with the screen circuit returned to cathode, it is necessary to drive the screen grid along with the cathode. The screen-plate capacitance will then act as a coupling between the input and output, destroying the shielding action of the control grid. The same thing applies if the tube has a suppressor grid. Actually, the procedure of grounding all the grids just makes multigrid triodes out of the tubes.

**Operating Conditions**

No information is available from the manufacturers on grounded-grid operation of the power tubes commonly used by amateurs. However, such ratings as maximum allowable plate dissipation and maximum current and voltage still apply. The operating points to be given are ones which happened to be convenient, and, of course, are not the only ones which can be used. They are intended to indicate the possibilities more than anything else. Generally, the ratings from the tube manuals for grounded-cathode operation seem to be good starting points for grounded-grid operation. Simply set the amplifier up with the indicated voltages, and adjust the drive and plate loading for the desired results.

An unexpected bonus cropped up when it was found that the 4-250A and the 813 made excellent zero-bias tubes. That is, all the grids are directly grounded, and the plate voltage is adjusted to give the desired no-signal plate current. The plate voltage may be anything less than the value which results in rated plate dissipation. In linear amplifiers, it is probably desirable to keep the voltage high enough to give as much no-signal plate current as is safe. The drive and loading are then adjusted in the usual fashion.

Admittedly, adjusting the plate voltage is not always convenient. An autotransformer in the a.c. input to the high-voltage power supply is ideal. Another possibility is a small buck-boost transformer in series with the input. Luckily, the voltages required are about what is normally used on these tubes. Using this zero-bias mode requires more driving power, but against this may be placed the quite large convenience of not needing any separate power supplies for the grids. This is particularly advantageous in the case of the control grid, since for linear operation its bias must be well regulated.

The actual numerical data are given in Table I. These values were obtained using a modulated driving signal which had a low duty cycle, so that the average dissipation ratings would not be exceeded. These values may not be used continuously, as when plate modulating the grounded-grid stage. However, the values should be quite satisfactory for peak conditions when the stage is used as a linear amplifier in single-sideband work with speech input, since in this case the average signal is much less than the peak signal.

It was not possible to check the efficiency of the system directly, but observations of d.c. input, tube color and relative output indicated that the efficiency was in the normal region of 60 to 70 per cent.

Of the four tubes, the 4-125A was the only one which did not perform too well. As a zero-bias triode, it was not possible to get enough idling current through it, and the plate dissipation went up very rapidly with drive. It is possible that further investigation might turn up a more suitable set of operating conditions for this tube.

The 4-250A and the 813 performed about the same, within the limitations of the 813 maximum ratings. It is possible to run quite a bit more input than indicated to the 4-250A, but the required driving power increases pretty rapidly. It was necessary to be a little bit more careful about shielding the input and output circuits from each other with the 813, and it is recommended that the 813 base be solidly grounded by the use of metal spring clips or the like.

The 304-TL cannot be used as a zero-bias tube. The grid-bias requirement is a major difficulty, as the tube has such a low amplification factor that 150 to 200 volts bias is needed to keep the no-signal plate dissipation within reason when 2000 volts is used on the plate. In view of this and the filament current requirement, the thing that makes the tube of interest in this application is the fact that many people picked them up at low prices in surplus. Also, if driving power is available, the tube may be driven to very large inputs.

The 304-TL was the only tube of the four that needed more than a small r.h.f. inductor in the plate lead to suppress parasitics. A coil of 8 turns of No. 16 tinned wire, $\frac{1}{3}$ inch in diameter and $\frac{3}{4}$ inch long, with a 100-ohm carbon resistor tapped across half of the coil, was used in the

(Continued on page 188)

<table>
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<tr>
<th></th>
<th>$E_p$ D.C.</th>
<th>$(I_p$ No Signal) Ma.</th>
<th>$E_a$ D.C.</th>
<th>$I_a$ D.C.</th>
<th>Driving Power Required Watts</th>
<th>Plate Input Volts</th>
<th>$I_x^*$ (D.C., Ma.)</th>
<th>$I_{em}^*$ (D.C., Ma.)</th>
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<td>500</td>
<td>270</td>
<td>1000</td>
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* Approximate.
STARTING HARD-TO-GET-AT MACHINE SCREWS AND NUTS

When the needle-nosed pliers are too cumbersome, and the fingers are too clumsy, try starting a machine nut as follows:
Press the eraser of an ordinary pencil momentarily against the barrel of a hot soldering iron. Stick the nut to the melted eraser and then use the pencil to poke the nut in place; a screwdriver will do the rest. — Frank Joseph, WN9AOI

 Whenever difficulty is encountered in getting screws, washers and nuts into tight corners, it is possible to solve the problem by wrapping a couple of turns of masking tape, sticky side out, around the end of a pencil. Any small piece of hardware will stick to the tape long enough to allow completing the job on hand. — Joseph J. Kosina, W2LGK

"ALL-BAND" ANTENNA

Fig. 1 is a sketch of an “all-band” antenna system that I have been using with success for some time. The idea is not a new one, having appeared in QST at least 10 years ago. However, I feel that there are many newcomers since that time who would be interested in a simple system that can be fed with a single 70-ohm transmission line.

The arrangement consists of dipoles, cut for each band and connected in parallel at the center. Although I have not checked standing-wave ratios, the results seem to indicate that it gets out as well as a bunch of individually-fed dipoles. If you haven’t tried it, you’re in for some surprises.

— R. L. Cope, W8MOK

[Editor’s Note: As with any system of this type, special care must be exercised in reducing low-order harmonic output, since any harmonic energy fed to the system will be easily radiated.]

USING THE SELECT-O-JECT AS A KEYING MONITOR

Anyone who owns and operates one of the National Select-O-Jects may be interested in how the unit is used as a keying monitor here at WN0RVF. The unit has worked out so well that earlier plans to build a more complex monitor have been given up. The system employs a Select-O-Ject keyed by a small neon tube as shown in Fig. 2. The r.f. voltage that is used to ignite the bulb is obtained by placing the tube in the r.f. field of the transmitter output amplifier. Lead length between the bulb and the S-O-J is not critical and unshielded wire has been used to date. However, r.f. chokes should be connected in series with the leads and should be placed as close as possible to the key terminals of the S-O-J. The frequency of the tone fed to the telephones when the transmitter is keyed may be varied by means of the Select-O-Ject frequency control. My own experience with the monitor is that it follows keying without lag and reacts to bug keying much more favorably than some of the systems which employ relays to obtain the same effect.
— Tom Bakersmith, WN0RVP

Fig. 2 — Arrangement employed by WN0RVP to permit using a Select-O-Ject as a keying monitor.

REMOVING HOT TUBES

Turning is probably nothing new about this idea but even so it can bear repeating. A simple method for removing hot tubes from “hard to get at” places is to wind a rubber band around each of the jaws of an ordinary pair of pliers. This makes an excellent tool for gripping and removing the tubes.
— Lewis G. McCoy, W11CP

December 1954
• Recent Equipment –

The 500-W Power Amplifier

In the past, one was likely to think of an r.f. power amplifier as something that came as part of a complete transmitter he bought, or perhaps as something one built to boost the power level of an existing station. But the fashion is definitely changing, and you can now buy an amplifier as a separate unit, with or without power supply. The growth in popularity of single sideband is a prime reason for this change—many who got their s.s.b. feet wet on low-powered “barefoot” exciters want to increase the power level. Since the amplifier is of necessity a “linear” one, running in Class AB1 or AB2, there will be design features that did not appear in the earlier commercial r.f. amplifiers that ran only Class C. The Gonset 500-W Power Amplifier is an example of some of the novel features and engineering we can expect to see. It can be used for any mode of transmission: c.w., a.m., s.s.b., f.m. or f.s.k.

The linear amplifier is a complete package in a cabinet 23 inches wide, 13 inches high and 16½ inches deep, designed for a table-top location. It is bandswitching from 80 to 10 meters, with an “X” position on the switch for the optional 160-meter operation that is available. The single bandswitch knob controls both grid and plate circuits. Other panel controls include Grid Tuning, Grid Drive, Plate Tuning, Coarse Output Tuning, Fine Output Tuning, and power and meter switches. The Plate Tuning dial is marked directly for the various bands, to simplify retuning from one band to another without the need for referring to a chart. The Power switch is a three-position affair: Off, Fil and Plate — to permit warming up the rig before applying plate power. A green pilot lamp indicates when the filaments go on, and a red light is added when the switch is thrown to the “Plate” position. The meter switch allows metering of the cathode currents of the r.f. tubes individually, total grid current, and r.f. output voltage delivered by the amplifier. The output-voltage indication has two ranges, to allow for various output-impedance levels. Input and output jacks on the rear of the chassis are standard coaxial-connector fittings.

The 500-W uses four 807s in parallel, a feat that might be considered impossible by many amateurs who have struggled with only a pair of the little beasts. However, the problem was licked by a couple of constructional tricks that can be seen in the photographs and will be described shortly. The four 807s have a parallel-tuned grid circuit, with the input line tapped up on the coil instead of being connected to a separate coupling winding. The Grid Drive control is a switch that cuts in various amounts of “swamping” resistance across the grid circuit, as shown in Fig. 1. The plate circuit is the conventional pi-coupler arrangement, with the bandswitch determining the amount of inductance in the circuit. The output voltmeter uses a 9006 diode rectifier — the range is changed by inserting resistance in series with the meter.

As can be seen in Fig. 1 and one of the photographs, each 807 has a fuse in its cathode circuit, to protect the power supply and to allow operation without interruption in the event of a tube failure. Subsequent location of the bad tube is

The Gonset 500-W linear amplifier uses four 807s in parallel to deliver 250 watts peak envelope power. The individual suppressor resistors and chokes connected in the plate circuit can be seen here, as well as the heavy silver-plated straps used for low-inductance connections. Two of the four rectifier tubes can be seen in the foreground.
simplified by the individual fusing. Another protective device is an overload relay in the common screen-grid lead to the power supply. When the total screen current exceeds 40 ma., as it might with light loading or excessive drive, the overload relay drops out, which increases the grid bias and also turns out the green pilot light. The increased bias will, in most cases, decrease the screen current sufficiently to let the relay fall back, and the result is "cycling" of the relay and a flashing of the green lamp, for as long as the overload condition exists.

The power supply uses four 866 Jrs. in a bridge circuit, to supply 750 volts for the plates and 375 volts for the screens of the 807s. The 750-volt supply has an 80-µf. output condenser, and the screen supply has 160 µf. in the output. These high values of capacity are in keeping with current thinking about linear amplifiers, where the object is to build a high degree of dynamic regulation into the power supply. A selenium rectifier is used in the grid-bias supply.

For those who might wonder at the selection of four 807s in parallel for this amplifier, it should be pointed out that this results in the equivalent of a beam power tetrode having a plate dissipation of 120 watts, a transconductance of around 25,000, and full output at relatively low plate voltage. The constructional tricks, mentioned earlier, that permit this parallel operation without instability consist mainly of reducing the inductance of the common connecting leads. This was done by using heavy silver-plated connecting straps wherever necessary. And apparently another policy was "Don't spare the condensers," as can be seen by the generous by-passing at each socket. The currents of the 807s can run between 15 and 30 ma. without excitation, but they should match to within a 10 per cent spread at around 100 ma. with the tubes heavily loaded. Thus an important point in running four tubes in parallel is to match the cathode currents at full load and drive conditions, and ignore the wider variations in no-signal currents. If the four tubes do not match closely enough at full load, the errant tube is easy to replace. Tolerances on tubes permit wide variations but the low cost of 807s makes matching easy. Wide variations in tubes in the amplifier will degrade the linearity and reduce the potential output, so it is well worth while to match tubes.

The amplifier is designed to work into 52- or 72-ohm coaxial cable having an s.w.r. of 2 or less, but it can handle them up to s.w.r. = 5 under most conditions of line length.

(Continued on page 138)

Attention-getters under the chassis are the components and connections at the tube sockets. The square plate and heavy strap is the common control-grid lead. Each tube is individually fused in the cathode circuit.

December 1954
Number Participating Soars to 8380; 585 Clubs and Groups, 234 Portables and Mobiles Afield

BY PHIL SIMMONS, WIZDP

"Somebody fix 40 c.w.'s key clicks. We hear 'em all over 10 meters." . . . "Anyone yassed the generator lately?" . . . "Where's Joe Zitch? He's supposed to be logging at Position Two." . . . "Look alive, fellows, we're 50 QSOs behind this time last year." . . . "Quick, kill the gear! The line voltage is up to 140!" . . . "Now who went and sat on my sandwich?"

Such comments will ring a bell to anyone who's been on a Field Day outing. The grammar may not be impeccable, but these remarks typify that peculiar lingo which besets Hamdom every June as regular as clockwork. They reflect the joys and the woes, the trials and tribulations—they're part and parcel of every ARRL Field Day.

The first Field Day in 1933 wasn't exactly a howling success, it would seem. Just forty-one stations reported results. This was long before the advent of mobiles, of course, and the less stringent regulations for portable operation that presently prevail. And imagine trying to knock off 20 QSOs an hour using those Federal Radio Commission portable calls like W0ZZAO and W2ZZDI. At any rate, there was little evidence that Field Day would catch hold to the extent that thousands of individuals and clubs would bring about that annual ham-band cacophony.

Some groups lay careful plans for months in advance of the big day; others hold off until an hour before the opening gun. But whatever the means or degree of preparation, the emphasis is on the more serious aspect of Field Day, that of demonstrating that amateur radio is ready, willing and able to cope with a real emergency, be it flood or windstorm, hurricane or bomb attack. Judging from the quantity of newspaper clippings reaching ARRL, Field Day received a copious amount of "before and after" publicity—the kind that gains public support for amateur radio.

So hats off to every Field Day participant! Hats off to the boy with the 5-watt battery-powered peanut whistle who went up on the mountain and made five contacts all by his lonesome, and to the lucky mobileer who only had to climb into the family jalopy and call CQ FD. Hats off, too, to those multitransmitter installations with the club-owned generator and dozens of people helping out on the operating, maintenance, cooking, and what-have-you. Yes indeed, hats off to every Field Day participant for a job well done!

Like each of its predecessors, the 1954 affair smashed all previous records, with 8380 individuals in the field. Entries representing 819 portables and mobiles were received, and there were at least 2026 separate receiver-transmitter combinations operating independently of commercial mains. Those figures don't include the signals.
pouring forth from home stations, either. Yes, FD has proven once again that for sheer popularity it has no peer amongst ARRL-sponsored operating activities!

For purposes of our *QST* report, competition is considered to be among stations employing similar numbers of simultaneously-operated transmitters. Final scores are therefore tabulated according to the number of transmitters at each station. For purposes of geographical comparison in Class A, the following clubs and groups led in their respective licensing areas:

<table>
<thead>
<tr>
<th>Call Sign</th>
<th>Grid Ref</th>
<th>Score</th>
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<tr>
<td>W1OC/1</td>
<td>9009</td>
<td>1195</td>
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<td>17,847</td>
<td>1500</td>
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<td>KH6WO/KH6</td>
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</tbody>
</table>

The Tri-County Radio Association of Plainfield, N. J., whose members have posted astronomical FD scores for years, did it again in ’54, this time leading all entrants, With 30 watts or less to ten simultaneous-operated rigs, each of which used a 6146, an 807, a 1625, a 2E26 or

An integral part of most Field Day excursions is gassing the generator. Here W9UHV obliges by doing the pouring as W9AIN assists. Those and 23 other Hoosiers polled 2076 points with W3RDJ/9 in the one-transmitter category. The 3-kw. job on the trailer as well as the spare 300-watt at the right are the property of the Tri State Amateur Radio Society.

Honors for the second-highest score go to the Garden State Amateur Radio Association’s W2GSA/2. Forty GSARA enthusiasts set up shop at Hazlet, N. J., earning 18,890 points and 1979 QSOs, tops in the contact department. Except for the 80-c.w. and 20-phone installations, rigs were kept in the low-power bracket. The W2GSA/2 contact total by bands looks like this: 377 on 80 c.w., 236 on 75 phone, 250 on 40 c.w., 190 on 40 phone, 276 on 20 c.w., 158 on 20 phone, 3 on 15 c.w., 54 on 15 phone, 1 on 6 c.w., 48 on 6 phone, 264 on 2 phone. Wow!

Ohio Valley Amateur Radio Association, long renowned for its exploits in various operating activities, ran true to form in the Field Day, bringing home the third slot with 14,355 points and 1570 stations worked. Utilizing seven transmitter-receiver combos and the call W4FU/8, OVARA plowed all spectrum portions 80 through 2 (except 11 meters, which no one ever seems to tackle any more) and qualified for the multiplier by employing generators and low power.

Moving to one- and two-operator stations, we find W2DBQ/2, aided and abetted by W2PBA, leading Class B with 5373 points and 373 QSOs on 20-, 10-, 80-meter A1 and A3. A VFO-2E26, a Super-Pro, a 14-Mc. ground-plane and a couple of folded dipoles comprised their modest set-up near Scottsville, N. Y. Storage batteries furnished

S32A final, thirty ops rolled up 17,847 points at Mountainside, N. J., under the call W2LI/2. Doubles were available for 3.5 and 7 Mc., a doublet and 2-element beam for 14 Mc., and 3- to 10-element beams for 21 through 144 Mc. Receivers were 3 HROs, 2 75As, 2 Super-Pros, and an SX-28, with converters on a Super-Pro and SX-28 handling 6 and 2 meters. A 6-kw. generator powered the gear. A breakdown of W2LI/2’s 1958 contacts: 324 on 80 c.w., 304 on 75 phone, 319 on 40 c.w., 185 on 40 phone, 152 on 20 c.w., 128 on 20 phone, 58 on 15 phone, 238 on 10 phone, 33 on 6 phone, 217 on 2 phone.

These happy Hawaiians, flanked by the verdant scenery of Oahu, earned 1764 points in Class 1A at K16WO/KH6, led all KH6 entrants. L. to r.: K16DO, K16ARM, K16GU, K16AN, K16WU keying, K16AI0, K16KC, K16AS. The 100-watt p.p. 807s were powered by a 2-kw. generator.

December 1954
the juice. Other outstanding Class B scores: W5VRP/5 2216, W6VIF/6 2903.

Spearheading the record 167 mobile entrants was the 3551-point tally of K6ASK/6. On Mount Wilson near Pasadena, K6ASK and KO1FT worked 'phone exclusively, logged 238 contacts with the Harvey-Wells transmitter, Elmoe receiver, and car whip.

Cleveland's Westpark Radios, almost quadrupling their '53 showing, continued undetected mastery of the mobile aggregate category, turned in 77,918 points. Top score of the 48 club members on the air from their individual mobiles was WS1HE/8's 8470 points. A prime reason for the success of the San Jose Amateur Radio Club, it is, that each station originates that FD message (worth up to 337.5 score points), and many receive and relay from 30 to 40 such messages. Standings of all clubs that entered the mobile aggregate classification appear in a separate tabulation accompanying this report.

A half-dozen QSTs could perhaps be filled with the interesting experiences and incidents which FDers recounted on their logs. ARRl is pleased to pass along as many of these sidelights as space will permit.

**FD Quotes**

"We expected some success from our quarter-wave 7-Mc. vertical but were really amazed at the performance of the odd-length (40-foot) vertical on 14 Mc. Elbow or more radials were staked from the base of each vertical. DARC old-timers admit this was the club's most enjoyable FD. They still remember last year when at two hour it was discovered that the generator ran off butane, and there was no backups for any of the various amateur radio clubs. However, if and when the same generator started again, it was found to be full of rust in its gas tank and gas lines; plug would not fire and the carburetor leaked. We fixed it up before FD, but what if it had been a real emergency! Club: See that your e.d. equipment is properly maintained and ready for action at all times!" — Lamont, Arizona Amateur Radio Club, W6YTM/8.

"Our score dropped this year, but we didn't do too badly considering we had over an inch of rain and an 80 mc noise level. We did work KA2IM, and we are proud of our operators for doing such a fine job under difficult conditions." — Twin City Contest Club, W6FAM/6.

"Our six ops went without sleep for nearly the full period. Atmospheric conditions were poor and it was necessary to change bands frequently, which caused us to lose valuable operating time."


"Our power source was a 1-kw, alternator belt'd to a 1951 Ford engine, with d.c. excitation for the alternator driven from a bank of storage batteries. We were off the air only briefly to replace two fouled spark plugs in W51DQ's faithful buggy. Our site, Beach Haven on Long Beach Island, was chosen because of supposedly high ground conductivity as evidenced by RCA and other overseas transmitters in the near-by area." — Berkeley Heights Amateur of Phila., WD5YL/5.

"Despite bugs, heat, forgotten equipment and a sagging 750-foot-per-minute Yac of 12-foot drawn copper wire (which had to be tightened five times), our club had a grand time." — Northwest St. Louis Amateur Radio Club, W6NFT/5.

"Surprised to work Falkland Islands via North Pole. A 100-foot lookout tower served as an ideal antenna support." — Prince of Wales Emergency
Field Day axiom: *Keep the signal on the air at all costs!*
Above W8MIQR does a hurry-up repair job on a temporary power supply for Sandusky Valley Amateur Radio Club’s W8NCK/8.

Time would be saved if FD voice operators would identify their stations properly. Most said “W4XXX-salt-4” which is not even legal. Location given with call is required by FCC and would save many repeats.”— W4GLW/4...

“If we could get a 0.001 multiplier for each chigger bite, our outfit would win hands down!”— W6BYC/B...

“We used ARC-5s which are handy and compact, and that single dial control is the only way to move from place to place in a hurry. We’ve decided coax food lines are a must— the only time you hear the guy next to you is when you hit a harmonica.”— State Line Radio Club, W8DTU/B...

“We used mastade by holding 20-foot two-foy-four to 20-foot two-by-sixes, held fast by six guy wires. Our site was a cow pasture. At 3 A.M. we heard a terrific crash. A cow had ‘spooked’ at a flashligh and bumped into one of the masts, which fell and splintered into right strange. We finished the run with one 15-foot mast. P.S.: The cow is okay.”— Martinsville Amateur Radio Club, W9NTA/9...

“We all got cherry-red sunburns and learned too late that it always pays to measure the antenna. From now on we won’t just throw up a piece of wire.”— W8KLK/B...

“Fine time had by all, though the county woodcutter took down all our antennas Saturday morning.”— Central Texas Amateur Radio Club, W8ZDN/8...

“Twenty operators, locale food, FB weather, no tech...
Just across the Indiana border at New Paris, Ohio, W9E2BZ (foreground) and W9PSD keep things humming for the Richmond Amateur Radio Association's W9PSD/8. The soldering iron appears to be in readiness for that almost inevitable FD exigency.

day p.m. but we gave up after two stations politely refused.” — Paso Robles Radio Club, W6BRY/6.

“Use of a 3 1/4 x 7 1/4 IBM card for each contact proved beneficial in eliminating duplications. Cards for each band-log were filed by the call letter after the numeral. Tab cards for each letter facilitated rapid looking. The more the contacts, the better the system works.” — Mount Diablo Amateur Radio Club, W6LUF/6.

“Tables with interchangeable legs helped in setting up. Each table was equipped with a plug-in strip, a Variac, and an a.c. meter. Forty-foot extension ladders were used as antenna supports.” — Old Colony Amateur Radio Assn., W1WKN/1.

“Biggest turnout we’ve ever had — 84 operators. The fellows worked hard for the event and enjoyed testing emergency-powered low-wattage rigs.” — Rock Creek Amateur Radio Assn., W5RJN/3.

“We operated FD on an island about 1000 feet in diameter and were able to ground all equipment exceptionally well because of damp ground just under the surface. Interference between positions was therefore greatly reduced.” — San Antonio Radio Club, W5SC/5.

“The following FD stations were in Hastings, New Zealand, between 1430 and 1600 NZT, June 20th, on 14 Mc. W5X BP LV OY, K2AA, W5W NA NKM, W4S VTY ZYD, W5X KFD CU OAO, W6 BIP CG HJK IYY MBA NQJ OGQ SST TR UW, K5S RCF EKB EB, W6C CGY, W6F PTI JP ORE RGM, W2X KWH FLA GPV SLP SX, K1GDF, K4PDF, VE3BGO.” — ZL2ARL.

“Greatest thrill was the excellent performance of our low-power transmitter. Our percentage of answers was close to 100 per cent, and average report received was 59X. The rig, designed by W2NCI and built by W2GNT, consisted of a dual-range e.e.o. with a 8A6Q covering 80 and 40 meters and a 6B6Q5 final doubling on 40 and 20. A bandswitching rig network provided excellent flexibility. Power input to the final was 12 watts, provided by storage batteries and a PE101-C. A 6-volt vibrator furnished hash-free power for the NC-88 receiver. The complete station, except for batteries, was placed on a 20 x 36 foot operating table, with room to spare.” — W4HCI/1.

“Amid dust, rain and wind, I still had F0 is tops of all ARRL activities. Already looking forward to next year.” — W6JSSQ/8.

“Dip-stick vibrated out on generator and we lost lots of all before noticing the trouble.” — W6JZQ/4.

“Up until two months before FD I had made no plans to participate. The last time I honored FD with my shaky fist was four years ago in VE1-hand. However, a growing awareness of the real purpose of FD began to overtake me. Here was an opportunity to field-test equipment that might be called into use in an emergency. With mounting enthusiasm, plans were made and equipment readied. There are few amateurs in the vicinity, so with an eye to the future, four potential operators were drogued to the wilderness of the FD site. This is that we now know exactly what technical work has to be done for the next test, we have four aspiring amateurs and our alternate communications for civil defense are going to be efficiently set up.” — W8BOP/8.

“As both SEC and SCM of Idaho, I request that next FD I be allowed 25 points credit for receiving FD messages addressed to me. How can I ever get more than 575 points credit for originating a message to myself?” — W7JWU/7.

“W1DHX/1 and I exchanged ‘light signals’ for about 15 miles. He copied our flame tower on Mount Asumony and I heard his call. Nothing solid. Is this a real FD record?” — W1MMN/1.

“Just before FD I installed in the car a heavy-duty Bosch generator which is capable of the full charging rate at very low speeds, with the result that it was at full charge even at the end of FD.” — W6LUC/6.

“W9E2BZ and I were mobile in motion for the entire period of operation, traveling 306 miles through the valleys and mountains of Los Angeles section. We wonder how many other mobiles participated in Field Day.” — W9RHE/6.

“My 49 QSOs were made during a FD drive through Utah, Colorado and Kansas. Very enjoyable.” — W7NTY/7.

“We used the identical setup which netted us top listing in the 58 mobile category, but were plagued with more complications this year. Heavy static and a severe storm, which toppled 60 TV towers in town, forced cessation of operation for almost eight hours. All considered, it is still a source of great surprise to learn what can be done with low power and nothing but a whip on the back of the car.” — W3RQM/9.

SCORES

**CLASS A**

Scores are tabulated according to the number of transmitters operated simultaneously at each field station. The figures and letters following each listing indicate the number of contacts, the power or power inputs used, the number of participants at each station, and the final score. The "power classification" used in computing the score is indicated by the letters A, B or C after the number of QSOs shown. A indicates power up to and including 30 watts (multiplier of 5); B indicates power over 30, up to and including 100 watts (multiplier of 2); C indicates over 100 watts (multiplier of 1). More than one letter indicates that at times power inputs fell within different classifications.

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<th>Transmitter</th>
<th>Connecticut Wireless</th>
<th>Central Connecticut</th>
<th>Twin City Contact</th>
<th>Midland Amateur Radio</th>
<th>Egyptian Radio</th>
<th>South Jamaica</th>
<th>Chowder and Propagation Society</th>
<th>Whittier Radio 50 Club</th>
<th>amateur Radio Station 919</th>
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<th>amateur Radio Station 919</th>
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<td>Assn.</td>
<td>W1KXM/1</td>
<td>W5HLM/4</td>
<td>W5GGL/2</td>
<td>W5DU/5</td>
<td>W1EH/2</td>
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<td>W6JZQ/4</td>
<td>W6JZQ/4</td>
</tr>
<tr>
<td>W1BDI/1</td>
<td>Connectist Wireless</td>
<td>Central Connecticut</td>
<td>Twin City Contact</td>
<td>Midland Amateur Radio</td>
<td>Egyptian Radio</td>
<td>South Jamaica</td>
<td>Chowder and Propagation Society</td>
<td>Whittier Radio 50 Club</td>
<td>amateur Radio Station 919</td>
<td>amateur Radio Station 919</td>
<td>amateur Radio Station 919</td>
</tr>
<tr>
<td></td>
<td>Assn.</td>
<td>W1KXM/1</td>
<td>W5HLM/4</td>
<td>W5GGL/2</td>
<td>W5DU/5</td>
<td>W1EH/2</td>
<td>W3DYL/2</td>
<td>W6LGT/6</td>
<td>W6JZQ/4</td>
<td>W6JZQ/4</td>
<td>W6JZQ/4</td>
</tr>
</tbody>
</table>

"Br-r-r-r," you say, and justifiably so. Far from the edge of the mosquito, this far-clad quintet manned VE8GY/8, the world’s most northerly Field Day Station, near the Arctic Ocean on Yukon’s north coast, i.e., for: VEGAAS, W3YVY, VE3BQO, VE1QJ, W2JY. The portable and weatherproof, this was the highpoint of DX, there being no locals in these parts.
No, this isn’t a 1951 Jack-the-Ripper. It’s WTAZI, gallery charge d’affaires for the Radio Club of Tacoma, preparing to serve up a tostotne repast to the hungry Radio Club of Tacoma crew. Roy’s offerings must have been tasty indeed, as WTDK’s 5679-point tally was the ace for the W7 call area.

W7OTV/7  Tulalacht Valley Emergency Radio Club         245- AB- 17-  2662
W8IQQ/8  Three Radio Amateurs Ass. (one group of four)
W8CEA/8  Dayton Amateur Radio Assn.
W83EH/3  Abington Township Amateur Radio Assn. (one group of four)
W3EDV/7  York Amateur Radio Club
W8TOL/8  Aerial Radio Club
W8GFZ/8  Muskegon Amateur Radio Assn.
W8WJD/8  Bay City Shortwave Radio Assn.
W8UNM/8  Great City Amateur Radio Assn.
W8QV/7  Fort Wayne Radio Club
W8WJY/9  Syracuse Civil Radio Club
W8QDJ/9  Try the Amateur Radio Societies (nonclub group)
W8WLM/9  Society of Radio Operators
W8OA/3  Mercer County Radio Assn.
W8WR8/5  Canton Amateur Radio Club
W8WU/2  Utica Amateur Radio Club
W2LST/2  Hasbrouck Heights, N.
W8QYN/8  Lima Area Amateur Radio Club
W8VY/7/3  Allegheny Valley Amateur Radio Assn.
W78SF/7  Butler Amateur Radio Club
W8NCK/8  Scranton Valley Amateur Radio Club
W8WY/3/8  Minneapolis Radio Club (nonclub group)
W8WVO/KH6  Richland Amateur Radio Club
W8YPA/7  Windward Oahu Amateur Radio Club
W8LJ/8  Dayton Amateur Radio Assn. (one group of four)
W8PTO/2  W8WFE/5  Winchester County Radio Club
W8AGY/7  Albany Amateur Radio Club
W8PQX/3  Lafayette Amateur Radio Club
W8DDL/5  Jamestown Amateur Radio Club
W8EJ/9  Mid-South Dayton Amateur Radio Assn.
W8RNE/9  Blackhawk Amateur Radio Club
K2BCT/2  Benton Amateur Radio Club
W8WBI/5  Los Angeles Union High School Amateur Radio Club
V8LJV/1  Puyallup Amateur Radio Club
W8WDR/6  (nonclub group)
W8WPN/6  (nonclub group)
W8TAG/4  Spokane Amateur Radio Club
K8AA/5  (nonclub group)
W8WBM/8  Port Angeles Amateur Radio Assn.
W8VW1/4  (nonclub group)
W8QDA/9  (nonclub group)
W8WGT/6  (nonclub group)
R2APT/2  (nonclub group)
W8AUK/7  Cedar Valley Amateur Radio Club
W8TRK/7  Jr. Division, Boy Scouts of America Radio Club
W8KKE/4  Peninsula Amateur Radio Club
W8WSW/7  Snake River Boys and Mikes Club
K7AA/6/KL7  Anchorage Amateur Radio Club
W8CEA/9  San Luis Obispo Amateur Radio Club
W8CNX/6  Northeast Iowa Radio Am. Assn.
W8TVJ/7  Pentium Amateur Radio Assn.
W8DVJ/9  Emilia Amateur Radio Assn.
W8VKE/3  State of Amatuer Radio Assn.
W8WBF/J  Connecticut Amateur Radio Club
W8N1R/9  (nonclub group)
W8JAD/9  (nonclub group)
W8QAX/9  (nonclub group)
W8BOW/4  (nonclub group)

W8WFW/2  (nonclub group)
W8SMV/5  Dayton Amateur Radio Assn. (one group of four)
W8MT/5  (nonclub group)
W8ZJ/2  (nonclub group)
W8FQ/7  (nonclub group)
W8QTH/5  (nonclub group)
W8KKE/5  (nonclub group)

W8WJ/8  (nonclub group)
W8WJ/1  (nonclub group)
W8WUN/9  (nonclub group)
W8QDJ/9  (nonclub group)
W8WLM/9  (nonclub group)
W8QV/7  (nonclub group)
W8WJY/9  (nonclub group)
W8QQA/3  (nonclub group)
W8WJ/9  (nonclub group)
W8OA/3  (nonclub group)
W8WR8/5  (nonclub group)
W8WU/2  (nonclub group)
W8LST/2  (nonclub group)
W8QYN/8  (nonclub group)
W8VY/7/3  (nonclub group)
W78SF/7  (nonclub group)
W8NCK/8  (nonclub group)
W8WY/3/8  (nonclub group)
W8WVO/KH6  (nonclub group)
W8YPA/7  (nonclub group)
W8LJ/8  (nonclub group)
W8PTO/2  (nonclub group)
W8WFE/5  (nonclub group)
W8AGY/7  (nonclub group)
W8PQX/3  (nonclub group)
W8DDL/5  (nonclub group)
W8EJ/9  (nonclub group)
W8RNE/9  (nonclub group)
K2BCT/2  (nonclub group)
W8WBI/5  (nonclub group)
V8LJV/1  (nonclub group)
W8WDR/6  (nonclub group)
W8WPN/6  (nonclub group)
W8TAG/4  (nonclub group)
K8AA/5  (nonclub group)
W8WBM/8  (nonclub group)
W8VW1/4  (nonclub group)
W8QDA/9  (nonclub group)
W8WGT/6  (nonclub group)
R2APT/2  (nonclub group)
W8AUK/7  (nonclub group)
W8TRK/7  (nonclub group)
W8KKE/4  (nonclub group)
W8WSW/7  (nonclub group)
K7AA/6/KL7  (nonclub group)
W8CEA/9  (nonclub group)
W8CNX/6  (nonclub group)
W8TVJ/7  (nonclub group)
W8DVJ/9  (nonclub group)
W8VKE/3  (nonclub group)
W8WBF/J  (nonclub group)

83- AB-  4-  837
92- A-  6-  828
112- A-  6-  816
125- AB-  3-  799
87- A-  5-  783
84- A-  5-  774
129- B-  9-  774
102- B-  9-  762
59- A-  5-  755
60- A-  5-  750
94- B-  5-  714
59- A-  4-  711

December 1954
Columbia University Amateur Radio Club
Froebel Bay Amateur Radio Club
Calumet Area Radio Club
WENMAR/5
Anderson Amateur Radio Club
WFXK/85
Halix Kipling
W2HBB/7
Maumee Valley Radio Assn.
WBPAL/9
Central Illinois Radio Club
W6WPA/8
El Dorado Amateur Radio Club
WBFRO/7
Gallatin Valley Amateur Radio Club
W6LAD/9
(bondclub group)

Two Transmitters Operated Simultaneously

W3EBS/3
Frankford Radio Club
W4MK/4
Richmond Amateur Radio Club
W3RT/3
Frankford Radio Club
W1VB/1
Cleveland Radio Amateur Club
W3NMR/3
Tannen Radio Transmitters Society
W2JIC/2
Bloomington Radio Club
W9C/L/3
Antietam Radio Assn.
W9HUG/4
Iriverton Radio Amateur Club
W9UDU/9
Radio Amateurs of Erie County
W4HRX/4
Hutchinson Amateur Radio Club
W5OFW/8
Tippinapeau Amateur Radio Assn.
W9YMM/8
Fremont Amateur Radio Club
W2EOP/2
Radio Amateurs of Erie County
W4RLD/4
Middletown Pennsylvania Radio Club
W6CLX/6
Aerostar Radio Amateurs Club
W1INM/1
Providence Radio Assn.
W4R6/4
North Mrslb shipyard Radio Club
W3KX/3
Miami City Amateur Radio Club
W4NC/4
Winston Salem Amateur Radio Club
W2TQ/2
Lawrence Amateur Radio Club
W6SKY/9
Pennsylvania Amateur Radio Club
W9NTA/9
Martinsville Amateur Radio Club
W2ODV/2
Bayonne C. V. Amateur Radio Club
W2EWT/2
KBT Radio Club
W2MWA/A
Menasha Amateur Radio Club
W4HIO/4
Chillicothe Amateur Radio Club
W5FC/5
Dominion Amateur Radio Club
W8TU/8
Central Iowa Amateur Radio Club
W6ZD/2
Waukesha Radio Club
W5IOY/9
Prairie Dog Amateur Radio Club
W4HWS/8
Rampshephon Valley Radio Club
W6MLB/0
Midway Amateur Radio Club
W4KE/6
Tampa Radio Club
W4MN/4
Palm Springs Amateur Radio Club
W1GB/1
New Haven Amateur Radio Club
W7AQA/7
Yakima Radio Club

W4ACA/4
Pittsburgh County Amateur Radio Club
W5GUO/5
Radiation Lab. Radio Club
K2DZI/2
Cowanefco Amateur Radio Assn.
K2DZL/2
Mid-Hudson Amateur Radio Club
W6DJ/7
Collingwood Amateur Radio Club
W8FRT/8
Findlay Radio Club
W8CIA/6
Louisville Amateur Radio Club
W7LAP/7
Ozark Amateur Radio Club
W8RTY/8
Kalamazoo Amateur Radio Club
W9DKR/9
Kokomo Amateur Radio Club
W4PA/4
Jackson Radio Club
W4KUD/4
Greenhires Amateur Radio Club
W9GQN/2
Queens Radio Amateur Club
W8WLYT/8
Meredith Amateur Radio Club
W5FGR/3
D1 F + HRP
W1HJL/1
Hounds
W3BVE/3
Alentown Mike and Key Club
W4CWR/6
Baker Ten Cateanias and Operators Club
W9ORD/8
Troutville Radio Amateur Club
W7QWI/7
Scranton Calcium Radio Amateurs
W2KQZ/2
(bondclub group)
W5AVE/5
Mineral Wells Amateur Radio Club
W4UMV/4
Rock Hill Amateur Radio Club
W9GEY/9
Adams County radio Club
W1LW/4
Hoppers Radio Club
W8RFU/8
South Pennsylvania Radio Club
W3MKA/3
West Philadelphia Radio Assn.
W5FE/E
Hartsville Amateur Radio Club
W8EPA/8
Rolls Amateur Radio Assn.
W4XEY/4
Lake Amateur Radio Assn.
W2SON/4
Mecosta County Amateur Radio Club
W3D/3
Haverford Township Emergency Radio Assn.
W4CRI/4
Piedmont Amateur Radio Club
W6ZGA/8
(bondclub group)
W6SKEG/8
(bondclub group)
W7TFQ/7
Hageman Amateur Radio Club
W9EI/9
Muscatine Amateur Radio Club
W7QM/7
Davis High School Radio Club
W6XLC/7
(bondclub group)
W6LNN/1
Glacier Bay Amateur Radio Club
K2CER/6
(bondclub group)
K6KIN/K6B
(bondclub group)
W9WHL/9
W7BPA/7
W9WNS/9
KJBGQ/2
W9WLF/7
W7MTM/2
W8WLI/8
W9WAV/5
(bondclub group)
W9WV/5
(bondclub group)
W8WLY/7
(bondclub group)
W8WLV/7
(bondclub group)
W9BEP/2
St. John's Radio Club
W6KXK/2
(bondclub group)
WITYM/1
Malden Amateur Radio Assn.
W4GLW/A
(bondclub group)

The v.h.f. portion of South Jersey Radio Association's K2AA/2 racked up 215 QSOs on 11-Me., 'phone. Shown (l. t. r.) are W2JAV and W2ECP. Rig ran at 30 watts to an 829-B and a 5-over-5 flop-over-beam. Clubs that haven't already done so better fire up on 2 meters for a real score-booster! Competing in the four-transmitter class, SRA got 972 contacts and 9099 points.

OST for
Halifax Amateur Radio Club, 3221 points in Class 3A with the club-assigned call VE1FO/1, posed with this display of equipment while breaking camp at Glen Margaret, N. S. Sitting (l. to r.): VE1Y, VE1F0, musician VE1S, VE1SF, floating, VENF, VE1F, VE1SA, VE1OM, VE1WE, VE1BD, VE1WD, VE1HJ, VE1ED.  

(Photos by VE1Z)

December 1954
The Novice Round-up
January 8th Through 23rd

ROUND-UP PERIOD

Starts
Jan. 8th
6:00 P.M.
Local Time

Ends
Jan. 23rd
9:00 P.M.
Local Time

The invitation is out to all amateurs to plan participation in the January Novice Round-up, the beginning-of-the-year event tailored to the new operator, CQ NR! Novice or not, your presence is requested January 8th-23rd.

Novices may contact any stations and claim credit if full information is exchanged. Non-Novices will be out to make Novice contacts only. Don't hesitate giving the Novice your number and section even though you're not actively engaged in the Round-up. A few minutes of your time will help him in the competition.

A total of 40 hours is available for operation. Times used listening for culls, checking bands for WN stations, etc. are included in this 40-hour total. (Note the sample reporting form shown.)

Your report is computed by adding the total number of contacts to the speed certified on your Code-Proficiency Award or endorsement sticker; this new sum is then multiplied by the number of different ARRL sections (see page 6) worked to obtain your claimed score. (No Code-Proficiency certification? See contest Rule 4 and Operating News this issue of QST — there's still time to qualify and gain the extra points!)

Novice entrants would do well to check the frequencies above and below the 3700-3750-ke. region for contacts with non-Novices. While the 100-200 watt stations can operate in the Novice segment without undue QRM, to general operation, the higher-powered fellows will probably follow the past practice of calling WNs while outside the Novice band limits.

How To Take Part

Listening to a contest exchange by any of the top contest operators would indicate a pattern to guide you toward efficient activity. If KN6GTK (San Joaquin Valley Section) called CQ and was answered by WN1CKZ of Connecticut, their exchange would be an example of contest operating “know-how” if it approximated this form:

CQ NR CQ NR CQ NR DE KN6GTK KN6GTK KN6GTK K
KN6GTK KN6GTK KN6GTK DE WN1CKZ WN1CKZ WN1CKZ AR
WN1CKZ DE KN6GTK R HR NR 10 SJV BK
BK R HR NR 6 CONN BK
BK R TNX 73 SK WN1CKZ DE KN6GTK Short? Yes! It should be both brief and brisk during a contest event. All information has been exchanged and acknowledged (by use of “R”) and there has been no unnecessary repetition. Send the required information (number and section) keyed to your receiving ability; avoid repeating unless you're requested to do so and in short order you'll be in proper form for the '55 Sweepstakes!

To help minimize your paper work, convenient log sheets are available without charge from ARRL. Write today for these summary sheets and a poster-style U. S. map for your shack.

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

Sample of reporting form that must be used by all contestants.

STATION KN6GTK — SUMMARY OF CONTACTS
NOVICE ROUND-UP

<table>
<thead>
<tr>
<th>Band</th>
<th>Time on or off the air</th>
<th>Date, Time of Contact</th>
<th>Mf. Section</th>
<th>My NR Sent</th>
<th>His NR Recd</th>
<th>His Call</th>
<th>His Section</th>
<th>Number of each new section as worked</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>1901 Jan. 8 1907 1 S.J.V.</td>
<td>1 K9BPL 2 K9CQT</td>
<td>3 2 WN7WKL</td>
<td>4 10 W9BRD</td>
<td>5 4 W9UXM</td>
<td>6 5 W1ZID</td>
<td>7 6 WN5FS</td>
<td>8 5 WN5FIM 9 9 W1YNC 10 6 WN1CKZ 11 16 KN1EUI</td>
</tr>
</tbody>
</table>

Total operating time: 2 hours 31 min.

No. contacts: 11
CP credit: 15
No. sections: 7

Claimed score: 11 contacts plus 15 CP = 26 X 7 (sections) = 182

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

Signature: ____________________________
Date: ________________________________

December 1954

51
RENEWAL FORM 405-A

FCC's amateur licensing unit continues to have occasional difficulty with improper or incomplete filling-out by amateurs of the "streamlined" renewal form 405-A. Let's go over the ground once again:

The regs say that renewal of an amateur license may be filed at any time within the 120 days prior to expiration. If, during such period, you contemplate a change of address or taking the exam for a higher class of license, combine your renewal request with such an action and use the standard form 610. If, however, your application will be only for renewal, use form 405-A which you can also obtain from your district FCC office. This form consists of three joined cards, each of which must be filled out — in other words, in triplicate. Most of the questions are self-explanatory, but the various items under paragraph (4) sometimes cause confusion.

(4a) **Nature of Service.** Here insert the words "amateur operator and station," assuming you are renewing a combined license; if only one license is involved, such as a trustee-club station, so indicate.

(4b) **Class of Station:** Simply, "amateur."

(4c) **Call Sign:** Obviously, the call being renewed.

(4d) **File No.** This is the confusing one. Leave it blank! (The question applies only to certain other services which also use this particular renewal form).

(4e) **License term ending:** This is the expiration date of your ticket being renewed; it is *not* the new expiration date five years from the present.

Then you have the form notarized (only the one card segment needs this action, as indicated) and mail the whole thing to Washington, not to your district office. It is not necessary to include your present ticket. FCC will process the application and mail back to you one portion of the form, authenticated, to serve as your renewal. Thenceforth you carry both your present ticket and your renewal "endorsement" as your license. Incidentally, don't rush to get in your renewal right at the 120-day mark. In the processing of such applications FCC doesn't get around to handling them until about 90 days before expiration anyway; so 45 or 60 days in advance of expiration date is a good time to apply.

SPECIAL ROANOKE ELECTION

To All Full Members of the ARRL Residing in the Roanoke Division:

A special election is about to be held to choose a vice-director for the 1955-1956 term, inasmuch as there was no valid nomination for this office filed in the course of the regular election now being completed.

Nomination is by petition which must reach the Headquarters by noon of December 20, 1954. Ten or more Full Members of the Roanoke Division may join in nominating any eligible Full Member of that Division. The election procedures are specified in the By-Laws, a copy of which will be mailed to any member upon request. Or refer to the August and September QST election notices for general information. Full Members are urged to take the initiative and file nomination petitions immediately.

For the Executive Committee:

A. L. Budlong
Secretary

October 1, 1954

SIDEBAND SEGREGATION DENIED

Something over a year ago the Old Old Timers Club petitioned FCC to remove single-sideband operations from regular amateur voice subbands, claiming the two modes were incompatible. The request had the support of a number of individual southern California amateurs, whose argument

There are now 35 licensed amateurs among the crew at ARRL HQ, well over half the total staff personnel, with the addition in October of six new Novices shown here previewing a "bread-and-wire" waveletter just completed for an up-coming issue of QST: Lorraine Brouillet, WN1CIM, secretary to the Treasurer; Gerald Pinard, WN1CH, shipping department; Mrs. Muriel Roche, WN1CH, mail room; Connie Hegarty, WN1CIE, advertising department; Sam Cowles, WN1CLZ, traffic manager; Joan Mulligan, WN1CLC, circulation department. ACM-Phone Ellen White, W1Y1M, continues her noon-hour tutelage of these newcomers, now of course aiming for higher grades of license.
was that segregation was needed for proper advancement of the art. The Commission has now dismissed the petition, without any affirmative action, reporting that there is no evidence to show incompatibility, and stating further that it is contrary to policy to allocate additional subbands for special groups of amateurs and modes of emission.

CALL SIGN REQUESTS DENIED

Some amateurs recently have requested that FCC make some additional exceptions to its present hard-and-fast rules about the orderly issuance of call signs, to provide two-letter calls for holders of the old "Certificate of Skill" issued by the Department of Commerce, and to provide distinctive call signs to Extra Class licensees. The Commission has denied the requests, pointing out that the burden of processing such special requests would only have the effect of slowing down the entire amateur licensing operation.

GENERAL CLASS EXAM SCOPE EXPANDED

While for some years the old Class B and Class A written examinations remained pretty much the same in scope and, indeed, in precise questions, in recent years FCC has been following a policy of periodic revisions of the technical and regulatory material covered in the various written tests. Some time ago a few questions were added to the Novice exam. When the "restricted" phone bands were thrown open to General and Conditional Class amateurs, FCC upgraded the written exam for those classes to include more material on radiotelephone subjects. By the end of this year written examination papers for the General Class (and of course for Conditional and Technician Classes, since they are the same exam) will carry a number of additional questions on various technical subjects. The License Manual now being distributed from Hq. has complete data. For the information of those for whom the exam might be imminent, we publish herewith example questions to show the scope of the new material.

What is the reciprocal of resistance?
What is skin "effect"?
How may the shock hazard from high-voltage condensers be reduced, after the power supply is turned off, be reduced?
What precautions should be taken to avoid the danger of shock from high-voltage electrical circuits?
What are the undesirable effects of overmodulation in radiotelephony?
What effect does the Q of a circuit have on harmonic output?
What are the relative bandwidths of Type A1 and A3 emissions? Of single-sideband and double-sideband amplitude-modulated emissions?
What is the advantage of a high-pass filter at the input circuit of a television receiver?
In the event of harmonic interference to television reception, what is the advantage of a low-pass filter in the output circuit of an amateur transmitter?
What is the Q of a resonant circuit?
(Continued on page 144)

Walter E. Bradley
1910—1954

Walter E. Bradley, W1FWH, for nearly thirteen years an ARRL Hq. staff member conducting the Technical Information Service, passed away in Hartford on October 30th after a short illness. He was 44.

Born in Greenwich, Conn., W1FWH joined Hq. in 1912, bringing with him considerable experience in conducting radio classes in local schools. Handling the TIS, Walt Bradley became a friendly counselor to thousands of amateurs seeking advice on suitable rigs to build, or on technical problems once they had started construction. Perhaps to many, he was the League. And because his whole heart and soul were in his work, his warm and helpful letters of guidance won many staunch supporters for the League he loved so much. Despite the daily quantity of inquiries to be answered, he was never too busy to jot down a suggested wiring diagram or other sketch when he thought it would amplify the letter.

As an extra project, Walt handled with meticulous care the annual revision of the Handbook tube tables, and autumn evenings would regularly find the light in his office burning through the darkness so that he might meet the copy deadline.

As civil defense radio officer for Hartford, Walt contributed immensely in developing the RACES program of that city. An active amateur, he was also secretary of the Newington Amateur Radio League, and a mobile and Field Day enthusiast. His many friends will, with those of us at Hq., feel a keen sense of loss at his passing.
WTHWH

As an Industrial Arts teacher, my work is entirely with boys. I teach woodwork and drafting in the Tyler Junior High School in Providence, Rhode Island. We have a pleasant shop which occupies the entire length of one-half of the building. Here the boys make the usual articles such as tables, cabinets, etc., and some not-so-usual articles.

All of this leads up to my introduction to amateur radio. Our foundress, Mother McAuley, wished the members of her community to be alert to every new branch of learning and to keep up with the latest methods and developments. I happened, in my capacity as shop teacher, to meet one of the directors of the school who was an A-1 amateur. It was decided that it would be a good plan to give the boys an opportunity to see what an amateur station was and introduce them to the many opportunities that were open to them in the field of electronics. As a result, some have already chosen that field for their life work and have become amateurs.

I started to learn the code and prepare myself to take my Class B examination. In October, 1933, I went to the Customhouse in Boston and took the examination. Some years later, I took the examination for Class A. So far as we have been able to find out, I was the first Sister in the world to receive an amateur license.

I have worked on the 75-, 40-, 20-, 10-, 2-meter and on the old 5-meter bands. At present I am on 75 with a Viking II. The hurricane demolished my antenna, which was attached to the cupola about 100 feet high. My shack was also flooded.

I guess I am just an ordinary ham. During the war, I was a member of the Providence Police Radio Patrol. I like to QSO both phone and c.w. My extra-curricular engagements tend to break up my time so that I have never felt justified in joining a net, which I certainly would do otherwise. I have written a brochure on radio for Youth Magazine, and have had some very interesting and enjoyable contacts and have made some very fine friends.

There is nothing inconsistent in a religious being an amateur radio operator. I think the future will see many more religious women in the field, and then we who have pioneered will be glad that we have blazed the trail for them.

Incidentally, amateur radio provides an excellent means of keeping in touch with other religious members who are toiling in the foreign mission field.

I think ham radio is one of the most enjoyable hobbies that anyone can have, be he OM or YL. But it is more than a hobby; as for the youth of today, it can be a steppingstone to a very fascinating occupation. In no organization is a better spirit of fellowship manifested than in the amateur fraternity. I am very happy to belong to it.

W7MUT

When I came to Boise ten years ago, I had never heard of amateur radio, but in the capital city of Idaho there are more hams than in most cities of the same size. I wanted to buy some war surplus material for my physics laboratory at St. Teresa's Academy - but, and that is how I came into the field. I told my Superior that I could not use a transmitter without an amateur license, so she told me to get one. In July, 1948, I called W7WHU on the telephone and asked him to help me get a license.

In August he gave the exam, and in October I was on the air. A year later I passed the Class A and B exams.

Since that time I have worked most of the bands, but I like 10 meters best when it is open and, in the meantime, I use forty mostly. I used c.w. almost exclusively at first, but now I use phone, too. I have belonged to MARS for three years and was net control one summer. Occasionally, I check into the YL net on 20 meters and am able to give a number of Idaho contacts. I also belong to the Buzzards, Dog Catchers and Polecat Nets and have WAS and RCC certificates.

I think building would be my favorite phase of amateur radio, if I had more time. As a religious and as a full-time science teacher, my time is very limited.

My rig is really something to look at now, as some friends among the Buzzards of California built me a beautiful final, with 211s as modulators. I use Command transmitters to drive the 211s and so now have 300 watts on the air. My antenna on all bands is a Zepp, about 136 feet long, and for ten

*YL Editor, QST. Please send all contributions to WIQON's home address: 318 Fisher St., Walpole, Mass.
I have a three-element beam on top of the school. How I long for the ten-meter band to come back as it was when I first was on the air, and got my first big thrill when I heard Massachusetts giving me a call.

My ticket gave me a greater thrill than any accomplishment, and the joy of it has never faded. The amateurs I meet on the air make me know that the world is still a joyous place, and that it is a safer place because of the amateurs.

W9CLE

In 1948 or 1949, Mother Reilly, president of Barat College [Lake Forest, Ill. — Ep.] asked Don Humnicutt, W9GAP, for advice in buying a receiver to enable us to listen to Vatican broadcasts. Mr. Humnicutt, chief engineer of our broadcast studio (we have a wire direct to WKRS in Waukagon, Ill.) suggested a popular make. I don’t know if any Vatican programs were heard, but in October, 1950, when I returned from studying at the Catholic University, the main interest was Mr. Humnicutt’s 500-watt transmitter. I was merely amused by the transmissions that were appearing on our public address system and all the telephones. It was the first portable he had built and I used to watch him tinker with it, never dreaming that someday I would own one myself. Mother Reilly wanted to set up a short-wave radio club for the students as soon as she found out how simple the procedure was. She set the example by using the code equipment she had procured, but the necessary time to devote to study was often lacking. After Mr. Humnicutt moved to Champaign, Ill., the next step was to accept the proffered services of Chief Frank B. Ramme, USN, W9BWR, who is not only an ardent ham but also a fine teacher with equipment for group instruction. We organized the club at last in September, 1953, enrolling fourteen students. Mother Reilly and I took our Novice examinations early in December and by the end of the month, when the tickets came, we had our Viking II installed, complete with VFO, signal switch, Matchbox antenna coupler, s.w.r. bridge, and — most important — TVI suppression. The antennas are an end-fed Zeppl for 80 meters and a beam for 20. I hope to set up another for 40 and then perhaps for 10. We studied hard to take the examination for the General license during the Easter vacation, and as soon as the tickets came I was named trustee for the club and sent in an application for a license. The ticket came during the graduation ceremonies. A little late for me to capitalize on it for arousing more enthusiasm among the departed students, it was nevertheless ap-

preciated. The call letters are W9HEH. Mother Reilly was transferred to Seattle in early June, where she has already interested several youngsters in her hobby. Her call is W9CLW. I do not know whether she has made application for a W7 call or not. She will not be able to set up a station where she is, so I fear she is lost to the ranks of active amateurs, but her interest is still in it. Chief Ramme is now on duty in the Pacific. He left with us an 80-meter station for the Novices to use: an Eldico TR-75 TVI transmitter, a Hallcrafters SX-28, and a center-fed half-wave antenna. We also have a two-meter Motorola rig on a fixed frequency.

I would be attracted to building if time were cheap. Communications will have to be our main concern. We have students from many foreign countries, and we are hoping to contact friends and families of theirs who have stations. We are also interested in civil defense, and hope to contribute some small share in the programs being worked out.

There is one lesson we are all learning from our hobby — that amateurs are a friendly group with genuine interest and ready service for other amateurs. This summer I taught three Dominican nuns and on the side found it easy to persuade them to start learning the code. It is so easy to arouse interest in amateur radio, and for anyone dealing with youth in extracurricular activities, it is an asset.

Little can be added to the stories given above — they certainly reemphasize the appeal of amateur radio to people in all walks of life.

The November 20th issue of the Saturday Evening Post features an article by Murray Hoyt entitled “Lovely Neighbor.” Inspiration for the fiction piece with an amateur theme came from sixteen-year-old Judy Gage, W1YCU, of Worcester, Mass. (Judy’s photograph appeared in the June column.)

Advance Notice!

The first International Convention of the Young Ladies Radio League will be held the week end of June 25, 1955, at the Hotel Miramar in Santa Monica, California. The Los Angeles Young Ladies Radio Club will be the hostess club. All YLs, whether YLRL members or not, are cordially invited to attend.

December 1954
**40-Meter 'Phone Net**

The forty-meter 'phone net was omitted from the schedule of nets listed with the YLRL which appeared in the October issue. All YLS who operate on forty are invited to call in on 7215 kc. Thursdays at 1000 EST. W4SGD is NCS, with W8IIWX as alternate.

**YLs You May Have Worked**

A quick biography of one of the most well-known YLS of the Southwest.

She's Yettee Matthews, W5DRA, of Las Cruces, New Mexico. Her initial interest in radio sprang from a high school physics class. Later, a course at a technical school.

"Teev" Matthews, W5DRA, prepared her for an amateur license in 1938. Her first rig was a jumble of home-built parts fastened to an old ironing board. To lie of the usual breadboard, which held out for 38 contacts on 30 c.w. before the hand-wound transformer smoked. Out for a ride one evening, Teev spotted the call letters W6CFC on the tire cover of a Model A chugging along ahead. A few c.w. tools on the auto horn and both drivers stopped for a personal QSO. Result: the happy marriage of the two in 1936. Since then, Dick (now W8BIIW) and Teev have enjoyed amateur radio together in a variety of ways. In May 1958, they took over the editing and publishing of the monthly State Radio News Bulletin in CG, New Mexico, which was started in 1948 by W5RNX and his XYL W5RMH. Teev is publicity manager of the Mesilla Valley Radio Club. She operates on 10, 20, and 80; all ASDRA she participates regularly in the State YL MARS net.

**Keeping Up with the Girls**

Captain Kurt Carlson's (W2ZXM) two youngest daughters are now N2KZ TVT and JAT. WNICDE is the call of twelve-year-old Maraca McCoy, daughter of OM W9IWM. Of Headquarters. Southwestern Division Director W6KW's XYL, Roxanna, has been licensed for several months as KN5ELO — thanks to WIYMM, Ellen, for the forecoping. . . . Not only have several of the young YLS featured in the June column gone on to General Class licenses of their own, but two, at least, have talked their fathers into licenses. K2DLS's dad is now KN2JID, and Merced is coaxing Mom, too. W1FCO's dad recently came through with W1KISN. . . . On Sept. 24th, W1UMI, Norma, became the bride of W1YOC, Walt (see Sept. '52 YL column for picture of Norma). . . . Three additional YLRL appointments: District chairman for Africa: Joy Jones, Z85MW, P.O. Box 400, Pretoria, Transvaal, S. Africa. District chairman of England and Europe: Louise (nee) Herklotz, PA0ZGC, 489 Waseenaarweg, The Hague, Holland. District chairman for Australia and New Zealand: ZL4GR, Myrtle Earnhart, 98 Albany Street, Euned, N.J. . . . W6LGG, Bertha, of Marshalltown, Iowa, is sending code practice on 50 six days a week. . . . After three years in Puerto Rico, K1P4WI, Millie, plans to return to the U. S. in January. . . . When V53DDA visited V53AFR, Dell, recently, Ellen was already up on new working c.w., that she used Breyer's instead of plaster on her toothbrush the next morning! . . . OM W9KU6, operating maritime-mobile aboard the SS African Endeavor, reported fine contacts with Z52JR, Helle; Z571NZ, Eileen; Z546ATQ, Theda; Z57F,Padding; and Z588B, Mary. . . . The Los Angeles YLRC sent a delegation from its two-meter net to hear W15DQ speak during the V.H.F. Editor's recent West Coast trip. . . . W1YBT, Cecile, announces the birth of her fourth jr. op., Marie, on Sept. 12th. . . . At one time last summer V66ATP, Maude, had nine hands with her family as her guests at her new mountain-side home in Celctic, Alberta. . . . Several new members have been welcomed to the L.A. YLRC: W6WQK, K5ELI, K5ELE, K5GK, K5EXQ, K5XY, and K5HFF. . . . Conducting a courtship which began on 75 meters, on June 27th W6QY, Martha Phillips, became the bride of W6RQD, Noel Edwards. Martha, a L.A. YLRC member, was introduced to Noel via the Club's Southland Net by W6J3Z, Elna. Unfortunately, Martha became ill shortly after her marriage, and she will be confined to bed for some time. Her address is Cabin 90, Box A, Monrovia, California. . . . On Oct. 7th, W0UH1A, Maxine, had a luncheon for visiting W5RZJ, Louise. Other YL present were W8BEE E11A, KYZ, LBO MFF Q0G and WRT; and on Oct. 8th, W6NAZ, Lenore, interviewed W5RZJ on her TV program. . . . Two new YLS in Glendale are KN6C1R, Allen, and W6DXI, Gladys. . . . The Long Island Unit of the YLRL voted to continue its work for the Braille Technical Press. . . . YLS who attended the New England Division Convention at Manchester were W6CUC, BFC, F94, MCM, M1XX, OAK, QXJ, R1L, RYJ, S1V, T65, T4R, T5H, YKS, YVS, VYT, VYH, VYD, Z4J, Z2D, W2A TBT, K1F, K1W0, and VE2ZHL, W1VO9, Alarge, YLRL chairman for New England, conducted the YLRL meeting. W1YPP, Leona, took the top prize, an 8X83.

**YL Expedition**

Hail the fair sex! Indescribable W9GME, Grace Ryden of Chicago (see this department, May 1959), could well be the instigator of a new type of YL exploit — amateur radio expeditions "maimed" exclusively by YLS!

On August 19th Grace journeyed by boat to Madeline Island, one of the twelve Apostle Islands in Chequamegon Bay off the coast of northern Wisconsin. Discovered in 1665, the island still is inhabited almost exclusively by Chippewa indians, rare birds, deer, and big uncordial bear. After five hours of search for a good and sunny spot, Grace found the spot, and while she hoisted a half-wave doublet, two Chippewas stalked through the bush and eyed the curious proceedings. Using a portable transmitter running 30 watts and aCommercial receiver loaned to her by W6AC, Grace broadcast W9BCY in Ashland, Wisconsin, on ten 'phone, and originated three messages — one each to W1BUD, W9A3D and W9BYX. Her Indian friends stood by, duly flabbergasted by the invisible voice blasting forth from the speaker. At dusk, thought of 1000-pound bear seemed to depart sooner than she would have preferred. She's already planning future trips to each of the twelve Apostle Islands, with Otter Island next on her list. The State of Wisconsin will place a plaque on the site shown in the picture, commemorating Grace's activities.

**Inspired Yet, Girls? Think of the possibilities!**
On the TVI Front

21-Mc. TVI

Good winter band openings bring about an increase in 15-meter operation. This often brings to light the presence of neighborhood TV receivers with 21-Mc. i.f. strips. If such is your interference problem, you might note the continued availability of the Kiser article "TV I.F. Interference." Reprints of this article, discussing the amateur operator, the doctor's dilemma, technician's role, manufacturer's duty, etc., are available from ARRL upon request. The QST TVI bibliography continues to be available, too, as are numerous other printed items tailored to your TVI troubles. Address all requests to the Communications Department.

ARRL. TVI DEMONSTRATION VISITS DALLAS

It isn't every day that over 500 TV servicemen gather under one roof at the same time; however, such was the case during the Second Annual Radio and Television Service Clinic and Electronics Fair held in Dallas, Texas, on August 27th-29th. Officials of the Fair invited ARRL to present its now-famous TVI demonstration in order to instruct visiting servicemen on the causes and cures of TVI. The League was happy to accept the invitation, of course, and the show was presented at the Fair under the direction of Lewis G. McCoy, W11CP, of the ARRL technical department staff.

As a result of numerous planned tours, the ARRL TVI demonstration has been witnessed by thousands of TV servicemen and amateurs in over 50 cities throughout the nation.

ENCOURAGING LETTER

Editor, QST:

I have just finished reading that Vermont will have a television station shortly. As one of the thousands who have gone through the same period and successfully weathered it, I would like to address an open letter to those WIs affected.

This does not mean the end of ham radio for you — not even on 10-meter 'phone! You don't have to give in to it, and you can live with your neighbors. Your hobby can aid thousands in a period of distress. Your hobby is an instrument of peace, helpfulness, and communication.

But it does mean the end of some things: sloppily-constructed rigs, 3 turns on the antenna link, mismatches. But these things never aided you anyway, did they? And in the long run you will own a better, more efficient transmitter.

And since there may always be so horrible a television set that it could never reject TVI, why worry about any complaints that may result in your receiving a notice from the FCC? The television is instructed to solicit your cooperation, too! Try to cooperate. Did you ever realize that when you reply to these complaints you are going on record as having a clean rig? The instant you clean up your rig so your own TV set utters no complaint, that's it. Nothing more is required.

By staying off the air you do nothing in the right and much in the wrong.

Phil Rand has spelled it out for you. Using his techniques, I have been able to operate a TBS-50-D on 10 'phone with the family TV, just ten feet away, tuned to Channel 2.

So please, please do not stay off the air.

— Charles F. Smith, Jr., W3UJP
CALENDAR NOTES

The December Calendar has been prepared and will be in the hands of member-societies shortly. Among subjects discussed are the announcement of the readmission of the Japan Amateur Radio League as the member-society for Japan; acceptance of the proposal made by the Radio Society of Great Britain recommending the adoption of the RSM Code; and a proposal by Headquarters that the Radio Club Boliviano be accepted as the member-society for Bolivia. Mention is made of further implementation of the Atlantic City allocations in Hong Kong, due to effective liaison between the Postoffice and the Hong Kong Amateur Radio Transmitting Society. The following members have completed, this year, their 25th year as members of the IARU: New Zealand Association of Radio Transmitters, Norsk Radio Relae Liga, Experimentierende Danes Radio-amator, Sveriges Sandreamator, Union Schweiz Kurzwellen Amateur, and Irish Radio Transmitters Society. Another 25th anniversary: that of the Calendar itself!

A fine international convention was held by the Savez Radioamatera Jugoslavije in Ljubljana August 19th-23rd. Over 500 hams, from England, Sweden, Denmark, Austria, Italy, Germany and Yugoslavia, were present.

Also in the Calendar is the annual report of the Secretary, which reflected a fairly quiet year, with no major conferences. It showed moderate progress in the liberalization of operating restrictions in several countries; notably, Austria withdrew its objections to international communications by its amateurs, and DX restrictions in the Philippines were eased. Several new countries were put on the DX map by expeditions.

QSL BUREAUS OF THE WORLD

For delivery of your QSLs to foreign amateurs, simply mail cards direct to the bureau of the proper country, as listed below. (Bold-face type indicates a recent change from previous listings.) Do not send foreign cards to A.R.R.L. headquarters except for those for which no bureau is here listed.

For service on incoming foreign cards, see list of domestic bureaus in most QSTs (page 56 of September) under the heading, "A.R.R.L. QSL Bureau."

Algeria: Via France
Angola: L.R.A., P.O. Box 158, Luanda
Argentina: R.C.A., Avenida Libertador General San Martin 1850, Buenos Aires
Australian: W.I.A., Box 2611 W, G.P.O., Melbourne
Australia: DVS, Kurlingang Street 10, Klaestenhagen
Austria: QSL Bureau (U.S. Occupation Forces), APO 969, 96, 97, Postmaster, New York, N. Y.
Austria: Via Portugal
Bolivia: C.A. Albuoy, Telecommunications Dept., Nassau
Bosnia: V.P.C., Wood Goddard, Bromley, Welch's, Christ Ch., Barbados, British West Indies
Belgian Congo: P.O. Box 271, Leopoldville
Belgium: U.B.A., Postbox 684, Brussel
Bermuda: V.P.D., James A. Mann, The Cut, St. George
Bolivia: R.C.B., Casilla 2111, La Paz
Brazil: L.A.B.R.E., Caixa Postal 3535, Rio de Janeiro
British Guiana: Diamond Yond, 22 Sunset St., Charlestown, Georgetown #18
British Honduras: D. Hunter, Box 178, Belize
Bulgaria: Box 830, Sofia
Bolivia: B.A.R.S., P.O. Box 376, Rangoon
Ceylon: H. B. Johnson, KB6BA, U.S.P.O. 05-50000, Canton Island, South Pacific
Chile: Radio Club de Chile, Box 761, Santiago
Cyprus: Mrs. E. Barrett, P.O. Box 219, Limassol
Czechoslovakia: C.A.V., P.O. Box 69, Prague I
Denmark: P. Heinemann, O24H, Vanloes Alle 100, Copenhagen
Dominica: Calle Duarte #76, C. Trujillo
East Africa: (VQ1, VQ3, VQ4, VQ5): P.O. Box 1813, Nairobi, Kenya
Equador: Guayaquil Radio Club, Casilla 784, Guayaquil
Eire: I.R.T.S. QSL Bureau, 9, 95, 96, 97, 98, 99, Orwell Gardens, Rathgar, Dublin
Fiji: S. H. Mayne, FB2AS, Victoria Parade, Suva
Finland: SRL, Box 506, Helsinki

(Continued on page 148)

Dr. Edmundo A. Reyes, DU1OR, president of the Philippine Amateur Radio Association (second from left) learns the history of the Wolff Ang at WIBUD during a visit to Headquarters on August 10th. Looking on are WIBDI and W1DF.

QST for
PROTECTIVE CIRCUIT

4820 Narramasse Ave.
San Diego 7, Calif.

Editor, QST:
I read with interest the article "A Protective Circuit for Transmitting 'Tetrodes'" in October QST. The circuit described is almost identical to the circuit that was published in QST for April, 1948, in the H & K section. The principal difference is that in my circuit the tube was protected against failure of the plate supply in case the screen is furnished from a separate supply. This circuit is protected by U. S. Patent No. 2,572,832; however, I have no objection to the use of the circuit by an individual amateur for his own transmitter.

— W. B. Bernard, K8EUS

OPEN LETTER

Route No. 5 (Lafayette Pike)
Clarksville, Tenn.

Editor, QST:
Fellow Single-Sideband Operators — please don't let the action of so few double-sideband operators cause you to become "numskulls" also. We now have an a.s.b. traffic net on 3990 kc. each Monday and Friday evening — let's all get this net going to become a "net standard." Remember this same frequency is shared with other nets on other evenings — respect these other nets. Remembering you hold the "big stick," why use it to destroy an old-fashioned d.a.b. net just because a few carriers bother you? If one remembers that d.s.b. lends everything the hard way you can see that the correct approach is to set up the Interstate Sideband Net as an example of a.s.b. at its best.

The point is that the action of a very few double-sideband operators in deliberately trying (if they only knew how helpless they are) to QRM the Interstate Sideband Net is causing a few single-sideband boys (mostly power-mad Yankees, hi) to "pay-em-back" by destroying the Trans-Continental Telephone Net (3075 kc.) and the Tennessee Telephone Net (3980 kc.). Knowing full well, through much experience, that you can't tell a d.a.b. die-hard anything, it is felt more will be accomplished by appealing to the a.s.b. numskull. Actually, there is very little difference between the thickness of either's skull, hi. See page 9, Oct. QST (spare-c.w. feats of the Twenties). Think I'll go to u.h.f. until the above "mess" clears.

— Conway L. Wilson, W4WWT

FOXY

R. R. No. 2
Hagerstown, Ind.

Editor, QST:
A word for the hidden-transmitter hunters from one who has had the experience of being thought of as a spy.

On October 3rd I was the "fox" for the New Castle Amateur Radio Association's transmitter hunt. The rules stated I had to be on public property. I pulled into an old barn on the premises of the Wilbur Wright birthplace and started to transmit for the "hunters." I never gave a thought about it looking suspicious as the property is open to visitors to see Wilbur Wright's birthplace and is owned by the Indiana Department of Conservation. I noticed a car come, but thought it was visitors to see the place. However, when the first ham found me he discovered that the sheriff had been called, as there was a "car in there with the motor running." Being able to hear the radio at times they thought it transmit for Communists using radio.

You can see how serious this might become. Ham's in general might not know how suspicious they can look at times. In this case the deputy sheriff who investigated was a personal friend of mine so there was no trouble.

My advice would be always to get permission to use a place, even if it might not seem necessary, if you're off the road, and always make sure that any strangers around are informed as to what is happening. We as hams don't want to cause any trouble, so profit by my mistake.

— Horace N. Smith, WA4POD

THE LAST WORD

643 Oak Street
Las Animas, Colo.

Editor, QST:
It seems to me that every amateur who has voiced an opinion in QST has taken sides in the "codeless" license conflict. It is my opinion that adequate space has been devoted to both sides and that the advocates of code have presented the better case.

I hope we don't lose track of our main objectives, however. One of the outstanding virtues of hams is the ability to get something done as a group. Frankly, I don't think the idea of a "codeless license" has brought about much except some differences of opinion. If there is going to be something done, let's do it — as a group — and stop the individual debates.

— William E. Stradley, W6BHK

STAFF OPENING

We have a permanent opening for a young man to do general editorial and production work on the QST staff. Here is a chance to make amateur radio your career. The work requires the ability to express yourself both orally and on paper, and will later involve a modest amount of travel. Any applicant should be one with initiative and should be able to assume administrative responsibility readily.

We'd like a someone about 25, preferably single, of pleasing personality, with at least a couple of years of ham experience under his belt; mostly someone who has had some publishing or writing experience. We want a young man because we would expect to train him on the job. Salary would be commensurate with ability and background.

If you are interested, write to Box A, ARRL Hq., West Hartford, Conn. State your age and marital status, and give a résumé of your educational and employment or military background; also your amateur experience.

December 1954
DX Century Club

The following list contains the call letters and countries totals of all holders of the Postwar DX Century Club award as of October 15, 1954. The calls of new members as well as those receiving endorsement credit during the period September 15 through October 15, 1954, are included in this listing.
(Continued on following page)
Hooper Trophy

The Eighth Naval District won the top three places in the first national competition among Naval Reserve electronics divisions for excellence in electronics training during fiscal year 1954.

Naval Reserve Electronics Division 8-12, Paris, Texas, came from behind to win the Hooper trophy (p. 73, November QST).

In third place in the Eighth Naval District competition at the end of May, a final score of 104.2581 carried NRED 8-12 to the top among approximately 125 electronics divisions. Cmdr. Paul H. Daniels, USNR, is commanding officer.

Naval Reserve Electronics Division 8-10, Tyler, Texas, commanded by Lt. D. Hudson, jr., USNR, was a close second with a score of 104.1999. Another Tyler division, Naval Reserve Electronics Division 8-14, commanded by Lt. W. J. Murdaugh, USNR, scored heavily in June to win third place with 101.7603 points.

Fourth place in the national competition went to Naval Reserve Electronics Division 12-6, Santa Rosa, Calif., commanded by Lt. Cmdr. A. R. Butz, USNR, with a score of 100.1508.

The Eighth Naval District was the first naval district to put all of its Naval Reserve training centers on the air as licensed amateur radio stations.

NFD at district headquarters in New Orleans was the first master control station with all of its stationkeepers and Naval Reserve supplemental personnel holding amateur radio licenses.
CONDUCTED BY ROD NEWKIRK, W9BRD

Who?
In many respects, thirteen years is a long time. W2TNC agrees. We think you'll find the following excerpt from his recent letter quite interesting.

... On the morning of December 7, 1941, at about 0700 Hawaiian time, I was operating K6SRZ at Port Shafter on 14,200-ke. phone, working a station in the Colorado-Utah area. As you no doubt can well imagine, there came a bit of confusion around there at that particular moment. The operator of the mainland station heard some of the fracas in the background and asked us—Harry Longeriher, W2QGY, and myself—what all the noise and fuss was about. We said QRLX while we looked him up and found out. He didn't think we ever did come back to the guy. For all we know he may still be holding the circuit open, waiting for our reply.

Inasmuch as he is one of the few State-side persons who actually heard the commotion that morning, we now wish to establish his identity. Major Longeriher recently was in the islands but was unsuccessful in locating the old K6SRZ logs for that period.

Hams, as a rule, are a patient lot. Yet we doubt that the other end of this K6SRZ QSO is still standing by waiting for the answer to his inquiry. Anyway, the ex-K6SRZ gang would like to find him. Can you enlighten W2TNC?

Where:
Don't overlook 1ARC News in this QST for it includes a review of the first issue of QSL bureau that we ever heard of. KB6BA (ex-KL7CB-WASBN-KH6ANZ) who takes over the Canton Island bureau, expects to inhabit the KB6 area for at least two more years. ETSS of Addis tells ZD6BX that stations he works should QRX for his calls before eluding their own QSLs Ethipianward. Although Thalass—and along with Cambod, Laos, Viet-Nam, Indonesia, Iran and Korea—still is on FCC's ban list, for correspondence purposes you can reach H6ID, James D. Fry, Jr., at JUMAG, Box B, APO 740, at Postmaster, San Francisco. From LeRoy Waite of NNRC we learn that LU6AH, Jose Guerra, Dpto. Com. Nav. MM, Buenos Aires, Argentina, acts as QSL bureau manager for LU "Z" stations. W6WKE tells 6W6K that he's shipping a batch of Grahamland pasteboards northward this month and expects to remain active until March. Notes from W2MLO: (1) MP4BBL, a Yablakh mechanic, laboriously patches up homemade QSLs until an order of 3000 arrives. He owns 100-per-cent QSL, although it may take some time to lick the zooming backlog. (2) SV6s WK and WL (K6AUU and W6ZID) who recently completed their Crete jaunt, desire stamped self-addressed envelopes be sent to them at APO 206, c/o Postmaster, New York, N. Y., by those Ws seeking desired Crete confirmations. Please bear in mind that none of the addresses to follow is necessarily "official" nor can we guarantee accuracy. Thanks to W6 RD VED WPO WPR, K2GFQ, W2WZ, W3 SOH WPG, W3NOQG, W4 UF YDT YZC, W5WQN, W6 GP BQ UJ, W8CED, W9CFT, F9BM, K6M8, ZD6BX, NDXC, NNRC, W6GDX and 200- DXC for this rundown:

AG2BB, Bill Roth, APO 200, c/o Postmaster, New York, N. Y. —— BV1US, MAAC, APO 63, c/o Postmaster.

+ New Mailing Address: Effective immediately, please mail all reports of DX activity to DX Editor Newkirk's new QTH: 8833 North Kenmore Ave., Chicago 40, Illinois.
Left: ON4VY's installation is a good example of the more elaborate Continental ham shack. Re椐 operates most amateur bands and also performs duties as 18A society's secretary-general. — Right: OQ5ZZ showed up on schedule in early September, operated by UCAR personnel at the Commercial and Industrial Exhibition, Elisabethville. In the UCAR booth we find (1. to r.l) OQ5E, PU LY RU AJ and HG. OQ5ZZ had 276 QSOs on twenty meters, 51 on fifteen, 13 on forty, 2 on eighty and 1 on ten; all continents and 59 countries were worked. OQ5CP sat in to roll up 93 of these contacts. Specially designed OQ5ZZ QSL cards are on the way.

Capé, U. of So. Afr. ... SAA7S, P.O. Box 372 Tripoli, Libya.

Whence:
Asia — XZ3OM, whose new address appears in "Where," operates regularly on (A3) 14,120, 14,240 ke; (A1) 14,020, 14,050 and 14,100 ke. KR6RS finds him available daily between 1200 and 1400 GMT with 40 watts to an 807, a dipole antenna and an AR-88 receiver. ... Had news for W1YPO and others: Ex-AP2N, according to friend W9FKC, hasn't been in Pakistan since last December. Norm now is in India and hopes to reappear permanently as a V42. ... KR6OS keeps losing antennas in Okinawa typhoons; an N8 beam was the most recent casualty. "Have been disappointed by QSL returns—44 countries worked and only 26 confirmed so far—but pleased with the fine W6 QSL return. Paths seldom open for W6 during the present operating period (1000-2000 GMT)." ... K9AAH is an instructor in the 1st Calvary Division's Hokkaido radio school. ... "The Chinese Nationalist Government has assigned the local call sign BVIUS to the MAAG Mars station ABUIS. ... Call sign BVIUS will be used when operating on 7060, 14,050, 14,250, 21,200, 29,080, 28,100 and 29,050 kc." This from Co., W. B. Latta, USA. Thus the ABUIS gang now can do business toward widely needed Formosa DXCC credits. ... In a note to W6SWG, CR6AF registers his expectation to become a CTI onetime after next March.

Arica — A Mr. T. Shepherd, who penned the following excerpt to W6UJ, is about to fire up ZD8SA on Ascension Island. "This is to inform you that ZD8V is a pirate. We're being inundated with QSL cards and letters and our relatives are getting bashed, so will request that ZD8V hear that a USAF detachment is setting up on Tristan da Cunha. More future ZD9h? ... During his 6-month South African visit GOTT will be QSOing DX buddies behind the label Z9GG. That fat 144-ke. phone signal of Z5SNN stows from an 841 home in a 2-watt and 3-el. squitter. He receives with an Edystone 750.

Oceanias — From G2RO, now touring Pacific areas with his fantastic 15-watt, we receive this tentative itinerary: Solomon Islands, Nov. 22nd through Dec. 7th; Gilbert & Ellice Islands (and possible nearby stops), Dec. 30th through Jan. 4th; Cocos Islands, Feb. 6th-8th; Mauritius, Feb. 9th-13th; Kenya, Feb. 12th-16th; and back in London by late February. ... From KB6BA re Canton ham doines: "With the departure for the mainland of KB6s AO and AY a few days ago our ham population now is down to two — KB6AM and myself. KB6AM accepted a position with CAA in the Bay area and KB6AY is slated for Albuquerque, N. Mex." KB6s AY and QA prefer 20 meters, A5 and A1, and the latter is niggling up a 60-ft., high 3-el. beam, while considering possible S.A.S. work. KB6BA anticipates no local VRI activity in the near future ....... W6YY1 gleanings: VE2BZ/ZM17 knocked off 29 Ws, seven ZLs, four Ws, three Ws, two K8s, and six W3s with K4Y and KL7 customers during his August Tochesian cruise. Bard's present assignment calls for further visits to ZM7 areas — keep QRV with that QRO! ... From ZK1BG: "Lately I have been receiving many QSL cards from European amateurs for 20-meter operation in July, 1964. ... I have not been on 20 since before Christmas, 1963. There are two ZK1s very active on 20 — ZK1AB and ZK1B1 — but I, myself, stick to 80. ZK1AB is consistently on 20 around 0400 GMT," ZK1BG regularly hauls 3512 kc. beginning at 0800 GMT. Europe — 3A2AW (SM6AP) made it to Monte Carlo this year but QSOs just can't be had. ... SM2PM on 40. Carl admits he was very QRV having fun at Monte Carlo. SM6AP now has 138 countries confirmed, 169 on ... on 40. ... 3E1F, school station at Haslem Technical College, Netherlands, aims to QSO more W2XZ/W2N in the future. ... CT1CL gives 75-meter 'phone a try every Sunday from 0600 to 0800 GMT on 3700 kc. ... F7BM, formerly the call of WS6DAZ, is now used by W2TXY in the U. S. station — F7BM has 80 countries and 42 states confirmed toward DXCC and WAS trophies. Other Yanks in F7-land include W4YDF, W5VK0, W7TJY, WS8X1, W6JEF (F7DB), W6UPM, K2IH, K2JOS and K6DCT (F7C2). ... Concerning the transatlantic crossing of British 61-foot lifeboat Arias (p. 58, June QST), W1RSC was of emergency assistance on July 22nd when the vessel's ship-frequency gear conked out. W1RSC, contacting the boat on 7 Mhz., forwarded word of the predicament to the Coast Guard for relay to the British Admiralty, London. Arias made hom dock okay on August 10th after 55 days and 8200 miles of ocean hardship.

South America — In QSO with W8HUT, V8PA confirmed the present absence of ham activity on South Sandwich and South Georgia islands. VPs6 AA AZ and BE are very active from Grahamland; VPs6 A Q and AX, South Shetlands; and VPs6 AB and AT. ... San Andres & Providencia Islands (HK8) is a country newly added to the LABRE (Brazil) WAA-award list. Newfoundland & Labrador (VO) credit for W4A henceforth will be given only for QSLs confirming QSOs made before Dec. 31st, 1954.

HEREABOUTS — FM7W1N still works toward an FG7 ham-style vacation, according to W6YY. John also found X6PGQ mightily popular on 20 'phone, who turned out to be W6MYC mobilizing in the higher mountain reaches of Mexico. ... W4HQN understands that his was the only 75-meter 'phone heard by the KC4AB gang on Navassa (and while operating mobile at that). ... Ex-V6RCD (V6YAR) dropped in at ARRL, on his mobile-style tour of the U. S. Chas successfully dodged windy YLs Carol, Edna and Hazel on a journey which ultimately will wind up in Hawaii. ... In addition to heavy editorial work on NC0XJX's DXer, W6PC managed to elince a DITF-IV diploma .... W6TL, chairman for the 6th annual DX Conference sponsored jointly by the Northern and Southern California DX Clubs and scheduled for January 16th-18th at the Fresno, Calif., Hotel California, is standing by for inquiries and reservations at P.O. Box 76, Oakland. DXers throughout the world are welcome .... WSBDBK flew into the Virgin Islands and WDNN dropped in at Home Group headquarters while in St. Louis. ... W8KBT lost his 10-15 and 40-40 tower in recent breeze .... Write Radio Club of Cuba, Lealad

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160-METER TRANSATLANTIC TESTS

Plans for the 1954-1955 series of 160-meter DX tests, as arranged by informed U.S.A. and British amateurs, have been completed and all "Top Band" stations throughout the world are invited to participate. Conditions are expected to be good, for transatlantic and New Zealand-U.S.A. contacts occurred as early as October 9th. Regular nightly activity is anticipated and concentrated efforts are recommended as follows.

**Dates:** December 6th and 19th; January 2nd, 16th and 30th; February 13th.

**Times:** The period between 0800 and 0000 GMT is recommended. W and VE stations are urged to transmit for a minimum of five minutes, listen for DX answers for five minutes, transmit for another five minutes, repeating the ten-minute cycle after the hour, etc., until DX contact is established.

Transmission by DX stations will commence five minutes after the hour, observe a 1-minute period of silence for DX activity. Station operators are urged to maintain time-piece accuracy. The use of a "QO TEST" is recommended. Stations should be kept short to ensure maximum opportunity for all participants.

**Frequency:** Look for all stations on their assigned band, 1935-1875 kc. ZLs will be using their 1875-1900 kc segment. DX stations are urged to tune in all W/VE sectors — 1800-1925, 1835-1900, 1900-1925 and 1975-2000 kc.

**Reports:** Stations should make a complete report. 25-AW Pleasant Street, Winthrop, Mass., will appreciate reports from participating W/VE stations. DX stations can communicate their reports to C. J. Thomas, W1QGH, Farnet Barn, Turkey Road, Bexhill, England. Good Luck!

Note: See text for news of additional organized 160-meter activity sponsored by the Top-Band DX Club and W3RQG.
The text is a mix of natural and non-natural content. It seems to be a page from a magazine or a book, containing a mix of text and images. The text is not legible enough to transcribe accurately.
ANY good v.h.f. man knows that September and October are the wrong months to be away from home. This was never more true than in 1954; your conductor was only two days out on a 7-week western tour that started Sept. 2nd, when things began popping. Since the early ‘30s Labor Day week end has marked the beginning of the fall v.h.f. DX season, but with our much-improved equipment and more widespread activity records topped this year as never before.

Just compare the 2-meter states-worked box in November QST with the one appearing in these pages and you begin to get the idea. New states were being added everywhere; one operator reaching a grand total of 291 The September Mc. record was extended for the first time in two years and now stands at 700 miles. Two-way work was done on 144, 220 and 420 Mc. over many paths that would have been considered impassable to v.h.f. signals only a few years ago. It was a good fall!

Checking of the September V.I.F. Party logs, just being completed as we write, shows 373 reporting. This pushes the fall party just a few logs ahead of the spring affair, and that one set a record for participation and reporting. Growth of interest is particularly in evidence in the Middle West and in W6 and W7. Activity in our v.h.f. parties was once largely confined to the northeastern seaboard states, but it is no longer that way.

Proof: 155 contacts on 50 and 144 Mc. by W9WOK, Bensenville, Ill.; 131 on 144 Mc. alone by W9KLR, Rensselaer, Ind.; 106 in 17 sections on 144 Mc. only by W8WXV, Shiloh, Ohio. In Oregon, W7OKV worked 60 stations on 144 Mc., and W7UF and W7PZV/7 lead the Washington Section with 63 and 83 contacts on 2 meters, respectively. You had to do better than 100 contacts to rank near the top in most of the California sections. Reporting was way up from W6land, particularly from the Los Angeles Section, where W6WSQ made 230 contacts on 50, 144 and 220 Mc. Contest details and scores next month.

September-October DX

The big doings of Labor Day week end are rather ancient history by now, but even at this late date some highlights are worth noting. W4UMF, Arlington, Va., reports Wisconsin and Michigan stations coming through on 144 Mc. as late as 1100 on the 4th, with the band opening again in a westerly direction about 2000. At 2055 EST Tom hooked up with WB5EFQ, West Richfield, Ohio, on 144, shifting to 220 Mc. shortly thereafter, for what was probably the first Ohio-to-Virginia contact on that band. W2QED, Seabrook, N.J., also was busy on 220, working W5E SUT L.P.D. DX FPQ and NAM, either two-way or crossband 220-144.

A big event for eastern stations was the appearance of (for most of them) their first Kentucky signal on 144 Mc. Working as fast as possible, W4PCT, Covington, provided contacts with his state for 2 Massachusetts, 6 Connecticut, 12 New York, 16 New Jersey, 1 Maryland, and 14 Pennsylvania stations between 1922 and 2330 CST. WB5EFQ worked the same number of stations as W4PCT on 144 Mc., 52. Here were divided between 6 W1s, 18 W2s, 6 W3s, 8 W4s, 4 W5s, 6 W6s, and 2 VE2s. Margaret also worked W4UMF, W3s SUT KMRQ/JLZ, and W2s QED FBZ DZA RFY, WSDX and W9QYV on 220 Mc. On 432 she worked W2RE, W3MIRQ/S, W2QED, and was heard by W5N. Agawam, Mass. This last one was a new record if Harold had not had feeder trouble on his 432-Mc. beam, preventing him from making it a two-way.

Probably never before in v.h.f. history had there been such busy work over the Allegheny Mountains. All we suspect that this general success was more the result of improved equipment and polarization standardization than of exceptional fall conditions. These 400- to 800-mile contacts are being made increasingly often over mountainous paths, and getting both areas on the same polarization seems to have been an important factor in this. We feel reasonably sure

*V.I.F. Editor, QST.

December 1954
that the trend to horizontal polarization now showing in
some western areas will prove equally beneficial to W6A and
W7A who are interested in extended-range work.

October produced v.h.f. DX sessions at least equal to the
best that September had to offer. On the morning of Oct.
8th W6BFQ found W411RK, Collierville, Tenn., and
W5RCL, Marks, Miss., coming through on 144 Mc. Nancy
was made with W5RCL, for a switch to 220 Mc. Rex heard
Margaret at once, but she was not able to read his phone.
W5RCL then rigged a keying method and at 0941 EST they
made it two-way on 220, for a new record of 708 miles.

The band remained open throughout the morning and
into the afternoon. WSBFQ made her first contact on 144
Mc, with W5JTT, Jackson, Miss., and skeds were kept hourly.
Tim got W5HQC, Rayville, La., on the air during noon
hour, and this netted state No. 29 for W5BFQ. They
worked solidly on voice at 1421 EST, over a distance of
about 800 miles. Then followed numerous attempts at new
states east of way, but it being mild static activity was low.
WSBFQ heard W5FSF, Houston, Texas, and W4UFU, Pensacola,
Fla., weekly several times, but no contact could be made. W5JTT and W6EP, Terra Alta, W. Va., were also on
the edge of a QSO but never quite made it.

Oct. 8th to 10th was good farther east, also, WSRNC, Hagerstown, Md., worked W4PCT, Covington, Ky., W9MUD, Doecurt, and W9UED, Belleville, Ill.

RECORDS
Two-Way Work
50 Mc.: CEAII — J9A00
10,500 Miles — October 17, 1917
111 Mc.: W6ZL — W5QNL
1100 Miles — June 10, 1913
220 Mc.: W8BFQ — W5RCL
700 Miles — October 9, 1914
415 Mc.: W1RFU — W6YVE
410 Miles — June 12, 1914
1215 Mc.: G3QC/P — G8DD/P
100 Miles — July 26, 1913
2300 Mc.: W616FE/6 — W5ET/7
150 Miles — October 5, 1917
5250 Mc.: W2LGF/2 — W7QPF/2
31 Miles — December 2, 1915
10,000 Mc.: W7JP/7 — W7OKV/7
109 Miles — August 8, 1914
21,000 Mc.: WINVL/2 — W9SAD/2
800 Feet — May 18, 1916

Overland, and W6ETJ, Ellsberry, Mo., on the night of the 9th, and W6YFX, St. Louis, the night of the 9th. This was a "pipeline" to the St. Louis area, with W6YFX running 88 to 9 for about 11 hours beginning about 2215 EST.

This period netted three new states for W62BL, Haddon Heights, N. J., George was hearing several W6s and is shortly after midnight of the 8th. At 1000 on the 9th, W411RK was heard calling CQ, and later working W8A4R and W4AO. W2BLY raised him at 1045, at which time the signal of W411RK was running about 82, with occasional S97s who are heard in the area. W2BLY worked him out to 1217, and there is no activity to be found at that time of day.

W8HID, Overland, Mo., used this session to catch W5HQC, W2U1 and W6SCNC, Louisiana, New Jersey and Maryland, bringing his states-worked total up to 21. Now that there is 2-meter activity in just about all areas east of the Rockies, one of those born to show some of the DX possibilities of the 2-meter band. A circle of 800 miles radius takes in a lot of territory.

Here and There on the V.H.F. Bands

While aurora contacts have been made now and then with voice on 50 Mc., modulation of any sort has been largely unintelligible on 144 Mc. In most aurora sessions, usually, if you hear a continuous roaring noise on 144 Mc., during an aurora you can take it for granted that you're listening
to someone trying to use voice, but W1YQI, Marblehead, Mass., had better luck on Sept. 14th. Coming across some aurora at the 130-mile mark, a rather busy 2-meter activity was heard, with someone summoning "W7 X7, X7, X7." The W7 station responded in vision for Key, Bill tried calling W8XWY on "phone, Al came back, and later shifted to voice, also. Though the sig-

als sounded "like someone shouting into an empty barrel and moving around, in a manner similar to that of a two-way on
voice, and W1RFU, Withillaugh, Mass., made it on voice shortly after. These distances, 600 and 825 miles, respectively, are the best we've heard of being worked on voice since a 144-Mc. aurora on May 31st (both W8XWY and W1YQ1) and the 61-element array 105 feet high at W8XWY undoubtedly had quite a bit to do with this.

In the "mountain complex," is gradually disappearing. As the result of numerous demonstrations of what is now known as "knife-edge refraction" (see October, 1933, QST, page 65) and greater familiarity with the scintillating effects that they come to play when high power and large antennas are used, more and more v.h.f. men are working out some of these locations. A recent example is the work of WTVMP, Phoenix, Ariz. This station is manned by the Fowlers, who first made the pages of QST (April, 1932) as amateur radio's first licensed tripler.

They now live in Phoenix, Ariz., where they have a kilo-

watt rig (pair of GL-50Es in the final), a 32-element array and a Tecraft converter. With this setup it was no time at all before WTVMP (they also call the callsign W60VMQ) began working beyond the mountains, to points never before worked from Phoenix on amateur frequencies above 60 Mc. First came W7U5, Boulder City, Nev., a 240-
meter shot, made first on Aug. 29th, 1932, and this was the first California QSO on 144 Mc. From Phoenix came on Sept. 5th, W6B8E/5, on Santa Rosa Peak, New Mexico was added on Sept. 15th, with W6FAG/5, Mt. Withington. Perhaps the most significant contact was W411RE in Angeles, 357 miles, Sept. 14th. If there was ever a QSO to disqualify the "impossible mountain" complex that has gripped v.h.f. enthusiasts for a generation, this was it — home-station to home-station over mountains as rough as you're likely to find anywhere. And to prove it that was one shot-out proposition, another contact was made Oct. 20th.

Schedules are now being kept with W6QKI (ex-W3QKI) Sherman Oaks, Calif. (Los Angeles area), regularly. Beginning Oct. 15th, this sked was kept successfully 6 out of the first 7 days. Signals are weak, but in them regularly. Similar results are being achieved with W5WU, Albuquerque, N. Mex., following a first contact Oct. 21st. This is a 250-mile hop over very mountainous terrain. Best DX to date: W62AT/6, Mt. Pinos, 414 miles, during the September V.H.F. Page. Interest in this sort of work is growing rapidly. W7KFS is also out with high power and will do well, and W7FGG will be in there shortly with high power and a 64-
element array.

There have been scattered reports over much greater distances from both Arizona and New Mexico recently. W5WU was heard during the contest by W6TJF, Bresi-

lyn, Minn., nearly 1000 miles. John has 500 watts and a 32-element array. Meteor-scatter tests between W5WU and W411RK are producing some signals, though W6411RK found communication-quality stuff as yet. W7UFQ reports reception of an unidentified W6 on Sept. 20th, and has received information that W6UFQ, Des Moines, Iowa, heard him at about the same time.

A fireball seen in the skies east of Albuquerque the night of Sept. 18th appears to have been responsible for several 144-Mc. DX heard reports, though the W7UFQ reception (240 Mc CST) reports a half-hour trouble time and no definite observation. W6WU saw the phenomenon, aimed his beam at it, and heard several fluttery signals but was not able to identify them. We'd like to collect more information on this one, including specific details on the report of reception of W7UFQ by a station in Chicago. Will anyone who was in on this (time around 2130 CST, Sept. 18th) please fill us in on details?

Some rather extensive antenna rebuilding projects are under way along the Atlantic Seaboard as the result of the damage done by the several hurricanes that passed over way last fall. W2BLZ gives a partial report of his experience and or tower casualties: W2s ERI PAU GLE EDAYV UCY QED FXT VX ZUL, W3BII, W3 Us and GC. These go a long way toward accounting for the quiet state of the 2-meter band we've noted from our return from the West.

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S.s.b. on 144 Mc. Some time ago we reported a W6 as being possibly the first user of s.s.b. on 144 Mc. This brought out the fact that W2JFC, New Market, N. J., has been on since March, his first contact being with K2BP on the 27th of that month. At that time he had an output of only about one watt, from a 6G6. More recently, an 852A at 30 watts peak has been added. The signal has been received with excellent results by many users of crystal-controlled converters, including W2MIN, some 50 miles distant. The antenna up to now has been a temporary affair lashed to the boom of a 20-meter beam, but a better array is under construction.

Use of the 230-Mc. band for regular nightly rag-chewing is gathering momentum in a number of our metropolitan areas. W9Q2Z, W6OYF and W5QZ are active regularly in and around Minneapolis. W9QZL, W9FRY and W9DRN recently. The hams would be glad to keep schedules with other 230-Mc. operators.

WS4K, whose letter in September QST, "A Technician Speaks," stirred up quite a hornet's nest, says that he also brought him in contact with several fellows in the Atlanta area who were interested in 230. W4JX, among them, has already run on two ways on 230.

Anyone interested in 220 around Cleveland check out W3IR, W3BY, or W3RQ, all on 220.

**2-METER STANDINGS**

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</tr>
</tbody>
</table>

**H. E. M. Stevenson,**

**WSDN, HC20T, CO2JF, W5BR**

In the high n.u.u.f. years of 1946 to 1961, few amateurs did more to promote international DX on 50 Mc, than HC20T, Guiyuqui, Ecuador. Steve kept a constant check on the frequencies near the 50-Mc. band, and by comparing notes with many others of like interest all over the world on 14 and 28 Mc., he missed few chances to make DX contacts on those bands.

Such diligent searching, and before the sunspot cycle petered out in 1961, HC20T had worked more than 150 stations on 50 Mc., in 26 states and nearly every country of South and Central America where there was 6-meter activity. To commemorate these history-making QSOs, Steve created the Order of the Friendship of an American ham with a notable American ham to Cuba. Soon he was on the air there, too, and as CO2JF gave many Ws their first 50-Mc. contact with that country.

In 1961 this famous station passed into history, when Steve joined work with a constellation of Dxers specializing in large-scale projects in Latin America. He then followed a short period on 10, 6 and 2 from Houston, Texas, under his old call, W5DDN, and later, W5BR. But before long he was off to Latin America again, this time to Northern Chile. Before he had a chance to get on the air as CO2JF, Steve was transferred to Lima, Peru. There, as OA4DX, he worked principally on 14 and 21 Mc., but kept a watchful eye on his pet band, 50 Mc.

When we last heard from him was in Colombia, filled with enthusiasm over his promising location, and hoping soon to be trying for 40-Mc. DX as HK4JF, which was not to be; late in the summer he came back to his home town for treatment of an old ailment, and on September 23rd he passed away in a Houston hospital.

Steve's ham activity began back in the war days. In the years just prior to World War II he was active on 20, 10 and 6 meters as W5QZM. During the war he served as an officer in the Army Engineers in the China-Burma-India Theater. It was probably as HC20T that he was best known. His cheerful voice and competent fist will be missed by DX men as well as W.h.f. men, for he ranked high in both circles. With a rare combination of friendly relaxed manner, technical competence and operating skill, Steve made friends, as well as contacts, on whatever band he used.

**IS YOURS ON FILE WITH YOUR QSL MGR?**

<table>
<thead>
<tr>
<th>Your Call</th>
<th>Your Name</th>
<th>Your City, State.U.S.A.</th>
</tr>
</thead>
<tbody>
<tr>
<td>W2RJ</td>
<td>W2RJ</td>
<td>W2RJ</td>
</tr>
</tbody>
</table>

December 1954
by a very full ARRL activity schedule as may be confirmed by a quick glance at the Activities Calendar. December offers a last chance to get those improvements in the operating arrangement, where you have been putting them off. Are you all set for operating with full fast break-in, the receiving set-up the best for maximum signals and noise ratio and general efficiency, impedances matched for top power transfer and 1:1 a.w.r.? It’s not too late to fix a rig for h.f. (if you have been on v.h.f. only) or a v.h.f. rig (for the v.h.f. SS Jan. 8th-9th) if up to now you have only experienced the low end of our spectrum! All Novices should get our free log form to be ready for Jan. 8th-23rd operation in the Novice Round-up, rules elsewhere in this issue. The DX-minded gang according to reports is already putting up new beams and kw. finals for the annual DX contesting time coming up in February. The story is the same: with the good midwinter conditions activities will come so hot and fast after the turn of the year you can’t make them all unless the technical matters are finished now in December!

RTTY. The RTTY Society of Southern California held its second annual RTTY Sweepstakes, October 30th (9 P.M. EST) to Nov. 1st (3 A.M. EST). VE6GL reports working F7BM quite often. KA2WW and others overseas are getting operational according to reports. The East Coast RTTY Net meets each Wednesday 3620 kc. at 7 P.M. EST. W3PTYW then clears with W9TJ, NCS of RTNET Midwest meeting at a later hour. RTNET So. Cal. meets Tuesdays 8 P.M. PST on 147.85 Mc. with W6AEE having liaison through 7140 kc. schedules to the first mentioned groups.

Region I, Civil Defense Test. Federal Civil Defense Administration Headquarters has just written ARRL of tentative plans for a civil defense test of stand-by radio planned tentatively for February, 1955. Plans call for a careful survey of the amateur facilities in the whole Region I area (New York, New Jersey, and New England). Results and conclusions should be applicable to all parts of the nation.

FCDA in asking the assistance and cooperation of ARRL in these plans has in view the maximum development of radio stand-by facilities and their integration at state and local levels, and the expansion, testing and recruiting of facilities looking to February. All ECs and SECs in Region I have been notified. Your monthly reports to ARRL as well as the special questionnaire put out on this test will indicate what this whole ARRL leader-

**QST for**
ship crew can accomplish, working toward a definite objective over the all-too-short period from now to February!

Throughout the nation FCDA is asking fullest participation of both the Amateur Radio Emergency Corps and every RACES group and the expediting of Radio Amateur Civil Emergency Service plans in all states and communities. Monthly reports by each EC and Radio Officer should cover training activities, radio drills, new members brought into groups, extension of plans and the like. When consolidated by the NEC these constitute the regional and national picture. It is essential we have these data so we at ARLRL may be able accurately to convey to FCDA, FCC and others interested, the true public service potential as represented in our operational facilities.

We appeal to every EC and SEC to start a build-up. Be ready to meet any call or emergency requiring your communications. This will be directly preparatory to the over-all nationwide civil defense exercise (of which the February Region I test is a dry run) looking to about May, 1955!

A question to the individual amateur: Are you registered in the AREC or identified with a RACES group?

— F.E.H.

<table>
<thead>
<tr>
<th>A.R.R.L. ACTIVITIES CALENDAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dec. 4th: CP Qualifying Run — W60WP</td>
</tr>
<tr>
<td>Dec. 16th: CP Qualifying Run — W1AW</td>
</tr>
<tr>
<td>Jan. 7th: CP Qualifying Run — W60WP</td>
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<tr>
<td>Jan. 8th-9th: V.H.F. Sweepstakes</td>
</tr>
<tr>
<td>Jan. 8th-23rd: Novice Round-up</td>
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<tr>
<td>Jan. 14th: CP Qualifying Run — W1AW</td>
</tr>
<tr>
<td>Jan. 15th-16th: CD QSO Party (e.w.)</td>
</tr>
<tr>
<td>Jan. 22nd-23rd: CD QSO Party (phone)</td>
</tr>
<tr>
<td>Feb. 5th: CP Qualifying Run — W60WP</td>
</tr>
<tr>
<td>Feb. 8th: Frequency Measuring Test</td>
</tr>
<tr>
<td>Feb. 11th-13th: DX Competition (phone)</td>
</tr>
<tr>
<td>Feb. 14th: CP Qualifying Run — W1AW</td>
</tr>
<tr>
<td>Feb. 25th-27th: DX Competition (e.w.)</td>
</tr>
<tr>
<td>Mar. 5th: CP Qualifying Run — W60WP</td>
</tr>
<tr>
<td>Mar. 11th-13th: DX Competition (phone)</td>
</tr>
<tr>
<td>Mar. 15th: CP Qualifying Run — W1AW</td>
</tr>
<tr>
<td>Mar. 25th-27th: DX Competition (e.w.)</td>
</tr>
<tr>
<td>Apr. 8th: CP Qualifying Run — W60WP</td>
</tr>
<tr>
<td>Apr. 13th: CP Qualifying Run — W1AW</td>
</tr>
<tr>
<td>Apr. 16th-17th: CD QSO Party (e.w.)</td>
</tr>
<tr>
<td>Apr. 23rd-24th: CD QSO Party (phone)</td>
</tr>
</tbody>
</table>

ELECTION NOTICE

(To all ARLRL members residing in the Sections listed below.)

You are hereby notified that an election for Section Communications Manager is about to be held in your respective Section. Please note that this notice supersedes previous notices.

Nominations are solicited. The signatures of five or more ARLRL 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 in West Hartford, Conn., on or before noon on the closing dates specified. In cases where no valid nominating petitions were received in response to previous notices, the closing dates are set aside 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 reason of expiring memberships, individual signers uncertain or ignorant of their membership status, etc.

The following nomination form is suggested: (Signers will please add city and street addresses to facilitate checking membership.)

--- F. E. Handy, Communications Manager

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

<table>
<thead>
<tr>
<th>Section</th>
<th>Closing Date</th>
<th>SCM Present</th>
<th>SCM Previous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mississippi</td>
<td>Dec. 15, 1954</td>
<td>Dr. A. R. Cortese</td>
<td>Mar. 8, 1955</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>Feb. 15, 1955</td>
<td>Howard C. Bellman</td>
<td>Apr. 12, 1955</td>
</tr>
<tr>
<td>Southern Texas</td>
<td>Feb. 15, 1955</td>
<td>Dr. Charles Fernandich</td>
<td>Apr. 29, 1955</td>
</tr>
<tr>
<td>New Mexico</td>
<td>Mar. 15, 1955</td>
<td>G. Marion Sayre</td>
<td>May 4, 1955</td>
</tr>
</tbody>
</table>

* In Canadian Sections nominating petitions for Section Managers must be addressed to Canadian Director Alex Reid, 169 Logan Ave., St. Lambert, Quebec. To be valid, petitions must be filed with him on or before closing dates named.

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.

Arkansas

<table>
<thead>
<tr>
<th>Section</th>
<th>Closing Date</th>
<th>SCM Present</th>
<th>SCM Previous</th>
</tr>
</thead>
</table>

December 1954
SEPTEMBER FMT RESULTS

In the September ARRL Frequency Measuring Test, open to both ARRL Official Observers and other amateurs, entries were received from 147 participants who reported 641 measurements; 72 entries were submitted by Observers and 75 by non-OOs entrants. Each entry has received an individual report comparing the accuracy of his measurements with the special W1AW FMT transmissions with those made during the test by a professional frequency-measuring laboratory.

The standings of leaders in the test are given below. Decimal fractions are shown only to establish an order of listing, since the entries can only be accredited to 0.4 parts per million. W4JWT, W2OUT, W811H, W8CUJ and W8YCP were all within this 0.4 ppm range of accuracy of the laboratory-issued, and all therefore have honors equally. In accordance with the announced rules, no entry consisting of a single measurement was considered eligible in the competition.

<table>
<thead>
<tr>
<th>Observers</th>
<th>Parts/</th>
<th>Million</th>
<th>Non-</th>
<th>Parts/</th>
<th>Million</th>
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<tr>
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<td>0.0</td>
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<tr>
<td>W811H</td>
<td>0.5</td>
<td>W811B</td>
<td>0.0</td>
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<tr>
<td>W2IPF</td>
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<td>W8CUJ</td>
<td>0.3</td>
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<tr>
<td>W3PSI</td>
<td>3.3</td>
<td>W8YCP</td>
<td>1.3</td>
<td>1.3</td>
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<tr>
<td>W61IQ</td>
<td>5.2</td>
<td>W5TVG</td>
<td>2.3</td>
<td>2.3</td>
<td></td>
</tr>
<tr>
<td>W81IQ</td>
<td>5.3</td>
<td>W9LZP</td>
<td>2.4</td>
<td>2.4</td>
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<tr>
<td>W8W1Y</td>
<td>5.7</td>
<td>W2WH</td>
<td>3.3</td>
<td>3.3</td>
<td></td>
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<tr>
<td>W82X</td>
<td>6.5</td>
<td>W4ANK</td>
<td>3.3</td>
<td>3.3</td>
<td></td>
</tr>
<tr>
<td>W8WUX</td>
<td>8.5</td>
<td>W4MB</td>
<td>3.4</td>
<td>3.4</td>
<td></td>
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<tr>
<td>W8W1Y</td>
<td>8.7</td>
<td>W6LYY</td>
<td>3.7</td>
<td>3.7</td>
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</tr>
<tr>
<td>W82X</td>
<td>9.0</td>
<td>W1GKO</td>
<td>4.4</td>
<td>4.4</td>
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<tr>
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<td>W5EQD</td>
<td>4.9</td>
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<td>11.2</td>
<td>W4QN</td>
<td>5.4</td>
<td>5.4</td>
<td></td>
</tr>
</tbody>
</table>

The following ratings are based on a single measurement:
OOs — W6DVT 2.3, W5QYX 1.8, W1PXH 11.0. NON-OOs — W6AXY 2.5.

OPERATION ALERT

The nation-wide test of civil defense preparedness sponsored by the Federal Civil Defense Administration and conducted at federal, state and local levels in the U.S., its possessions and Canada, was not just a test of RACES (amateur) facilities, or even just of communications facilities. It affected every civil defense service. We amateurs took our place in the line-up along with all other civil defense volunteers, and the performance we turned in as amateurs did us considerable credit, as c.d. administrators throughout the country have recognized.

Prior to the test, way back last year, ARRL dispatched a bulletin to its c.d.'s announcing the coming of Operation Alert and requesting all to get ready to participate to whatever extent possible. Some 350 c.d.'s replied, 343 of whom indicated their intention to participate in the test, 38 saying they could not participate for one reason or another. After the test we received 189 reports of participation by 2558 amateurs operating over 1700 stations of which 857 were fixed, 128 portable, 736 mobile and 63 hand-carried. Sixty c.d.'s reported participating under RACES, the others in AREC status in support of their local civil defense organizations. Along with these statistical data were volumes of detailed information on the test, probably of more significance than the data themselves. Browse with us a bit while we summarize some of the reports.

In Alberta, participating stations were divided into two groups: Key Stations in the larger cities, such as Edmonton (W81IM), Grande Prairie (W6RRF and W6FED), Calgary (V6GOD), Lethbridge (W6BPY and V6GEO), and Medicine Hat (V60GJ, W6NA and V6OEE); and Stand-by Stations in the smaller communities of Camrose (V6GFF), Cowboy (V6YAI), Olds (V6YDI) and High River (W6YQI) and others. These latter to maintain radio silence until or unless called upon. V6GOD assumed his station as c.d. Radio Officer for Edmonton at 1800, June 14th, and the Alberts Net was opened at 1900 MIST. Although there was little traffic passed, civil defense officials were very much aware of the existence of the amateur net.

Although it at first appeared that Allegheny County (Pittsburgh) traffic was going to be heavy, only one call was made; c.d. for a fire at the Federal Building. No other traffic was passed.

In Arizona, the same was true. A call was received from c.d. in Phoenix on June 14th, but traffic was nil.

In California, Operation Alert was not well publicized. In the Los Angeles area, a call was received from c.d. in Long Beach, but traffic was nil.

In Connecticut, Operation Alert was not well publicized. Traffic was nil.

In Illinois, Operation Alert was not well publicized. Traffic was nil.

In Maine, Operation Alert was not well publicized. Traffic was nil.

In Missouri, Operation Alert was not well publicized. Traffic was nil.

In New York City, c.d. there received a call to report to his station at 1700. However, there was no traffic passed.

In Ohio, Operation Alert was not well publicized. Traffic was nil.

In Oklahoma, Operation Alert was not well publicized. Traffic was nil.

In Pennsylvania, Operation Alert was not well publicized. Traffic was nil.

In Wisconsin, Operation Alert was not well publicized. Traffic was nil.

This trailer was the alternate Control Station for Norfolk during Operation Alert. Built by and for the Cavalier Amateur Emergency Radio Assn., it has been a major personal project of Norfolk EC W4NY for several years. Shown in the picture, left to right, are W4LS, HPC LCW, TEL NO, WJR and VWP. (Photo by W4FV)
was pleased to note that the amateurs were on hand and ready to go except for getting RACES authorization. Approximately 40 amateurs turned out in Norfolk, which was struck by a simulated atom bomb in the downtown area at 10:04. The headquarters station was manned by W44AJ, W45BB, W46JA, W47JI, W48JD and W4B. The alternate control station, the mobile communication trailer of the Cavalier Amateur Radio Assn. (W44WJZ), was set up in the suburbs and manned by EC W44WJ, W45A BRJ, W47LCW. The mobile units were several miles without control. When the control trailers was passed to the trailer, operation of which proved very successful. Across the harbor in Hampton, amateurs were active under EC W44A, in contact with Richmond, Norfolk, and other state points as well as with each other. W27WM reported from sea a Bock gang on 29.5 and 145.14 Mc., but the former was badly QRM’d by short skip, Two meters worked out best for local communication, Statewide, the QRN on 3905 and 1965 kHz was made operation all but impossible, says W7JTW. W5MU reports for the North Little Rock, Ark., gang which operated in full cooperation with the Little Rock AREC. He used his own station as NCS on 29,382 kHz. A long-penned rig was set up on 9935 kHz for transferring traffic from the 10-meter mobiles and fixed stations to the state control station in Little Rock. Excellent coverage of the entire area was available on 10 meters, and the net maintained excellent discipline.

Civil Defense authorities in the city of Louisville said no drill was needed and that no part would be taken in the national test. W4MPI reports that the Louisville AREC operated in coordination with the Third Mobile Support Group of Kentucky Civil Defense, the Louisville Citizens’ Cross, Ky., Main Fire Dept., State Highway Dept., Ky. State Police, CAA, the airlines and Fort Knox. Net control was W4RCC at the Red Cross in Louisville. Total traffic, about 500, with over 25 amateurs participating.

In Maine, amateurs were called upon to establish communication between state and county control centers. In addition, many counties used amateur radio for intracounty purposes. Available portable and mobiles. SEC W1BYK reports a total of over 70 amateurs participating. The state network operated on 3061 kHz, starting at 1020 on the 14th and ending at 1115 on the 15th. W1FRS was NCS at the State C.D. Control Center. W1AY and his gang were active in the New Bedford, Mass., area. Operation started at 0850 June 14th from control station W1KKM, operated by W1WGN, with W1AYY as stand-by station. The drill was conducted in an orderly fashion with neighboring towns also taking part. Contacts were 100 per cent throughout, with most stations observing strict radio silence unless needed.

At 0000 on June 14th, Pennsylvania’s Ozone Center activated its radio circuits comprising all the counties in the Eastern Area of Pennsylvania. Telephone lines were used to link the center with the net control stations: W3B1P for c.w. and W3UKF for ‘phone. Thirteen counties reported into the ‘phone net and three into the c.w. net. Sixty 30 messages were handled, and radio circuits were secured at 2200. Radio Officer W3F3BF held a critique after the test to pinpoint some of the shaky spots, but in general the test went off very well.

In Philadelphia itself, EC W3DYL (one of the county Amateur Radio Division put the extensive and energetic Philadelphia gang through its paces. The yellow alert at 0930 found all five county control centers in operation. The mobile communications unit operated from a central location with W3WXO at the control center and W3WXXVX in the exercise, and at one point talked from one of the control centers to the mobile control unit, known as Trunk No. 500. That evening between 1900 and 2130 a drill of mobile facilities was conducted, Seventy of Philadelphia’s main “gateways” were covered by mobiles to report to responsible control centers, using ten meters. All of Philadelphia’s c.d. officials agreed that the exercise was the most successful yet conducted in this city.

Tennessee State Radio Officer, W4AEE (formerly SEC) sent in a very complete report of Tennessee activities during the drill, via the present SEC, W4RRV. Since the state RACES network had not yet been organized, general amateur activities passed through SEC W4W5C. In Memphis, the approved RACES plan went into operation, working into the state civil defense net from their control center station, W4EM. Although there was no organized amateur plan in Chattanooga, W411D arranged to provide communication from that city to state control. Memphis and Chattanooga were “bombed” as a part of the state exercise. The state NCS, W4ADD, opened up on 3905 kHz, at 0900 the 14th. After checking with Georgia net control W4FBC, it was agreed that the latter would move to 3906, with Tennessee moving to 3902. Later, as the QRM became worse in the 10-kc. RACES segment, all stations in the Tennessee net changed to 3880 kHz, which was used from then on. Some 80 formal messages were originated, 25 received. Operation was completed at 0129 on June 15th. Over 20 stations were in the state net, representing all major cities and/or relaying when reception became difficult. The usual transmission and equipment difficulties prevailed, but the test was termed eminently successful by all concerned.

These are but a few of the more outstanding of the reports received—mainly those who gave us some details additional to (or instead of) the information on the card, Operation Alert, if it did nothing else, very strongly indicated to civil defense officials at all levels, throughout the United States and Canada, that amateurs are actively working in this thing, preparing to do a big job for their country in the event of need.

The following is a list of all the Eas who reported—hope we haven’t missed anyone:

<table>
<thead>
<tr>
<th>Call Sign</th>
<th>Reports Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>W4ADD</td>
<td>Tennessee</td>
</tr>
<tr>
<td>W411D</td>
<td>Chattanooga</td>
</tr>
<tr>
<td>W4EM</td>
<td>Memphis</td>
</tr>
<tr>
<td>W4ADD</td>
<td>Tennessee</td>
</tr>
</tbody>
</table>

NATIONAL CALLING AND EMERGENCY FREQUENCIES (kc.)

<table>
<thead>
<tr>
<th>C. W.</th>
<th>PHONE</th>
</tr>
</thead>
<tbody>
<tr>
<td>3550</td>
<td>14,050</td>
</tr>
<tr>
<td>7100</td>
<td>21,050</td>
</tr>
<tr>
<td>25100</td>
<td>20,640</td>
</tr>
</tbody>
</table>

During periods of communications emergency these channels will be monitored for emergency traffic. At other times, these channels will be used for national calling frequencies to expedite general traffic movement between amateur stations. Emergency traffic has precedence. After the contact has been made, the frequency should be vacated immediately to accommodate other contacts.

The following are the National Calling and Emergency Frequencies for Canada:

<table>
<thead>
<tr>
<th>Callsign</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>5965</td>
<td>14,060</td>
</tr>
</tbody>
</table>
Providing communications from the accident scene were W7PCC/M and W7VY/M. On the other end were K7FCC and W7KUH/M. K7FCC relayed information to Great Falls Air Base authorities and W7KUH provided communication between the emergency control tower. Also assisting was W7DXK/M who directed traffic near the accident scene until military police arrived.

W7KUH, SBC Montana

On Friday, Sept. 10th, W7N0M was at the Hart Mt. (Ore.) game refuge for some archery hunting when a large range fire was reported out of control and threatening the refuge headquarters. There was also some communication with the Forest Service in Lakeview, about 60 miles away, so a call was made on the Oregon Emergency Net frequency (3840 kc) and W7QEI and W7SB8 were contacted. QEI relayed to SB8 who called the department and requested equipment be sent to the area. W7VJU was also there helping. In due time the equipment arrived and the fire put under control — thanks to OSH.

W7N0M

Even while the SBT was being energetically worked by Indiana amateurs on October 9th-10th, the stage was set for two catastrophic strikes that took "simultaneous" out of the picture and inured more damage to the service facilities than was expected. Public opinion is at a low ebb and demands for the appearance of the section emergency facilities. During Saturday night, heavy rains poured onto northern Indiana and Illinois, causing flood conditions at Plymouth and other northern Indiana communities that were as bad as those in the New England area were through the same time. Then on Monday, October 11th, a tornado struck into the vitals of Franklin, Indiana, destroying thirty homes and injuring several persons.

EC W9AF was in charge of the Plymouth flood communications problems and was assisted by Ed W9GAD and W9JIW, all working mobile with stations in near-by South Bend, where EC W9UB headed an active group. EC W9KRM organized a group of mobiles to cover the Franklin tornado scene. They included W9s Alq UG7 and Z7NF.

The Indiana Fone Net was called into session to handle the emergency with W9EQO as NCS. Stations assisting included W9s CDU CMT NTA ILU FWS EDS FTM AB CC MAM ZIB FUE WSQBM and many others.

W9LZI, SBC Indiana

On Sunday evening, July 25th, the Sheriff's Department of Broward County, Fla., called Eastern Florida SEC W4IM requesting contact be made with one Leo Yob, W8KYY, who was operating mobile somewhere in Florida and advised he would call home due to an emergency. The Broward Emergency Net was immediately contacted for local coverage. Early Monday, July 26th, W4IM originated a message addressed to W8KYY/M which was passed to W4DRD for placement on the Florida 'Phone Traffic Net' on 3045 kc.

It was ten-meter skip that finally did the job, however. One of the mobiles of the Broward Emergency Net contacted W1LGE on 20,400 kc, and just on chance suggested he give W8KYY/M a call, after explaining the circumstances. In this way the contact was made and W8KYY was notified of the emergency from Florida via relay through Connecticut while he was traveling in Georgia.

W4IM, SBC Eastern Florida

On June 13, 1954, six members of the Sidney (N. Y.) Amateur Radio Club provided communications for the outboard motorboat marathon starting at Alexandria Bay, past Clayton to Cape Vincent and back to the starting line. A large crowd trip of about 69 miles. The six mobiles involved, operating on 29.0 mc., were W2s GFD UPT JG3 MTB RZP and R2CXY. W2GFD and W2RZP set up a 40-watt station

Dodge Division of Chrysler Corporation recently donated a Dodge Route Van truck to the Essex County Amateur Radio Club, W3GIS, for use of the Detroit area AREG in emergencies. The mobile unit is equipped with a generator and three complete operating positions, including a 4-meter W7XW transeiver unit. Most of the new equipment was donated by Elmac. In the picture, Dodge officials are thanked by radio by Assistant EC W3SLQ. That's W8CYL standing behind the van, and Detroit CD Communications Coordinator Al Thomas second from right.

QST for
on the dock at Alexandria Bay. W2JG operated at Clayton, R2CVX at Cape Vincent, with W2UPT and W2MBT oper-
ing a 10-watt operation. Each-day's report was sent via the mail and was kept on hand-by the Alexandria Bay station. Operation lasted from approximately 1800 to 1700 EDST. Approximately 60 boats started and were officially checked off at Clayton and Cape Vincent. These check-off returns were then returned to the starting point in order for the boats to qualify. The boys managed to get the results in despite weak signals and high ignition QRN.

On Sunday, August 29th, the Atlantic Motorcycle Club held an endurance run from Mirror Lake to Aultona Lake, a distance of about 78 miles. Amateur mobile units provided valuable assistance along the route. Mobile stations participating were W6°C TS RV1 YFR N8 IFL WRY PUM and QMN. Fixed stations who helped relay the W6 WWP LYG PMJ UOH KXM UMT and YER. Several weak points were discovered in the emergency set-up and will be corrected by the time we have another drill or a real emergency.

Thirteen SEC reports hit the NEC desk reporting August activities, on behalf of 3292 AEC members. This represents an increase of one report over last year, and a slight increase of AEC members is represented. However, it's a decrease of three from August, 1952.

**CODE PROFICIENCY PROGRAM**

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificates. The next qualifying run from W1AW will be made on December 16th at 2130 EST. Identical texts will be sent simultaneously by automatic transmitters on 1885, 3555, 7125, 14,100, 21,020, 52,000 and 145,000 kc. The next qualifying run from W6OEP will only be transmitted on December 4th at 2100 PST on 5300 and 7098 kc.

Any person may apply for a new ARRL membership or a new 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 transmissions will be made from W1AW each evening at 2100 EST, Speeds are 15, 20, 25, 30 and 35 w.p.m. on Monday, Wednesday and Friday, and 5, 75, 10 and 15 w.p.m. on Sunday, Tuesday and Saturday. Approximately 10 minutes practice is given at each speed as well as other speeds used on several occasions. Transmitters are given below. These make it possible to check your copy. For practice purposes the order of words in each line of QST text is reversed. To get sending practice, hook up your own key and buzzer and attempt to send in step with W1AW.

**Traffic Topics**

The way one becomes accustomed to doing things is a very powerful influence in determining the way he wants to do things. This principle applies very strongly in handling traffic as well as in all other phases of amateur operation. Habit is a very hard to break, especially when it is associated with an activity, and is often difficult to change.

Throughout many, many years, ARRL has been called upon to set the standards for procedure in handling traffic, and has endeavored to do so in as much detail as practicable. Yet, it has very seldom been possible to adopt the procedure preferred by the majority, because usually there is no such thing. We have tried to adopt procedure that is both logical and utilitarian to the maximum degree, and we have tried to make this the standard among amateurs, usually with success; sometimes it just hasn't taken hold.

We are a bunch of philosophers and stickers about the procedure, but at the same time are willing to point out to the possibility of an amateur standard in traffic handling procedure, as outlined in the booklet Operating an Amateur Radio Station. The writer of this column personally does not agree that all the standards set up are the best. You will not agree, either, with all of them, in probability. Yet that in itself is no reason to change them. Whether you or I agree with them or not, if we are to achieve an amateur standard we should follow them to the letter, squawking as we do so if it makes us feel better, until or unless the majority seems to prefer to do some other way. Then we'll change the standard, and the squawking will then be on the part of the minority who liked the old way of doing it. Yes, there will always be someone disappointed. C'est la vie.

The type of person most likely to be dissatisfied, however, is the one who disagrees but goes along in the hope that he can correct or change things with whom he disagrees. It is easy (and natural) to pick up your marbles and play by yourself, and most of us, in our own "hobby," follow the easiest and most natural path. But real progress is made by those who follow their natural instincts only after they have rationalized them.

W6BVU and W4RGI report that the Early Bird Net had a traffic count of 759 messages during the month of September.

**ARRL — AFFILIATED CLUB**

**HONOR ROLL**

It is with great pleasure that we here present the second section of our Honor Roll listings for 1954 in accordance with the Board policy for special recognition of all affiliated clubs whose entire membership consists of members of the League. Refer to page 69 of June QST for the earlier listing of additional active clubs with 100 per cent ARRL membership. Our Honor Roll is updated each time a report on analysis of data received in the '54 Annual Information Survey conducted to meet Board requirements. In early '55 a new form will be sent each active affiliate for the filings on which continued affiliation and new Honor Roll listings will be based. Very many clubs will now be engaged in mid-season activities, contests and other activities for newly-interested persons, civil defense, building and technical programs for members. The '55 survey will assist the nationwide compilation of our status and progress besides getting required ARRL information. The following clubs now will receive "100% ARRL Club" certifications following publication of this QST.

**The Amateur Radio Transmitting Society of Louisville, Ky.**

**Athena Amateur Radio Club, Athens, Ohio.**

**Dryden Radio Club, Dryden, Ont., Canada.**

**The 50 Club of California, Inc., South Gate, Calif.**

**Fulton County Radio Club, Canton, Ill.**

**Gulf Coast Amateur Radio Club, Inc., Huntsboro, Miss.**

**Helix Amateur Radio Club, San Diego, Calif.**

**Jacksonville Amateur Radio Society, Jacksonville, Fla.**

**Lower Columbia Amateur Radio Association, Longview, Wash.**

**Maxi Amateur Radio Club, Maui, T.H.**

**Muskingum Amateur Radio Association, Zanesville, Ohio.**

**Norfolk County Radio Association, East Walpole, Mass.**

**North Montana Radio Club, Montana**

**Palomar Radio Club, Escondido, Calif.**

**Reading Radio Club, Reading, Pa.**

**Rock River Radio Club, Dixon, Ill.**

**Southern Pacific Amateur Radio Klub, Eugene, Ore.**

**Valley Radio Club of Eugene, Ore.**

**Western Slope Radio Club, Grand Junction, Colo.**

**National Traffic System.** We believe we have not yet chronicled changes in several NT systems. Managers, in the Sixth Regional Net, W6JHJ took over from W6IPW some time ago, and VE3GI is the successor to VE3BUI on TRN;
One of the more prominent traffic stations heard daily on the forty-meter band is W3CVE, Conan W. "Red" Burger, manager of the Transcontinental Relay Net. Red is working out an agreement with the USO for handling servicemen’s traffic, and is shown here with the local USO Director at the W3CVE operating position. (Remo Photos)

Walt has had a long and successful management career in a tough field to handle, and he is remaining with the net but turning the reins over to Burt. In the Seventh Region, W7BZL has resigned but continues to act until the Pacific Area Staff recommends his successor — probably an accomplished fact by the time you read this. In the Fifth Region, W6KRK has resigned owing to the pressure of business, and a successor is being named forthcoming. So the NTS turnover continues, and that about brings us up to date as of the middle of October.

September reports:

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| Section* | 340 | 2033 | 6.0 |

Summary:

Regular: 737 7915 EAN 10.7 CAN

Late Report:

RNS (Aug.) 26 182 7.0 46.2

*Section notes reporting: AENB and AENP (Ala.), QSKS and QKS-SS (Kans.), Nebr. C.W., Tenn. Tec, and Tenn. Int. Speed, WYN (W. Va.), Minn. 'Phone (Noon & Evening), WSN (Wash.), N.Calif. Net, So. Calif. Net; CN (Conn.), WTNH reassumes control of PAM for the winter season; W6TUV was Acting Manager for the summer. W2LPJ reports starting early session of 2RN, but not much activity so far. WSQNB has congratulated MDD for having had someone on 2RN for seven consecutive months without a miss — 171 consecutive sessions. W7TGO has qualified for and has awarded an R7N NTS certicate. W9DSX sent 8RN needs more help from Michigan and West Virginia; one station is carrying almost all the load in each of these states. W9UNJ reports that R9N has been expanded to operate six days a week, and reproduction is improving, with Indiana showing signs of renewed life. W4RRK has done an excellent job of rejuvenating representation from Kentucky; what they need now is more traffic.

The Transcontinental Corps is also taking on new life, now that a new traffic session is under way. W6HIC has taken over the Pacific Area TCC Directorship in order to give W6JZ more time for his ARRL Directorship, and reorganization is under way. WSJHR has almost all sections filled in the Eastern Area, but if you’re available don’t let that keep you from asking him. W9UJJ reports Central Area TCC getting reorganized. The new roster includes new calls K8PCA and W8DRD. Most of the Central Area stations are reporting directly into PAN, but hope soon to be lined up with Pacific Area TCC stations. WS6CA doing a stellar job.

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for September traffic:

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Late Reports:

K8EFP (AEC). 7 325 339 4 675
K8EAF (Aug.). 13 251 233 11 508

More-Than-One-Operator Stations

K8PAF  100 189 1890 67 2984
W8IAK  91 186 1920 103 2625
K8USA  55 157 1578 23 3226
K8AEE  55 817 8274 60 13774
K8FUX  55 785 7853 22 16259
K8FDO  30 606 6084 28 13844
K8AZK  46 391 394 32 11254
K8AFK  34 374 377 9 3212
K8HCA  80 276 2825 24 6760
W8YMT  34 208 217 9 5690
K8RAI  46 257 260 10 510

BPL for 100 or more origins—add deliveries:

K8FCY  231 W8CWE 128 W8CMN 101
W8YEN  174 W8LYL 123 K8AZM 100
K8LDG  175 V8VSG 122 W8QSN 100
W8FGR  168 W8DRD 109 W8WV (Aug.) 100
K8IZD/1 168 W8PDRD 107

More-Than-One-Operator Stations

K8ZOE 244 K8FPT 185 W8VEK 100
K8TASB 185 VE1QF 100

The BPL is open to all amateurs in the United States, Canada, Cuba, and U.S. possessions who report to their SCM a message total of 600 or more, or 100 or more origina-tions—deliveries for any calendar month. All messages must be handled on amateur frequencies, within 18 hours of receipt, in standard ARRL form.
Me. Utch worked Rhode Island, Kentucky, and West Virginia for 2 years and 2 months. Officers of the A.S.C. at Stanwick are SWN, pres., JFR, v.p.-pres.; HAX, treas.; M£S, secy.; HWS, chief eng.; KZG, 2d v.p.-pres.; and K2GWP is working out FB with new 20-meter vertical antenna. K2AHH/2 is attending college. New officers of the A.S.C. at West Virginia are LCP, v.p.; CMH, secy.; K2A, v.p.; and D. Hamilton spoke on "A.C. Power" at the Elimina A.R.A. meeting. K4AB says QRM is the first "We worked on our first run on New Year's Day; LCP are LCP, pres.; CMH, v.p.; VE3IM, secy.; RVJ, treas.; and K2GWP has been appointed EC for Cayuga Co. and ZGK for Montgomery Co. ZGK has a give-away exam for those who pass. The A.R.R.L. Washington exam will be held Sunday, Jan. 8. The club is again active with a Viking I, S/FO-40 X, 122X, and HFS receivers, 2-meter as well as 430-Mc gear, center-fed antenna 165 feet up. At the last meeting, four-element, 10, 144, 440-Mc beams up over 110 ft. The Ozone Fest was enjoyed by everyone in attendance, thanks to the efforts of W3RZ. The YOQ, published by the A.S.C., is being issued on a policy of runs. The December issue reports that the 32-element 2-meter beam is working better since changing the distance between the upper and lower beams.

Renewals: CLX as EC for Carroll Co. ZK3G for York Co., ZV3G as ORS, BTB as OPS. Appointments: WS as ORS, CZT as UTH as ORS. NYS net certificates were issued to IFV, QKZ, and ZKK, and K2ACA (sept.) K2DXV 579, W2RZC 260, QH1 238, K2FAY 231, W2XAD 210, W2XAP 210, QST, OX2NG, MRC, v.p.; MSJ, secy.; JBD, treas.; COU 31, COU 27, JBD 39, K2UQG 10, W3EUX 9, CXM 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8, RXJ 8,RXJ 8,
SOUTHERN COLORADO — SCM. J. W. Silker and WARR — Asst. SCM. Carter Y. H. W. SEC: GCP. RM: SMV. PAMS: NEE and PRL. IQZ has volunteered as EC for Brooks County. GCP’s new DXCC Manager, 27 years old, resides with his dad. IQZ has 14 official mobile units in the section. New General Class licensees: OZQ, LRA, EYB, N6VHB and N6VHC were issued. IQZ, 1881, and K8VZ, received his ticket while working for WQG. GCS is attending State College and LXP is at Dakota Wesleyan. SOT received 15-wpm. Code proficiency endorsement. The NJQ Net, resumed operation Sept. 28th. 70C AK is in Custer Hospital. The Mitchell ARC is starting code and theory classes. JWZ has a new transmitter. The Islander ARC is supplied for ARRLI affiliation. Officers are FOQ, pres.; IHR, vice-pres.; and BAN, sec’y-treas. SMV is running 350 watts on c.w. and c.w. licenses. IQZ holds 12 sessions, 83 QNI and traffic 35. Traffic: W6CST 45, OJQ 39, MPQ 37, SMV 18, AYD 5, GWS 5, N6O 5, ZLW 4.

DAMASCUS ARC — SCM. W. H. Champion, W8XMC — Asst. SCM. Vince Smythe, sQEC, SEC: GTX, RM: DQL and OMG. PAMS: JIE and UCV. K6BA was back in the Twin Cities and visited PRO. Army will operate portable from Remind. BHY has been busy building a new home in North St. Paul. The Dakota Division Convention was a big success. Minnesota was well represented by about 20 bands and XYLs from the Twin Cities. President Desland, W.F. Collier, Ed Tilson, and Director Al Gowen were there representing the local WIBW. At the banquet, followed by initiation into that order known as the Royal Order of the Woffwong. A tour of Eflorsworth Air Force Base was made and a chuck-wagon feed of beef stew followed. ROF has its key General Class license. ANU is temporarily off the air while awaiting a new transmitter. The old 101 country and is awaiting QSLs from 4 new ones worked this month. UWA reports they are going along nicely, averaging 8 staciones per session. MLL, LC, WQG, HZS, and EXR report they were treated royally at the St. Louis Hamfest. Traffic: W3Y 44, GJL 22, W8WQ. Traffic: W4PL 1274, OGG 744, TYU 190, FPQ 166, HIB 129, WQW 128, H896, BQ 78, SFQ 51, WQ 50, T6G 20, OEX 27, OZG 20, KGQ 14, RRU 13, UOA 13, PAH 10, P9V 9, BET 8, BAG 6, RMJ 6, TSN 6, DCH 4, U4O 4, FLW 2, TIE 2, VGG 2.

DILLON — SCM. Joe W. Feller, W6CBL, and Byrill R. Chanhassen by JDO, Justice of the Peace. TII now is holder of a General Class license and is operating mobile with an Ekris. KPN and K1 came up with his new mobile with an Ekris. WMA soon will be using a Viking Ranger. Traffic: W6C4B 214, W6IA 128, UCV 82, AMY 81, FK 56, KHSO 20, KNR 10, KCC 6, LUX 24, GHT 16, OJH 17, KRY 15, BZG 18, IKJ 13, KJE 12, MXX 9, OMC 9, PBI 9, OZK 8, TSB 8, K6O 7, GWU 7, HAI 7, ALW 6, O6D 6, GWG 4, GQG 3, TSO 3, OPA 1.

DELA DIVISION

LOUISIANA — SCM, Thomas J. Morzagi, W6FMO — The Westside ARC is sponsoring a DX contest among its members with $100 in cash prizes. WQP’s XYL had the banana tree in the back yard and didn’t know that the OM’s guy wire holding up his 20-meter beam was tied to it. WQP is now DXing off as a prelude to its WQP 30, 20, and 10 meters with band-hopping and antenna-antennas tail. (WQP 30) W6VZB 168, CQX 332, WWJ 169, OKR 96, BQG 99, SA 48, FXA 44, RTG 35, GMY 27, UNJ 20, IFX 16, FFC 14, RQG 11, IQW 10, ZLW 10, IFX 6, ZLW 4, HUB 3, AEM 3, GVO 2, VEB 2, SDK 1. (Aur.) W9NUJ 69.

DELTA DIVISION

MISSISSIPPI — SCM, Dr. A. R. Cortese, W5OTD — Looks like the fellows have run out of news. They don’t send me much and I am much too busy to have to listen to DX bands to find out what they are doing. So, if you are hams doing anything and want it in print let me have it before the third of the month, GEONE. DX stations are in the Gulf Coast and meets each day on 26.6 Mc at 2203, SRT is off the air; work got him. ODV has his new Ranger, thanks to W5OHD. Jackie McCollum, of Tupelo, called. We’ll all miss him, RCF is having trouble getting his mail. A Very Merry Christmas to all of you and may your signals be always Q5 and 9-plus. Traffic: (Sept.) W6WZK 76, JHS 76, DRE 41, Y6H 40, OTD 5, (Aug.) W5W6E 128, JHS 51, YBH 20, VRE 16, OTD 4, DRE 2.

DOROTHY DIVISION

DOWAGIAC — SCM. Harry J. Simpson, W6SDF — SEC: RRV, FAM: PFP, RM: WQG, PL is taking a well-deserved Mexican vacation and says he may run into a ‘jibbaw ham or two, south of the border. Dowagiac is on target and states on 2 meters during the V.H.F. Contest, WU 311, UTB. ETS is recovering from a recent illness. AKC has moved to Virginia. A supplied report and their club meeting. The ARRL has sponsored a DX contest. The Elizabethton-Johnson City City Club has been in Watauga Radio Club, with WVL, BBD, and C8D as officers. The DX Club is up and running. W7KPF calls the DX operation to the air. QSLs to the DXCC Manager. Traffic: W6FNB 7, VMC 69, JHS 67, 9-plus. Traffic: W6WZK 76, JHS 76, DRE 41, Y6H 40, OTD 5, (Aug.) W5W6E 128, JHS 51, YBH 20, VRE 16, OTD 4, DRE 2.

DOROTHY DIVISION

KENTUCKY — SCM. Robert E. Fields, W9SWI — KKW turned in a report on the KYN, and shows that activity is on the increase. There are 40 active stations on the net, with the following stations: carrying netter certifi- cation, TAY, JPO, HRA, ANU, TII, and ANU. As a result of the CDA still being built, its latest is a 100-watt transmitter for 75-meter phone. K6FDB is building a 100-watt final, plus 2-meter rig. Eugene is still being plugged away with KYN and UTL. RYU, newly appointed EC, is reorganizing AREC and emergency activi-

(Continued on page 68)
Just listen to this! Grand prize is a complete ham shack worth one thousand dollars! The shack includes the finest of all receivers — the world-famous HRO Sixty — with a matching speaker PLUS a deluxe transmitter, a semi-automatic key, a microphone and a rotary antenna!

Even if you don’t win the Grand Prize, you’re eligible to win a monthly prize of a brand new NC-88 — a world-beater in receiver value! Features include calibrated bandspread for 80, 40, 20, 15, 11 and 10 meter bands, advanced AC superhet circuit using 8 miniature tubes plus rectifier, a tuned RF stage, two IF stages, two audio stages and a host of other features!

1. Describe the features you would like in your “dream receiver.” Suggestions can be as technical or non-technical as you like — anything from a circuit design to the style of a knob. Drawings or diagrams may be used. Please write legally. Enclose your suggestions with a signed entry blank and mail to: Contest Department, National Company, Inc., 61 Sherman Street, Malden 48, Massachusetts.

2. You can mail as many suggestions with an entry blank as you wish. Be sure that a separate entry blank accompanies suggestions mailed at different times. You may file as many entry blanks as you wish.

3. An NC-88 will be awarded to the winner of each monthly contest. A grand prize of a $1,000 value ham shack will be awarded for the entry judged best from all winning monthly entries. A certificate will be awarded to each entrant, making such entrant an honorary National Company, Inc. engineer. The contest will continue through midnight February 28, 1955.

4. Anybody is eligible to enter the contest except employees of National Company, Inc., its advertising agency, and their immediate families. To be eligible, an entrant must send a signed entry blank with his suggestions. To be eligible for any particular month’s contest entries must be postmarked no later than midnight on the last day of the specific month. Winners will be notified by mail.

5. Entries will be judged by a three-man panel composed of competent technically qualified personnel of National Company, Inc., each exercising independent personal judgment. All decisions of the judges will be final and will be decided by majority vote.

6. All suggestions submitted in this contest, whether awarded prizes or not, become the exclusive property of National Company, Inc., and are not subject to being returned. Entrants grant to National Company, Inc. all rights to suggestions, including the right to patent and/or copyright the suggestion. National Company, Inc. has no obligation to entrants other than to award prizes in accordance herewith.
MONTHLY
CONTEST...

Here it is! Another big month of National's exciting new contest for radio amateurs and shortwave listeners!

You've probably often thought of features you'd like included in your "dream receiver." Well, now's the time to put them down on paper! They may win you a brand new NC-88 or a complete $1,000 ham shack!

National's sole purpose is to find out what the majority of you want and don't want in a receiver. (Acceptance of your entry does not mean it will be included in future receivers and submission of an idea doesn't obligate National to use it.)

Whether he wins or not, each entrant will receive a certificate as an "HONORARY NATIONAL ENGINEER."

The entire contest closes on February 28. All entries must be postmarked no later than midnight of that date.

So, hurry, pick your official entry blanks at your National distributor.*
In Equipment You Build Yourself

USE HAMMARLUND CAPACITORS

The Precision Components that give trouble-free service!

Here are the variable capacitors built by precision craftsmen with long experience, and with the knowledge that quality is the major requirement for good ham operation. These components have been designed with the amateur and experimenter in mind since the first models were produced nearly 30 years ago.

Long, trouble-free service and continuous fine performance are assured when Hammarlund variable capacitors are used in your gear. You wire them in with the certainty that they will continue to function efficiently for the life of the set.

Have you received your copy of the new Capacitor Catalog? It lists Hammarlund's complete line of standard capacitors sold by responsible dealers from coast to coast.

SEND TODAY!

HAMMARLUND
THE HAMMARLUND MANUFACTURING CO., INC.
460 WEST 34TH STREET • NEW YORK 1, N. Y.

(Continued from page 79)
The receiver that belongs in every Ham’s shack!

Whether your "HQ-140-X" receiver comes as a gift, or you buy it for yourself, you can be sure it will give years of reliable, quality performance.

It’s many outstanding features are evidence that it was built for those who appreciate professional standards. Extremely accurate frequency setting is achieved because of the HQ-140-X’s carefully calibrated bandspread dial. The Hammarlund patented 455 Kc crystal filter and phasing network makes it possible to change bandwidth without the slightest detuning.

The separate oscillator (6C4) and mixer (6BE6) contribute to the high degree of oscillator stability.

Low-loss tube sockets, ceramic bandswitches, temperature compensating capacitors, zero temperature coefficient ceramic trimmers and a bimetallic compensating plate all keep frequency drift to less than 0.01%, from the lowest frequency (540 Kc) to the highest (31 Mc).

These are examples of the many features that make the "HQ-140-X" the receiver that belongs in every Ham’s shack.

Detailed information and specifications on this fine receiver are available. Ask for Bulletin N40.
Heathkit GRID DIP METER KIT

The insulating instrument for all Hams. Numerous applications include tuning, neutralization, locating parasitics, correcting TVI, adjusting antennas, design procedures, etc. Receiver applications include measuring C, L, and Q of components—determining RF circuit resonant frequencies.

Covers 50, 40, 20, 15, 11, 10, 6, 2, and 1.8 meter Ham bands. Complete frequency coverage from 2-250 MHz using 20 convenient blue-in-coils provided with the kit. Necessary coil kit, Part 341-A at $3.00 extends low frequency range to 250 Kc. Dial correlation curves furnished.

Compact construction, on-hand operation, AC transformer operated, variable sensitivity control, thumb-wheel drive, and direct-reading matching. Prescalibrated dial with additional blank dials for individual calibration. You'll like the ready convergence and smooth appearance of this kit with its baked enamelled panel and crimpless finish cabinet.

MODEL GD-1B

$19.50 Ship. Wt. 4 lbs.

Heathkit ANTENNA COUPLER KIT

The new Heathkit Antenna Coupler Model AC-1 was specifically designed to operate with the Heathkit Amateur Transmitter and will operate with any transmitter, input not exceeding 75 watts RF input. Coupling is recorded in a sturdy, well-shielded unit featuring a co-axial flanged coupling with a shielded compartment. Coaxial 200 ohm characteristic on the rear of the coupler connects to a three-section pi-type low pass filter with a cut-off frequency of 36 Mc. Tuning network consists of a variable capacitance and tapped inductance in an inductive matching circuit. Capacity coupled 70 cm frequencies. Sensing coupling indicator and will also detect rough indication of power output.

MODEL AC-1

$14.50 Ship. Wt. 4 lbs.

Heathkit IMPEDANCE METER KIT

The Heathkit Impedance Meter is basically a resistance-type standing wave ratio bridge, with one arm a variable resistance. In this manner it is possible to measure radiation resistance, standing wave ratio and antenna transmission line impedance; approximate SWR and field strength. Use it also as a monitor or as a field strength meter where high sensitivity is not required. Frequency range of the AM-1 is 100-250 Mc and range of impedances is 0 to 6000 ohms.

The circuit uses a 100 microampere microammeter and a sensitive null indicator. Shielded aluminum case is a light weight cabinet. Strong self-supporting antenna terminals.

MODEL AM-1

$14.50 Ship. Wt. 2 lbs.

Heathkit HUDBUS DIVISION

EASTERN NEW YORK — SCM, Stephen J. Neason, W21LJ — SUC: RTE, EMU, TYCO, ETO. I regret to announce the resignation of RCT as EM for this section and as manager of NYSS. Our sincere thanks to Carl for his long service and excellent record. QE report on the Western New York section, who is the new manager of NYSS. WBS has a new Gotset YTO and a sixteen-element log-periodic array. WAQ has a new SSB receiver and a four-element log-periodic array. W21LJ has a new SSB receiver and a four-element log-periodic array. WBS has a new SSB receiver and a four-element log-periodic array. WBS has a new SSB receiver and a four-element log-periodic array. WBS has a new SSB receiver and a four-element log-periodic array. WBS has a new SSB receiver and a four-element log-periodic array. WBS has a new SSB receiver and a four-element log-periodic array.

NEW YORK CITY AND LONG ISLAND — SCM, Carleton L. Coleman, W2YBT — Amt: SCM: Harry Danna, ZTUK, SEC: ZAL FAM: JZK, RXX: VNJ, LIV. Please continue mailing reports to W2YBT. YBT should go to his new address, P. O. Box 1011, East Huntington. Congratulations to OQY. QSL from the Hudson Division. JOA again leads the list of BPL stations, but school slows down his activities, DltoY for DYS, IVU, K2F QRP, ABV, and DXV. School first BPL second. HARRY is back. WJF set up last week where 4D32 went West, but still managed a BPL total. VNQ reports the NLI Net (3963 tr), 739 also had a good weekend, to fall level, but outlets still are required in Suffolk. How about it, gang? K2DFZ, ex-SCS, joins the gang at AE8B. K2CDF requests interested Brooklyn 50-meter stations to join the BAREG Emergency Net on Sun. at 11 A.M. on 3755 kc. The Tu-Boro Club is celebrating its 20th anniversary this year. FRR is now Amt. EC in Queens. JQF and his powerful 25-watter on 144 Mc. hit 12 sections in the VHF Contest and accounted for W6A in Ohio, Michigan, and West Virginia in the band-opened contests, and in the Hurricane Carol, but Don is back in business. IN is another addition to the a.m. gang on 40 and 50 meters. GRC is planning early fall activities. W3XCV with a low-power rig under construction. K2APZ, Brooklyn College station, returns to 75 meters. K2C7Y is back from Concord. NK2ZS and his A-1X is back in fine shape. New in the area is K2QIZ, 4D32 W6 and 7 to complete all Novice districts. HQL with 15 meters, control, control, waka, S26 ZAS and W6C, JPV is back from KX6C to the West. K2QIZZQZ QSOs to A.A. for 50 and 72 new counties. JXZ reports that Second District YLs meet the 1st Thurs. on 3906 kc. at 1400. In the 3rd section are KX2JQ, the XYL of NK2ZS, and KZ2A 101 and 102, KZ2H didn’t take long to drop the “N.” KZG, Beacon EC, reports the new OQ6 as working, and in the area is FR, K2QGK, Amityville Memorial School. Is active on the Novice bands with K2MMP as trustee. K2DQ is (Continued on page 88B)

HEATH COMPANY
BENTON HARBOR 9, MICHIGAN

(84)
NEW Heathkit VFO KIT

MODEL VF-1
$19.50
Ship. Wt: 7 lbs.

Here is the new Heathkit VFO you have been waiting for. The perfect companion to the Heathkit Model AT-1 Transmitter, it has sufficient output to drive any multi-stage transmitter of modern design. A terrific combination of outstanding features at a low kit price. Good mechanical and electrical design insures operating stability. Coils are wound on heavy duty ceramic forms, using Litz or double cellulose wire coated with polystyrene cement. Variable capacitor is of differential type construction, especially designed for maximum bandwidth and featured ceramic insulation and double bearings.

This kit is furnished with a carefully precalibrated dial which provides well over one foot of calibrated dial scale, smooth acting vernier reduction drive insures easy tuning and zero beating. Power requirements: 6.3 volts AC at 45 anspers and 250 volts DC at 15 mills. Just plug it into the power receptacle provided on the rear of the AT-1 Transmitter kit. The VFO output cable terminates in plastic plug to fit standard #4 crystal holder. Construction is simple and wiring is easy.

HEATHKIT AMATEUR TRANSMITTER KIT

MODEL AT-1
$29.50
Ship. Wt: 16 lbs.

Here is a major Heathkit addition to the Ham radio field, the AT-1 Transmitter Kit, incorporating many desirable design features at the lowest possible dollar-per-watts ratio. Panel mounted crystal socket, stand-by switch, key clicker, A.C. line filtering, good shielding, etc. VFO or crystal excitation—up to 35 watts input. Built-in power supply provides 425 volts at 100 MA. Amazingly low kit price includes all circuit components, tubes, cabinet, punched chassis, and detailed construction manual.

HEATHKIT COMMUNICATIONS RECEIVER KIT

MODEL AR-2
$25.50
Ship. Wt: 12 lbs.


HEATH COMPANY
BENTON HARBOR 9, MICHIGAN
Super-clever in conjunction with any good quality amateur converter, such as Gonset Super-Six, provides a complete mobile receiver capable of outstanding performance on both phone and C.W.

Unit is xtal controlled for maximum stability and utilizes 8 tuned circuits at 202 kc for high selectivity. Self-contained vibrator power supply furnishes voltage regulated power to converter and to BFO. Latter is highly stable with adjustable gain control. Separate RF and AF Gain controls, adjustable squelch, effective noise clipper. Built-in speaker with connection for external speaker, if desired. Pertinent controls are on a small control head which mounts near the converter for “fingertip” operation. Connecting cables and plugs are supplied. Power pack is designed for quick conversion to 12V DC.

Net $119.50

An extremely compact, highly effective 60 watt transmitter for mobile or fixed service. Normally xtal controlled, may also be used in conjunction with external Gonset “tubeless” VFO. Highly flexible output circuit, readily shifted to mobile if desired.

FREQ. RANGE: 1.7-54 mcs continuous.
TUBES: RF-6AQ7, 6146. AF-12AX7, two 7CS’s.
POWER REQUIREMENTS: 300V-500V @ 200-225 ma (phone) and 6.3V, AC or DC @ 3.15A. Up to 60W input, phone or CW.
MODULATOR: Class A32 tetradics and integral hi-level speech clipping.
ANTENNA FEED: All conventional feed lines, Coax ribbon or open line or direct to Marconi antenna.
MICROPHONE INPUT: Any standard carbon or PA type hi-impedance dynamic or crystal.

Complete with tubes, less power supply, xtal and microphone.
Net $124.50

A bit too large to fit under your Xmas tree but . . . there will be no difficulty in finding adequate roof space to contain its 10½ foot tip-to-tip element length. (Boom is 10') Light-weight too . . . easily rotated by any good TV-type rotator.

Its effective ! Performance, in all kinds of weather, approaches that of a full-length 20 meter beam. High Q silver plated, copper tubing inductors, are self-supported . . . ensure unimpaired weather operation. Bow-tie, broad-band elements . . . very low SWR . . . good F-B-R . . . 52 ohm line feed . . . symmetrical pattern.

Net $59.50

GONSET CO.
801 South Main Street
Burbank, Calif.

Here is a true general purpose “Power Package” for SSB, CW, AM phone. Its self-contained with a husky, dual-voltage bridge power supply . . . has a highly flexible pi network output circuit. Provides full band-switched coverage of 10-11-15-20-40 and 80 with provisions for adding 160.

This is an ideal amplifier to follow any low-power SSB exciter. Its highly stable, linear (Class AB) and has excitation control and complete metering to facilitate SSB operational adjustments. Operation is in no manner confined to SSB since AM phone with a few watts of modulated drive is readily possible. C.W. operation at substantial output is merely a matter of providing a low-power keyed RF input.

POWER OUTPUT RATINGS
SSB—250W (Peak envelope output)
CW—220-240W output. AM—80-100 watts carrier.
TUBES: 4807’s in completely unique electro-mechanical arrangement, stable, free from parastic or self-oscillation. 4860’s in bridge. Dual output heavy-duty 80 mid output filter for excellent dynamic regulation.

Use it for code practice at any time but . . . since it is also an excellent monitor for phone or C.W. . . . keep it in service as a permanent station fixture.

This unit can be used without danger of shock since the 115 volt AC power supply is isolated so that neither of the two external key or earphone leads are “Hot” to ground.

Audio tone and volume are individually adjustable and made audible on panel mounted speaker, (or external earphones). A small amount of RF, (link-coupled from the transmitter) operates the unit when used as a monitor. The actual transmitted signal operates the internal audio oscillator for C.W. . . . the rectified audio component is made audible on speaker, (or earphones for “side tone”) where utilized for phone operation. It’s attractively finished, functional.

Net $19.50
Physically, a comfortably-carried 20 pound package... but... a completely unique package which contains all circuit elements usually found only in a well designed 2 meter fixed station of conventional size. Here truly is compactness without compromise!

Sensitive superhet receiver with “Cascade” front end. Calibrated dial tunable from 144 to 245 mc. . . . . .
Three stages I.F. . . . . . . .
The famous Gonset noise clipper . . .
Adjustable squelch . . . . . . .
Built-in panel speaker—earphone jack . . .
Universal self-contained power supply for 6 volts DC and/or 115 volt AC . . . . . .
Transmitter uses 2E26 final at 5-7W output.
High level plate modulation . . . . . .
Modulator can also be used to provide a PA system for emergency situations . . . . . .
Frequency control is by crystal, (standard 8 mc types) or by Gonset 2 meter VFO. (Separate) . . . .
Coax fitting on case top accepts telescoping antenna, (supplied) or connects coax line to external antennas . . . . . .

DE LUXE COMMUNICATOR net 229.50
STANDARD COMMUNICATOR net 209.50
(Less squelch, earphone jack, etc.)

DE LUXE COMMUNICATOR
801 South Main Street Burbank, Calif.

Now...

a brand new Communicator which operates on the amateur 6 meter band. This highly interesting band offers virtually the same general coverage possibilities as 2 meters... adds an important PLUS... the thrill that comes when you contact stations hundreds... or thousands... of miles away when the band opens for sky-wave communication.

HIGHLIGHTS:

General appearance is identical to the 2 meter Communicator. Same size, same weight, same outstanding performance.

Receiver utilizes the well-known Gonset cascade front-end for high sensitivity, double conversion for increased I.F. selectivity usable on 6 meters. The receiver also tunes down to 49 mc., permits spotting commercial stations to clue band "openings."

Transmitter delivers 8 to 10 watts output with either 6 volt DC or 115 volt AC supply.

De luxe model only.
Model 3049—6 meter Communicator
6V DC/115V AC............. net 229.50
(less mike end xtal.).

NEW 12 VOLT COMMUNICATOR MODELS.
Model 3058—6 meter Communicator
12V DC/115V AC............. net 229.50
Model 3057—2 meter Communicator
12V DC/115V AC............. net 229.50
(Both de luxe models).

A very Merry Xmas and a healthy, happy and prosperous New Year.

THE GONSET GANG.

GONSET CO.
MORE RANGES AN EXTRA-LOW RESISTANCE RANG AN EXTENDED LOW VOLTAGE RANGE A LARGER METER SCALE FACE A POSITIVE CONTACT JACKS AND PLUGS

COMPANY TURNS WITH SWIVEL BASES AND HANDLES:
SHOWS WHAT YOU WANTED IN A HIGH SENSITIVITY MULTI-RANGE TEST SET

MODEL 120

THE NEW PRECISION

Price $125.00

Net Price $120.00

9" x 7 3/4"

PRECISION APPARATUS CO., INC.
710-21 8th Street, Glendale, Calif. 27, L. A. 19, Calif.

EXTRA LARGE 1/2" BURLED FACE, METER.
1 1/4" MULTIPOLAR METERS AND SHUNTS.
"TRANSISTOR SAFETY POSITION" ON RANGE SELECTOR.
PROTECTS TRANSISTOR IN ALL OPERATING CONDITIONS.
12 VRATING RANGES: 20,000 ohms per volt.
8.0 DB, 12.0 DB, 20.0 DB, 30.0 DB, 60.0 DB, 90.0 DB, 120.0 DB, 200.0 DB.
8 DB VOLTAGE RANGES:
5,000, 700, 1,000, 2,000, 3,000, 5,000, 10,000, 20,000, 30,000, 50,000.
500, 1,000, 2,000, 3,000, 5,000, 10,000, 20,000, 30,000, 50,000.

- 0 DB = 1 Millivolt 1000 ohms to 27 DB.
- 0 DB = 1 Millivolt 1000 ohms to 27 DB.

Includes complete with internal comparator and tamper-proof operating manual. Overall Case Dimensions: 9" x 7 3/4".

Net Price $125.00

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- 0 DB = 1 Millivolt 1000 ohms to 27 DB.
- 0 DB = 1 Millivolt 1000 ohms to 27 DB.

Includes complete with internal comparator and tamper-proof operating manual. Overall Case Dimensions: 9" x 7 3/4".
This Christmas...

PICK YOUR POWER from these 4 feature-packed JOHNSON TRANSMITTERS!

**VIKING RANGER**
Desk-top beauty in a self-contained rig. Designed to serve as a transmitter or an RF and audio exciter for high power equipment, the Ranger represents the absolute in compact transmitter operation and convenience. Phone input 63 watts, CW input 73 watts. Covers all amateur bands from 10 to 160 meters. Built-in, extremely stable VFO, or may be crystal controlled. Pi-network antenna load matching from 50 to 500-ohms—no internal changes needed to switch from transmitter to exciter operation.

Cat. No. 240-161—Viking Ranger Kit, less tubes, crystals, key and mike.
 Amateur Net. .................................................. $179.50
Cat. No. 240-161-2—Viking Ranger, wired and tested, less tubes, crystals, key and mike.
 Amateur Net. .................................................. $258.00

**VIKING II**
Make every day seem like Christmas with the famous Viking II. 180 watts CW input, 150 watts phone. Completely bandswitching and self-contained, the Viking II is professional in appearance and design. TVI suppressed—all stages metered—covers amateur bands from 10 to 160 meters. Owned and operated with pride by thousands of amateurs everywhere, it's the perfect choice this Christmas season or any season.

Cat. No. 240-102—Viking II Transmitter Kit. Complete with tubes, less crystals, key and mike.
 Amateur Net. .................................................. $279.50
Cat. No. 240-102-2—Viking II wired and tested with tubes, less crystals, key and mike.
 Amateur Net. .................................................. $337.00

**VIKING "ADVENTURER"**
Big transmitter features in a new compact CW kit. Single-knob bandswitching 80 through 10 meters. Rated at 50 watts input and effectively TVI suppressed, the "Adventurer" is engineered throughout for easy assembly and operation by novice or experienced amateur with a minimum of equipment wiring and operating experience. Self-contained power supply is wired for use as an "extra" station power source when transmitter is not in use. Clean, crisp break-in keying.

Cat. No. 240-181.1—Viking "Adventurer" Kit, with tubes, less crystals and key.
 Amateur Net. .................................................. $54.95

**VIKING MOBILE**
The "most wanted" mobile transmitter among discriminating amateurs, the Viking Mobile is easy to load and its powerful audio system packs that extra punch for sure mobile communication. Gang-tuned and bandswitching, it covers 75, 40, 20, 15 and 10-11 meters. May be wired for 6 or 12 volt operation—under-dash mounting—all controls readily accessible. Dynamotor power supply and external VFO for steering post mounting also available.

Cat. No. 240-141—Viking Mobile Kit, less tubes, crystals, microphone, power supply, accessories.
 Amateur Net. .................................................. $99.50

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CAPACITORS • INDUCTORS • SOCKETS • INSULATORS • PLUGS • JACKS • KNOBS • DIALS • PILOT LIGHTS

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Your FREE copy is ready!

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Handy reference book on America's most complete line of volume controls, switches, capacitors, Printed Electronic Circuits*, steatite insulators. Revised, 48-page edition keeps you up to date on Centralab's latest developments:

- NEW values in Adashaf* Radiohms
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- NEW Senior Concentratex®
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- NEW Phenolic Switch Kit
- NEW complete line of standard DD disc
- NEW miniature disc capacitors
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- NEW Tubular Capacitors
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Send me free copy of Catalog No. 29.

NEW ENGLAND DIVISION

CONNECTICUT: SCM, Milton E. Claffey, W1EYW
- SEC: LBM, FAM, LMM, KVO, CN, and MCN
- Connect: CT, CHM, and QST among the YL and CHM and CKZ among the QM. UGG is at LATT.
- This freshman, while using MGR, continues to work on 144 and 220 MHz. LQD finds themselves among the Fairfield County gang, which is much appreciated by your QT. WMJ and YMP are Milestone records. UMK and QSDs are on 160 meters.
- QSDs on 160 meters. LQD now is in operation with VK MGR on 80 meters. FAD moved to Devon and WTST to Woodmont.

(Continued on page 38)
I Call My
RAYTHEON
Tube Distributor
For
Time Tested Favorites... and the Latest in
Transistors and Diodes

RAYTHEON MFG. CO.
Receiving and Cathode Ray Tube Operations
Newton 58, Massachusetts

RELIABLE SUBMINIATURE AND MINIATURE TUBES
SEMICONDUCTOR DIODES AND TRANSISTORS
NUCLEIC TUBES
RECEIVING AND PICTURE TUBES - MICRO-WAVE TUBES

RMZ is active mobile on 20, 10, and 75 meters. SJQ was
worked by Hurricahne S. in the New York area on 20 and
40 meters. VJG lost his beam to Hurricane Edna.
Ten-meter motor operators from Connecticut gathered at
Bridgeport, Conn., to exchange with a similar group
at Port Jefferson, L. I. YQR is gaining fame on the faculty
of the U. of Bridgeport. NIVI reports on c.d. activity in
the Hurricane-New Haven area. HCF worked 35GQ on 120
watts on 40 meters and reports the participation by Strat-
ford yachts during the hurricane. YAZ, Z1Y, Z1Z, and
ZNU are now General Class. FYI reports on Amateur
hurricane activities. TZP went off to ANIT after comple-
ting the new receiver. NLMP renewed EC and OBS and
ADZ renewed EC appointments. LHE hopes to run his
traffic status at the new QTH. YNC has a new antenna and
200 watts on 40 meters. BBS added 10-meter vertical to his
antenna farm. MLT is portable at Block Island and usually
on 3830 kc. OBS skeds are being kept by GLX and TD
regularly. Thanks to all who sent in reports of c.d. and
AREC activities during the hurricane. Activity at WBN
has been curtailed for school. The CN/CPN joint meeting
on Sept. 30th was very successful. UIZ furnished the only
ORS report. Connecticut had many participants in the
V.H.F. Contest. RAN is a freshman at WPI. UIZ worked
Ohio, West Virginia, and Kentucky on 2 meters, which
gives him 14 states plus V61. RW7 now has a complete
and praises it highly. Traffic: (Sept.) W1WNN 306, C1U
144, YBH 102, W7NH 139, BOD 49, HUF 45, HYF 44.
QX 32, HUM 32, YVM 31, QJM 25, LV 20, MLT 20, UED 20,
KV 15, KM 12, KDJ 11, BFR 4, YNC 3, (Aus.) WILG 105,
UNG 61, QJM 16, OMT 17, RAN 7.

MAINE — SCM, Bernard Seamon, W1APT — SEC:
BYK, PAM, W1Z, RM, OMT. The First New Eng. Net
Mon. through Fri. at 7 P.M. on 3652 kc.; the Barnyard Net
Mon. through Sat. at 7:30 A.M. and the Sea Gulf Net Mon.
through Fri. at 8 P.M., both on 3865 kc. SCM feels very
sorry to receive the resignation of BYT as PAM. Your
new PAM is W1Z. Hap has had a lot of experience as the
founder and chief woodchuck of the Barnyard Net. A
bit of help from us will do him good. We're on the Sea
Gulf on 40 meters. No sooner had Hurricane Carol gone
than Edna blew in. The Maine gang was ready for her. HPT and
SEC, had all stations alerted and standing by in ad-
ance of Edna's visit. In connection with the above, your
SCM has a new chimney. LHA and HZE are active as
LHA plans to use a sallon. BPT and SDW called on APT.
PTL tried and has returned after mobilizing across the U. S. to
Seattle. Welcome to W1NICEY, of Augusta, who reports
his Radio Club's "Ham bake" was ruined by the hurricanes. "The
rumor that the AMR's will winter in Florida. Your SCM
would like to hear from you C.W. operators. Let's have
some dope on your station, your activities, etc. Season's Greetings
and Traffic: (Nov.) WLKP 155, KVY 16, W1Z 16, ZBN 97,
UDD 32, BK 28, LYS 25, RCI 17, BYT 10, NVQ 10,
BAD 4, NXX 11, VYE 10, APT 9, LHA 6, SNE 4,
U2E 4, VEB 4, FEB 2, FK 2.

EASTERN MASSACHUSETTS — SCM, Frank L.
Baker, jr., WIALP — The following counties make up the
Eastern Massachusetts section: Barnstable, Delaware, Essex,
Middlesex, Nantucket, Norfolk, Plymouth, and
Suffolk. New appointments: ZID Hudson, WCI Newbury-
port, EC. WLY = QG Class J. Appreciation extends to
IAP Lexington, VYD Weston, IO Danvers, LST Region 6
of Mass. C.D., BDK Westport, Littleton, Tyngham, as
EC. MEG = OBS; BHR = QG; RE = QG; BD = QG on
2 and 10, DR = on 20, BR = on 40, W = on 75
meters. AR also has the call AWF, AJU moved to Quincy,
Q1T has TBS-50 mobile. A1T has General Class license.
Novices: CAS Dorchester, CAF Brockton, CDR Lexington.
ZOF is new in Framingham. New officials of the El Ray
Radio Club are RND, sec.; BOD, vice-pres.; WYX,
secy.; ZOF, treas.; CAS, act. mgr.; A1T, chief engineer.
W1MFPW is a new ham in Whitman. WQ1M is secretary of
the Wellesley Amateur Radio Society. T2Z, WN1GFP is new
in Chelsea Mass. His father is AMQ and he is on 50-meter
ev. The South Shore Radio Club held its regular meet-
ing with a talk by WK, A.N.J. Secy. on the Long Island.
Fri., at the Quincy YMCA, Secy is secretary. ALP has a
Trouble Line transmitter. The following Beverly hands
handed out during our two amateur spots: GIV, TYP,
LJII, DWY, TAD, NAR, and JFS, BND is on
with an Elmore AF-47. VALD is having trouble with the
gyl. YAL, formerly of Needham, now is K1ADL in Virginia.
20LII wants skeds with Barnstable, Delaware, and Nantucket
Counties for his WANE certificate. New officials of the
Framingham Radio Club are SQY, pres.; HUP, vice-pres.;
WLL, secy.; Ils, treas.; MHC, act. mgr. Members on
mol: during the storms: MEG, OBS, BHR, RPA, and
RVA. MEG has a new NC-1830B. Among those active
during the second storm were MHC, SQY, WLY, JUL,
HIL, and MQ. LQ reports on 2 and 10, BR = QG and
Y1QQ mobile. AVY and WKM handled lots of traffic
during the storms. SS and UPZ kept the press informed
of the course of the storms. W1WNN has a Collins 77C
and a Super Six on 10 and 75 meters. Q1T has a new QTH
in Quincy. W1FQ is going back to W1E. CTR visited his
old club at Framingham. Radio Amateur Committee
meets at the Cambridge YMCA and Mr. Doornick, of the FCC,
(Continued on page 64)
How a peanut can "knock out" an Electrolytic Capacitor

Believe it or not, a salted peanut is one of the worst enemies of electrolytic capacitors. Just a few grains of salt on an assembler’s hand—left over from a mid-afternoon snack of peanuts—would be enough to ruin a whole production lot of capacitors.

Mallory engineers, investigating potential sources of trouble in the manufacture of electrolytics, have found that extreme care must be exercised to avoid any contamination by chloride salts. Only one part in a million of chlorides is enough to shorten the life of a capacitor seriously. Not only the salt from peanuts, but even the traces of chlorides present in a worker’s fingerprint must be strictly eliminated from chance introduction into the manufacturing operations.

As a matter of fact, the making of Mallory electrolytics demands far cleaner working conditions than you would find in a hospital. All employees in Mallory’s capacitor plant are not permitted to handle or even touch capacitor raw materials or capacitor cartridges with their bare hands. They use rubber or cotton gloves which are regularly cleaned and changed, to avoid possible contamination. And they observe what may seem to the casual visitor to be extreme precautions in every phase of assembly.

The result of this full-time vigilance on the production line is exceptionally high standards of life and performance of Mallory capacitors in their intended service. On a great many small details such as these is built the reputation that Mallory electrolytics have gained in years of use by radio experimenters, service men and electronic manufacturers.

Whether you buy electrolytic capacitors for your own radio gear... or whether you buy for someone else... you can be sure of this:

**NO OTHER ELECTROLYTIC CAPACITOR IS MADE WITH GREATER CARE THAN MALLORY ELECTROLYTICS**

In addition to the highest standard of purity, Mallory capacitors also give you the exclusive Fabriecated Plate anode construction, which permits 475 volt operation at 85°C. without derating. Serious amateur experimenters find it pays to specify Mallory every time they need electrolytics. Your local Mallory distributor carries a complete stock and can give you prompt service.

P. R. MALLORY & CO. Inc.
P. O. Box 1558
INDIANAPOLIS 6, INDIANA
LOOKING FOR DX?  
GET A  
GOTHAM BEAM  
and work the world!

Reports tell the story of GOTHAM BEAM performance — the gear says you can work more DX in a day off a GOTHAM BEAM than you ever got off a wire or dipole. GOTHAM BEAMS are strong, too; easy to assemble and install, no special tools or electronic equipment necessary; full instructions included. GOTHAM BEAM is automatic; maximum power gain built into the design — AND ALL AT LOW, LOW PRICES.

NEW! NEW! NEW!  
2-Meter Beam Kits

GOTHAM proudly presents a 6 element Yaesu beam for 2 meters or 110.0-118.0 Mc. Contains a 14 foot boom, 1/4" alum. tubing; 5/4" alum. tubing for elements; Amphenol frequency and model numbers; all hardware, and instructions. Vertical or horizontal polarization, terrific performance.

And GOTHAM's new 12 element beam, for 20 meters or 140.0-150.0 Mc, in a $16.95 kit contains a 12 foot boom, 1/4" alum. alloy tubing; 5/4" tubing for elements; all hardware, and instructions. Vertical or horizontal polarization; multiplies your power by 321.

10 M. BEAMS


S2035N * Std. 20m 3-El. No T. $34.95. 1 - 12' Boom. 1/4" Aluminum Tubing. 6/4" Center Element, 1/2" Aluminum Tubing. 6/4" End Inserts, 1/4" Aluminum Tubing. 1 - 1 Match (4). Polyvinyl Tubing. 1 - Beam Mount.

HOW TO ORDER: Remit by check or money-order. We ship immediately by Railway Express, charges prepaid. You may then be assured of unconditionally money-back guarantee.

IN CALIFORNIA:  
OFFENBACH AND REMUS CO., 1569 MARKET ST., SAN FRANCISCO  
DEALERS & CLUBS: WRITE FOR QUOTE PRICE CHARTS!
**HERE'S YOUR KEY TO SSB**

---

**Single Sideband Generator**

**FOR B & W's MODEL 5100 TRANSMITTER**

Single sideband transmission, with its superior effectiveness over AM and its elimination of heterodyne interference, is yours with B&W's new Single Sideband Generator, Model 51SB. Used with the B&W Model 5100 Transmitter, this generator offers you:

- **SSB bandswitching operation on 80, 40, 20, 15, 11, and 10 meters**
- **150 watts peak input on SSB and CW; 135 watts on AM phone**
- **VFO or crystal control on AM, CW, and SSB**
- **Voice control operation on SSB**
- **Speaker-deactivating circuit**
- **Completely self-contained — except microphone**
- **Simple to install**
- **No test equipment required for installation or operation**

The Model 51SB Single Sideband Generator converts a B&W Model 5100 into a band-switching single-sideband suppressed-carrier transmitter—with all the advantages of SSB plus the AM and CW features already built into your Model 5100. Its construction is completely unitized. Equipment removes easily and disassembles into three major sub-assemblies: the R-F Unit, the Audio Unit, and the Main Chassis Unit.

Factory wired and tested, the 51SB comes to you complete with tubes—all set to convert your Model 5100 Transmitter to SSB. This combination provides a superlative driver for any high-powered linear amplifier! Write for descriptive Bulletin 51SB.

---

**BARKER & WILLIAMSON, INC.**

237 FAIRFIELD AVE. • UPPER DARBY, PA. 95
GENERAL PURPOSE POWER SUPPLY

This power supply is ideally suited for transmitters operated under Novice class licenses. When higher R.F. power is added later on, this supply may be used as a modulator power supply.

Washingom — SCM, Victor S. Gib, WFTFX — FWD and FWR celebrated their Golden Wedding Anniversary on Sept. 14th and received a flood of congratulations from their host of friends, both by mail and on the air. WFTFX is rebuilding the shack and gear for the traffic season, RXI took over as WSM Manager on Armistice Day. UQY submitted an OQ report and an innocuous list of 40-meter cards with all Grahamland stations worked. C2Y benefited through Glacier, Yellowstone, and Teton Parks. ETO made two vacation trips but is back home ready for traffic. W.H.F.

(Continued on page 100)
MC-55 FIVE BAND MOBILE CONVERTER
For 10, 15, 20, 40 and 80 meters. 1.25 micro-volt sensitivity on all bands. Edge-lighted dial. 25-to-1 worm gear tuning, ANL. Transmit-receive switch. Three gang tuning capacitor. Individual coils for each band. Aperiodic i.f. stage aids in providing high-gain characteristic. Input impedance 50-72 ohms. Output frequency 1550-1580 v. at 15 ma. 6 or 12-volt operation. Tube lineup: 6BJ6 r.f. amp; 12AT7 osc-det; 6BJ6 i.f. amp; 6AL5 noise limiter. Dark gray. Size: 4%" high, 5%" wide, 5¾" deep. Shpg. wt. 7 lbs. Amatuer Net. $69.50

MC-53 VHF THREE BAND MOBILE CONVERTER
Designed for 2, 6 and 10-11 meters. 1.25 micro-volt sensitivity on all bands. 25-to-1 worm gear tuning. Individual coils for each band and each circuit. Three gang tuning. Aperiodic i.f. stage aids in providing high gain characteristic. Separate input connectors for each band. Send-receive switch. ANL, VR provides excellent stability. 6-volt operation. 150-180 v. at 25 ma. Output frequency 1550 ke. 6AK5 r.f. amplifier; 12AT7 osc-det; 6BJ6 i.f.; 6AL5 limiter and OB2 voltage regulator. Gray enamel. Size: 5%" wide, 4¼" high, 5¾" deep. Shpg. wt. 7 lbs. Amatuer Net. $66.60

DB-23 PRESELECTOR
Substantially improves the performance of any receiver. Three 6J6 twin triodes as neutralized push-pull stages in combination of selective and wide band r.f. amplifiers. Minimum gain of 20 db all ham bands from 3.5 to 30 mc with substantial image rejection. Signal-to-noise improvement can be as much as 7.5 db over the receiver itself. Permits optimum use of mechanical, crystal or audio filters. Input circuits match standard type antenna. Set band and adjust peak control. With power supply, Blue-gray. Size: 5%" high, 7½" wide, 6" deep. Shpg. wt. 3 lbs. Amateur Net. $49.50

RME 100 SPEECH CLIPPER
Peak limiting pre-amplifier provides higher articulation and intelligibility to combat QRM and QRN. Ideal for use with Johnson Viking, Collins 32V and all ham-built equipment. Clipping level adjustable from 5-25 db. PI low-pass filter provides high suppression of generated harmonics above 3000 cps, concentrating voice power to most effective band of frequencies. Response 200-3000 cps. If set to provide 100% modulation, louder speech will not over-modulate. Front panel input for H-Z microphone accommodates PTT circuit. Tube lineup: 6SC7, 6H6 and 6X5GT rectifier. With power supply in blue-gray steel cabinet. Size: 5%" high, 7½" wide, 6" deep. Shpg. wt. 9 lbs. Amateur Net. $39.50

Ask your RME Distributor or Write for RME Bulletin

Do you have your "SECOND OP"
Handy, complete DX-information, complete Amatuer Net. $1.00
I've been in business since 1921 and a Hallicrafters communications distributor since "way back when". I've been a ham for over 33 years - W2APF - and know it's items like the new SX88 that keep Hallicrafters leading in reputation with hams.

SX88 receiver - a new peak of perfection! Full precision gear drive for main and band spread tuning. Six position Band Width Control (selectivity) from 250 cycles to 10 kc. Exhusted B.F.O. for tops in single sideband reception. Full frequency coverage from 535 kc to 33.3 mc. Plus more than 20 other features. $595.00

Speaker, $19.95 extra.

S-85 receiver with over 1000 degrees of calibrated bandspread. Newly designed and engineered Hallicrafters with 10, 11, 15, 20, 40 and 80 meter amateur bands calibrated on easy-to-read dial. One r-f, two i-f and separate bandspread tuning condenser. Covers three S/W bands 1680kc-34mc. Built-in speaker. $119.95

HT-30 — new V.F.O. exciter/transmitter with full band switching. At your finger tips S.S.B., AM or CW with carrier frequency stability .009% or better. Built-in voice control and 50 watts S.S.B. peak envelope power output. Stable 50 kc filter system for side band selection. $349.95

SX-96 high frequency oscillator temperature compensated. Dual crystal controlled second conversion oscillator for side band selection on AM or S.S.B. $249.95. Speaker $19.95

Write for our big, illustrated catalogue.

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904 BROADWAY, ALBANY, N. Y.
TELEPHONE ALBANY 5-1595
Wow, only a few weeks till Christmas, and Uncledave will don the white whiskers again. Here's a tip for all you hams — if you want to give ham equipment for gifts, call Uncledave, W2APF and he'll help solve your gift problems (or any problems for that matter).

**PARTIAL LIST OF USED EQUIPMENT**

<table>
<thead>
<tr>
<th>Equipment Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surplus CBY 52208 transmitter</td>
<td>$25.00</td>
</tr>
<tr>
<td>National SW3 Rec. complete</td>
<td>$20.00</td>
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<tr>
<td>Thordarson 100 W. transmitter C.W.</td>
<td>$75.00</td>
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<tr>
<td>RME DM30X</td>
<td>$25.00</td>
</tr>
<tr>
<td>Lafayette UHF Converter (6-1e-11-15)</td>
<td>$35.00</td>
</tr>
<tr>
<td>MM-1 Micro Match</td>
<td>$27.25</td>
</tr>
<tr>
<td>(3) Tri-Band Gonset Converters... ea.</td>
<td>$30.00</td>
</tr>
<tr>
<td>Noise Clippers</td>
<td>$5.00</td>
</tr>
<tr>
<td>(2) Gonset transmitters Converters ea.</td>
<td>$30.00</td>
</tr>
<tr>
<td>National 5886 power supplies, new ea.</td>
<td>$25.00</td>
</tr>
<tr>
<td>National HR07 w/4 coils/power supply/speaker</td>
<td>$275.00</td>
</tr>
<tr>
<td>Eldico TR75 transmitter</td>
<td>$50.00</td>
</tr>
<tr>
<td>Motorola T69,20A transmitter</td>
<td>$50.00</td>
</tr>
<tr>
<td>Motorola MT30M — 10 meter complete</td>
<td>$190.00</td>
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<tr>
<td>National HR60 complete</td>
<td>$450.00</td>
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<tr>
<td>Lysaco 600 New condition</td>
<td>$115.00</td>
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<tr>
<td>Millen 90800</td>
<td>$250.00</td>
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<tr>
<td>Hallicraftsr 541G</td>
<td>$25.00</td>
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<tr>
<td>WRL Globe Trotter transmitter</td>
<td>$65.00</td>
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<tr>
<td>Collins 32V2 transmitter</td>
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<td>Collins 32V1 transmitter</td>
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<tr>
<td>RME GF10/20</td>
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<td>SC 221-Freq. Meter</td>
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<td>Sonar MB61</td>
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<tr>
<td>Hallicraftsr SX42 w/R42 speaker</td>
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<td>National NC125 w/speaker</td>
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<tr>
<td>HQ129X Hammarlund w/speaker</td>
<td>$195.00</td>
</tr>
<tr>
<td>Gonset super 6 converter (like new)</td>
<td>$40.00</td>
</tr>
</tbody>
</table>

Write for highest trade-in offers. We want your used equipment for trade or cash!

**FOREIGN TRADE SOLICITED**

**Collins 32V-3 Transmitter**

$775

VFO Controlled, Bandswitching, Gantuned. Covers 80, 40, 20, 15, 11 and 10 meters; 150 watts CW; 120 watts phone; entire RF section enclosed in metal shield. (In Stock)

**Collins 75A-3 RECEIVER**

With Mechanical Filter and Speaker

$550

Folded dipole amateur antennas 300 ohm (kilowatt cable) each cut to band length 75 ft. lead-in.

<table>
<thead>
<tr>
<th>Band</th>
<th>Feed</th>
<th>Feed</th>
<th>Feed</th>
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<td>40 meter</td>
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<td>80 meter</td>
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**CABLE SPECIALS**

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<tr>
<td>4 cond. rotor</td>
<td>$3.50</td>
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<tr>
<td>KG/SV/U &amp; ft. per 100'</td>
<td>$4.00</td>
</tr>
<tr>
<td>KG/SV/U &amp; ft. per 100'</td>
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</tr>
<tr>
<td>KG/SV/U &amp; ft. per 100'</td>
<td>$4.00</td>
</tr>
</tbody>
</table>

**Hammarslund HQ140-X**

$295.50

with spkr...$275.50

**Telrex 520 Beam**

$55.00

Also other Beams...

**SONAR SRT 120 TRANSMITTERS**

All band 120 w. CW, 100 w. phone.

Write for prices.

**New ELMAC TRANSMITTER**

**AF-67**

Trans-Citer

$177.00

**PMR 6A...$135.00**

**PSR 6...... 24.50**

6 or 12 V power supply

**ANTENNA ROTATOR SPECIAL**

Will hold up to 200 lbs.

$26.95

Complete with 100 ft. 4 Cond. Control Cable

**Johnson Ranger**

$179.50

With l.t. w/t l.t.

TUBES extra, $23.00

**Accessories**

<table>
<thead>
<tr>
<th>Accessory</th>
<th>Price</th>
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<tbody>
<tr>
<td>Matchbox</td>
<td>$49.85</td>
</tr>
<tr>
<td>VFO Kit</td>
<td>$42.75</td>
</tr>
<tr>
<td>VFO w/t</td>
<td>$62.50</td>
</tr>
</tbody>
</table>

**Johnson Viking I1**

$279.50

(In Stock)

Kit complete with tubes — less crystal, key and mike.

Wired and Tested, $337.50

**Fort Orange Radio Distributing Company**

904 Broadway, Albany, N.Y.

Telephone Albany 5-1594
Capacitors with leads that won’t pull out where others will

**Centralab**

**D6 Tubular BC Hi-Kaps**

600 V.D.C. Working 1000 V.D.C. Test

Pkg. of 5 for only $1

Suggested List Price

- Leads are mechanically and electrically bonded.
- You make close-coupled, low-inductance connections fast.
- New close tolerances.
- D6 tubulars withstand extreme humidity—operate efficiently at +85°C.
- Color-coded per R62MA and JAN specifications.

**NEVADA** — SCM, Ray T. Warner, W7JU — ECs: PJE, T.V., ZF, OPP, JUO, UFB, OEB, MHP, PEW, VIU, Q26, BVZ, PEW is the newly-appointed EC for Elko County, LGS, of Boulder City, has settled down in Reno. JLN is active with an ART-13 from his Paradise Valley ranch. His daughter received the call sign from her father. The W7JU is Nevada’s only active YL, she should be popular. 6Q5L now in 777WTR, RSY, of Las Vegas, handled emergency CAM flight traffic when a long lines telephone cable was broken recently. K7FDB makes BPL again with a traffic count of 721. KOA resigned as EC but remains an active emergency corps member. The Southern Nevada Amateur Radio Club (SNARC) held its annual picnic at Mount Charleston this year. It was well attended by members and their families. Traffic: K7FDB 721, W7JU 31, BVZ 2, VIU 3.

**SANTA CLARA VALLEY** — SCM, Roy I. Counin, W6ZL — Well fellows, this my last report and I wish to take the opportunity to say I have enjoyed working with you and I hope the many friends I have made during my terms as SCM will keep in touch with me. It is with some regret that I give up the job, but I honestly believe WGO, your new SCM, will do a real job if you will give him the kind of support he needs to put the section on the air. This is something that we all have to do, and this is the kind of job that makes our work on the air worthwhile. Thank you all for your help and support. Good luck to the new SCM.

Send coupon for Centralab Catalog No. 29.

**EAST BAY** — SCM, Guy Black, W6RLB — Ass’t, SCM: QZE represented the Walnut Creek Area, and RTA was Acting Emergency Coordinator for the Oakland County, assisted by DDT, UTX, KG8AD, and KGCCQ, during the Simulated Emergency Test. The Vallejo gang operated under ZFF, and CAN represented Napa. The Alameda County had ZFX, NQI, and JJ5 kept in touch with the Silver Lake Boy Scout camp during the summer. ATM, ZEF, DTTB, QGA, and JSU kept in touch with NQI, DTTB, and JJ5 to keep in touch with the Vallejo HSS. KJJ has joined in. BXX is new.

(Continued from page 9)

Activity is on the upswing in the section after an interesting talk by HHQ, the Spokane Amateur Radio Club meets the 1st and 3rd Tues. of each month at Manito Park. Officers are GBUH, V-5, GBC, Vice-pres.; FCB, adj.-sec.; EFB, QST; CVC, secy.-treas.; and the Clark County Amateur Radio Club (Vancouver) meets the 1st and 3rd Wed. in the Red Cross Bldg., 1310 East 10th, Vancouver. Officers: SAP, pres.; LVR, secy.; KJN, treas. The Sound Traffic Net resumed operation Oct. 1st on 28.6 Mc. at 1900 PST and will meet Mon., Wed., and Fri. for the time being. JPH is on 75-meter mobile, 69.1 MHz is being used as a modulator for the big rig. WSN reopened the 1988-kw. cw. section Oct. 11th, 1991 PST Mon. through Fri. The WARTS meets on 9370 kHz at 1200 PST Sat. and 9370 kHz at 1800 PST Fri. and Mon. The “torque guys” on his 95-t. tower with the 135-t. beam on top. OBE is about ready for ZTTY, PHO has a new beam on 20 meters, KRT 1 now is 200 meters. TQ9 is making MB 20 meters, TQ9 40 meters. AAM has orders from the other to a take a trip from Radio. BG’s big rig is now being used as a mobile. AMC has been hunting and relaying the score. HDT is preparing the RACES plan for Asotin County. FM is an 20-meter mobile. KRT is working on 170. The Salmon River Valley Amateur Radio Club, Inc., reports the club house is practically finished. Club officers are GYC, pres.; WGC, vice-pres.; NEC, secy.-treas.; and the Club meets Mon. at the club house off Milton Highway 6 miles southeast of Walla Walla. The Valley Amateur Radio Club, Inc., meets the 1st and 3rd Fri. at Post Memorial Bldg. at 62nd and Meridian North. Officers: JRL, pres.; MCC, vice-pres.; OEB, secy.; URE, TGO, acct.-at-arms; WMQ, pub. Traffic: (Sub) W7BA 1136, PFG 844, SER 27, PBK 59, GPM 136, TQ9 156, IRE 128, OEB 65, FXR 50, OEB 46, RXH 46, FWD 40, ZU 37, AIB 37, TGO 33, VCF 26, APS 15, JEN 11, K7 8, AMO 5, BK 3, TIQ 1. (Aug.) W7RXX 35, ETO 2.

**PACIFIC DIVISION**

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Send coupon for Centralab Catalog No. 29.
Worth waiting for!

THE Harvey-WELLS T-90 SUPER BANDMASTER

This midget with the mighty punch is truly a fine piece of engineering. Our field and laboratory tests have indicated even better performance than might be expected from its power range. Here in one small package (only 12½” x 10¾” x 6¾”) is a complete 90 watt band-switching transmitter for fixed or mobile operation incorporating more features per cubic inch than ever before offered at such a low price. In design, and in construction, the T-90 has “built-in” provisions for versatile adaptability in meeting most existing conditions of power source, antennas and other coordinated equipment. For example, filaments may be operated with either 6 or 12 volts input simply by proper wiring of the power input plug. A built-in low voltage D.C. relay is wired for antenna change-over; push-to-talk and receiver muting; and an efficient pi Network with a very flexible antenna loading circuit puts out the power and allows tuning out of considerable antenna reactance.

Other features include:

- TVI Suppression
- Complete break-in keying or keying of exciter stages only
- VFO tuning without carrier on
- Cathode biased exciter tubes, and clamping tube control of final screen voltage
- Selector switch for metering of PA grid, PA cathode and modulator current
- VFO voltage regulated and temperature compensated — VFO completely shielded
- Crystal access door on front panel
- Illuminated dial and meter
- Internal switch provided for either carbon or crystal and high impedance dynamic microphone
- Power supplies available for both fixed and mobile operation
- Price only $179.50* completely built and tested and with tubes

For more complete information, request Bulletin HW 456 and HW 457

Harvey-WELLS ELECTRONICS, INC., SOUTHBOROUGH, MASS.

R-9 MATCHING RECEIVER

8 tubes — double conversion — packed with performance. Same size as T-90 transmitter — together they make a complete station in only one cubic foot.

Price $149.50*

*Prices subject to change without notice.
MORSE CODE

I could fill pages with the story of the excellence of Morse code in communications. Especially with the new equipment we are building as a result of my conferences in England and Northern Europe this past year. We have a perforator which is as rugged in construction and dependable in operation as good any typewriter. We have a keying head which is so simple and dependable as to require practically no maintenance.

We have a Morse printer which will accept dots and dashes of the Morse code and deliver typewritten copy. This printer will leaf along at 120 words per minute on very poor circuits whereas ordinary telegraph operators using five unit code require good circuits and operate normally about 60 words per minute. All of this equipment, available here in Littleton, is sure to bring about a more widespread use of Morse code.

We have devised methods and equipment for teaching Morse code faster than had ever been thought possible. The methods are the result of a lifetime of experience of fine telegraph and wireless operators. The student will receive words and sentences (on our own plates of certain letters of the alphabet for roll No. 1) — within hours, instead of days or weeks.

The equipment is of such quality as used in government telegraph as well as communications companies employing perforated slip as used throughout the world.

We were the originators of inked slip and photo-tube keyers at this time when there was no other method of providing low cost practice material. Those photo-tube keyers did a good job, but there is no longer any need for them. Our Morse keyboard perforators and our Morse perforators make it possible to supply Morse perforated slip at a cost lower than the inked tapes and you have real commercial communications equipment throughout.

Would be grateful for any comment any of you may be so kind as to make. If you are a beginner we can make you of a good operator faster than you had ever dreamed. If you are a very fine operator we can make you still better.

AND FINALLY — We are more interested in developing good Morse operators for this new commercial equipment of ours than we are in any kind of a school job. I do hope, therefore, that schools and clubs will ask me for this information as well as individuals. This is the kind of equipment that will make it possible for you to toss into the junk heap any photo-tube keyers, which at best have been a substitute for the real thing. Write to me, won't you?

MCELRoy MANUFACTURING CORPORATION
LITTLETON, MASSACHUSETTS
(Ted Mcelroy)

OBS. Listen for him on 3870 kc., Mon., Wed., and Fri., at 0700 and Mon., Wed., and Sat. at 1900. The Central California Radio Council has set up a license plate committee to pass for renewal of our temporary privilege. ACR is chairman, with CTH, LOZ, and Mrs. GCG on the committee. A Northern California RTTY group has sent word that GCG and I will be back in April, and we meet the 3rd Thursday of each month at 900, San Francisco, California. The Oakland Radio Club has a new location, the location of KGAX and KGBAT is active on 420-Mc. mobile, and 01Q has talked to Vollmer Peak on 420-Mc. mobile with his plug-in converter for the 01Q receiver. The English Channel, the Paris Radio Club, the French Radio Club, the Orient and BDF is going to Seattle. EX-501V now is KG6K, W1TVI and K5AUC are putting up verticals. ACR is working up a k.w. ama. giving out by BLY. BLY at 505, with 400 watts, is working DX with only 8 watts. ACR has a lot of explaining to do when he switched to a k.w. Traffic: (Sec.) K6EFD 1284, B6F 105, W6PHF 172, K5KTH 196, W6FWD 49, JOH 47, AXB 34, BHP 9, LIL 4. (Aur.) K6BDF 103, OK 103, W6FWD 37, ITT 29.

SACRAMENTO VALLEY — SCM, Harold L. Luezo, W5MNN — With the Sacramento Valley Section Meeting coming up we hope to have a great many more appointments in the section so, fellows, come prepared to accept one soon. In the south we have the Sacramento Valley Section Meeting coming up during our annual Fall meeting on November 22nd. We will have a great many guests from the southern section who will be entering the meeting with a new spirit and we will have a wonderful program including a dinner at the Elks Club, Sac. City at 6:30 p.m. ACR is chairman, with CTH, LOZ, and Mrs. GCG on the committee. ACR is chairman, with CTH, LOZ, and Mrs. GCG on the committee. We are going to have a great many more appointments in the section so, fellows, come prepared to accept one soon. In the south we have the Sacramento Valley Section Meeting coming up during our annual Fall meeting on November 22nd. 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The CD-2 is a combined 2 meter crystal controlled transmitter and double conversion super heterodyne receiver. It is designed for CD fixed and emergency operations, and is engineered to meet all the rigid specifications of the FCDA. The CD-2 is a rugged, quality constructed unit, dependable for the serious work of CD — ideal for just pleasant QSO'ing on two. Compare these fine outstanding features . . .

- 110 VAC AND 6 VDC OPERATION
- RCVR SENSITIVITY: 0.5 MICROVOLTS
- IMAGE REJECTION: 60 db
- HARMONIC SUPPRESSION: 60 db
- 8 CRYSTAL CHANNELS
- NO MULTIPLIER TUNING REQ.
  (FACTORY SET)
- 6252/AX9910 P.P. FINAL
- PLATE MODULATED
- ANTENNA INPED.: 32 - 72 OHMS
- PROVISIONS FOR COMPLETE REMOTE CONTROL
- PUSH-TO-TALK OPERATION
- AVAILABLE FOR 6 METERS (CD-6)

A complete resume available on request to CD Division —
You can have full range of the audio spectrum at any listening level with this IRC high fidelity volume control. It automatically boosts 'highs' and 'lows' as you decrease the volume. Continuous compensation gives you full depth of tone and clear brilliancy even at whisper level.

This is a continuously variable Hi-Fi Control and should not be tapped or stepped type loudness controls. Many quality audio sets now include this unit. You, or your serviceman, can quickly install one in your set by simply replacing your present volume control.

List price is $9.95. Order from your IRC electronic parts distributor, or send coupon for literature.

WHEREVER THE CIRCUIT CALLS

For BALANCED Tone
at any
Listening Level


SOUTHERN CALIFORNIA VALLEYS — Sec: Howard L. Bays, WB6NLO. W66GW — SEC: EB1L, RM; K6BGM, PAMS: ZGR, WJF. The Stockton Club played host to ATO, who gave a very informative session. HB1R and K2RR got a write-up in the Stockton newspaper by saving the life of a critically injured truck driver. QGZ and BCI both achieved a fine score in the V.L.L.F. Contest, both on 8 and 2 meters. QGZ was appointed by the Stockton Club to give Novice exams, and is being kept quite busy. K6K6 is still under the doctor's care but is improving steadily. R3YTI is the new Club president.

The Merced club had a demonstration of ham radio at the Merced Junior Chamber of Commerce. Those participating were K6DRIU, W6SBCY, W62RJ, W65YW, and K6BGM. Fixed-station-to-mobile communication was demonstrated, also messages were sent via the National Traffic System. R3YTI is leaving the Air Force and the Merced Area. He plans to settle in the Los Angeles Area. K6DRIU and W3ZLIM make up the new TVI committee in Merced. K6HFA received his ticket in September and now reports he has worked 10 states with a Heathkit AT-1. K6NAT is the USNR station at Merced and is looking for traffic on V.2. WJF has a 94-foot mast and 3 wire doublet constructed for a problem of erecting them.

ROANOKE DIVISION
(See Roanoke (USQ) Party Announcement, Page 100)

SOUTH CAROLINA — SCM: T. T. Hunter, Wood, W4ANK — AKC is handling traffic from Rock Hill and reports into the traffic nets at least twice a week. MVX has a new jr. operator born Sept. 26th. PFI is active on V.2. nets and the South Carolina Phone Net, WN4HHW has an HA-129 and Henshaw transmitter. ZLZ reports into the Early Bird Net and expects to be a regular on it. QGE and QSTV are Navy hams currently stationed in Charleston and will be on the air soon. Few activity reports for September were received. More activity reports are needed from this section. Others are interested in your activities, so keep the SCM informed of your activities monthly. Traffic: W4LQK 658, ZLZ 88, PFI 71, FM 7, ANK 4.

VIRGINIA — SCM: John Carl Morgan, W4JKK — All Virginia section nets are back on full winter schedule. Everyone is invited to participate. Thanks to YC, UHEG, YZC, and HIC who led in keeping V.2 net during the summer. TYC, newly-appointed SCM for Virginia, will take over from JK, who celebrated 50 years on the air September 19th.

The Harrisonburg Area gang threw a big surprise shindig in Tom's honor, and the SCM understood, several of them did some fancy 'jamboree' to keep the cat from escaping the bag beforehand. The Tidewater Mobile Club handled communications for the International Yacht Regatta, with mobiles in site and allot and NCS at Yacht Club Hq. Those participating were DIZ, PFI, YVC, K6GZ, UB, PAM, IPA, LOW, ZRA, MLD, RRA, SVO, STV, TZA, and YR.

TMRC also started a Novice School. Frankie Dept. QFV, YZZ, sent HBC, while operating K2QAB, on low power, from a ferry boat in Massachusetts. KP2A, now in Arlington, is ex-V7D. V2Z1 is moving to Georgia. V2FR in Staunton is ex-OYAL from Massachusetts. LJR, now in Arlington, is ex-NHO. FFX serves college work at UWU and will visit his shrimping, so we will hear him from time to time. We keep the family on the air. LW continues to publish the outstanding Virginia Section Bulletin. If you're not on the mailing list you're missing a lot. LW 96 V, a last-minute call, the SVARC is about ready to break ground for a new club house. And speaking of clubs, about the most active club station around is FCL, of the Roanoke Club. VYX has a new 25-meter beam to play with — another good traffic man gone wrong. Congrats to MMH, who is starting his second term as our Division Director. He's YOUR voice in League affairs. If you have any suggestions or gripes he's ready to listen. Traffic: W4RFG 300, BLR 111, SY 64, AXN 61, DWP 40, TFP 26, PFI 5, YZC 63, W6LV, GY 15, WM 13, KJ 11, LW 10, UHEG 6, YOL 6, TFX 2.

WEST VIRGINIA — SCM: Alber E. Hix, W8HFP — SEC: YP, FAM: PAM, RHE, KOS, PAM, H6P. New hams in this State are WN2STU, WN1TVG (daughter of PFI), W8HSN (son of CCW), WN3G9N, XE, PFI, WN2TPD, WN6TGT, and WN2RHY. MN has returned to his home town of Princeton, W6NSSA, a new ham in Charleston, worked 24 states on 80 meters in five weeks. W6WID (son of HCA) is now in General Class. The following hams are to be welcomed to the Monongahela Valley: ISA, ISB, MBA, and MFF. DEC says things are beginning to pick up around his way. UFIQ, formerly at Fairmont, visited the MARA recently. PFT and K4U attended the October gatet afield held by MARA at Starlboy Restaurant near Bridgeport, West Virginia. The GARC, in West Virginia, is conducting two code classes per week. WYN lost a very consistent NCS when MBA left for college. The Ground Observer Corps has completed quite an extensive observation tower on a hill-top near Westover. The Winderlassett Club had an election of officers in August. The Club meets at the YMCA every other Fri. evening at 7:30. QWO

(Continued on page 106)
EVERYBODY WANTS
MULTIPHASE EQUIPMENT

and for good reason. It's versatile, permits all-band operation 10 thru 160, it's extremely stable and it's a well engineered, dependable piece of communications equipment.

MODEL 20A
MULTIPHASE EQUIPMENT is the overwhelming choice of SSB OPS everywhere. Ask any ham who uses it! Listen to it perform on SSB, AM, PM or CW!

MODEL 20A
• 20 Watts Peak Output SSB, AM, PM and CW
• Completely Bandswitched 160 thru 10 Meters
• Magic Eye Carrier Null and Peak Modulation Indicator
Choice of grey table model, grey or black wrinkle finish rack model.
Wired and tested ........ $249.50
Complete kit ................ $199.50

SIDEBAND SLICER
MODEL A IMPROVES ANY RECEIVER
Upper or lower sideband reception of SSB, AM, PM and CW at the flip of a switch. Cuts QRM in half. Excited carrier method eliminates distortion caused by selective fading. Easily connected into any receiver having 450-500 KC IF, built-in power supply. Reduces or eliminates interference from 15 KC TV receiver sweep harmonics.
Wired and tested ........ $14.50
Complete kit ............... $49.50

Check These Features
NOW IN BOTH MODELS
• Perfected Voice-Controlled Break-in on SSB, AM, PM.
• Upper or Lower Sideband at the flip of a switch.
• New Carrier Level Control. Insert any amount of carrier without disturbing carrier suppression adjustments.
• New Calibrate Circuit. Simply talk yourself exactly on frequency as you set your VFO. Calibrate signal level adjustable from zero to full output.
• New AF Input Jack. For oscillator or phone patch.
• CW Break-in Operation.
• New Gold Contact Voice Control Relay. Extra contacts for muting receiver, operating relays, etc.
• Accessory Power Socket. Furnishes blocking bias for linear amplifier and voltage for optional VFO (Modified RC-458 makes an excellent multiband VFO).
• 40 dB or More Suppression of unwanted sideband.

MODEL 10B
SUCCESSOR TO THE POPULAR
MODEL 10A
• 10 Watts Peak Output SSB, AM, PM and CW
• Multiband Operation using plug-in coils
Choice of grey table model, grey or black wrinkle finish rack model. With coils for one band.
Wired and tested ........ $179.50
Complete kit ............... $199.50

GT-1 ANTI-TRIP UNIT
Perfected Voice Operated Break-in with loudspeaker. Prevents loud signals, heterodynes and static from tripping the voice break-in circuit. All electronic — no relays. Plugs into socket inside 20A or 10B Exciter.
Wired and tested, with tube .... $12.50

AP-1 ADAPTER
Plug-in IF stage — used with Slicer, allows receiver to be switched back to normal.
Wired and tested, with tube .... $8.50

NEW AP-2 ADAPTER
Combined AP-1 and xtal mixer. Allows Slicer to be used with receivers having 30, 85, 100, 91.5 KC and other IF systems. One xtal suffices for most receivers. $17.50

WRITE FOR LITERATURE
FIRST ANNUAL ROANOKE DIVISION QSO PARTY
December 11-12, 1994
A QSO Party open to amateurs in the Roanoke Division will be held from noon EST December 11th to 6 p.m. EST December 12th. All amateurs in North Carolina, South Carolina, Virginia and West Virginia are urged to participate.

Rules: 1) The object is to contact as many fellow Roanoke Divisioners as many different counties as possible during the contest period. 2) There are no restrictions as to power, band, mode, or hours of operating, and cross-band and c.w.-to-phone contacts are permissible. Each station may be worked but once regardless of band or mode. 3) The general call will be "CQ Roanoke Division" on phone. 4) Information to be exchanged in each QSO will consist of the number of contact, your call, RS or RST report, your county and state (if located in an independent town or city near nearest county), your name.

Examples: NR 3 W4ACY S82X GUILFORD NC PHIL. 5) Scoring: Novice — all contacts whether W or WN count 5 points for each message sent and 5 points for each message received for possible total of 10 points per QSO. Others — 1 point for message sent and 1 point for each received for possible total of 2 points for each W-to-W QSO; 5 points for each Novice message sent and 5 points for each Novice message received for a possible 10 points for each W-to-W QSO. Bonus QSO Points — 25 points before multiplier for each of the six elected ARRL officials (Director, Vice-Director and 4 SCM's) contacted, Multiplier — Multiply total QSO points as determined above by the number of different counties worked to determine final score.

Here's a chance to meet the gang in your division. Get on the air December 11th and 12th and see how many you can work!
Amateurs and Experimenters!

ONE DAY SERVICE
2000 KC to 54 MC

ONE-DAY Processing

Orders for less than five crystals will be processed and shipped in one day. Orders received on Monday thru Thursday will be shipped the day following receipt of the order. Orders received on Friday will be shipped the following Monday.

International TYPE FA-9
(fits same socket as FT-243)

<table>
<thead>
<tr>
<th>RANGE (kc)</th>
<th>TOLERANCE</th>
<th>PRICE</th>
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<tr>
<td>Fundamental Crystals</td>
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<tr>
<td>2000-9999</td>
<td>.01%</td>
<td>$2.80</td>
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<td>10000-15000</td>
<td>.01%</td>
<td>$3.90</td>
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Overtone Crystals
(For 3rd overtone operation)

| 15 MC- 29.99 MC | .01% | $2.80 |
| 30 MC- 54 MC   | .01% | $3.90 |

SPOT FREQUENCY

.01% TOLERANCE—Crystals are all of the plated, hermetically sealed type and calibrated to .01% or better of the specified frequency when operated into a 32 mmf load capacitance.

HOW TO ORDER

In order to give the fastest possible service, crystals are sold direct and are not handled by any jobber. Where cash accompanies the order, International will prepay the Air Mail postage; otherwise, shipment will be made C.O.D. Specify your exact frequency and the crystal will be calibrated to .01% or better of this frequency with the unit operating into a 32 mmf load capacitance.

International Crystal Mfg. Co., Inc.
18 North Lee
Oklahoma City, Okla.

Please Send: _____ Crystals Freq.______
_____ Crystals Freq.______
_____ Crystals Freq.______
TOTAL $_____

TO: Name:
Address:
City_________ Zone:_______ State:
Enclosed: □ Check □ Cash, □ M.O. for $_______, or Ship C.O.D. □

International CRYSTAL Mfg. Co., Inc. 18 N. Lee Phone FO 5-1165
OKLAHOMA CITY, OKLA.
HOW TO SWITCH OVER TO SINGLE SIDEBAND

by Bill Cummings, W1RMG

Our early start in Single Sideband transmission has given us a long lead in the field. You get these three big advantages when you switch over to SSB via the Dale route: 1. We can deliver immediately from the most complete stock of SSB rigs. 2. Dale's trade-in allowance will help you bring the deal. 3. You can pay on easy Dale terms. Why wait, when you can enjoy SSB right now?

CENTRAL ELECTRONICS

NEW!

MODEL 20A MULTIPHASE SSB EXCITER
$249.50

20 watts peak output — SSB, AM, PM, CW.
Has great new performance features plus all the time-proven characteristics of popular Model 10A.

MODEL 10B MULTIPHASE EXCITER $179.50

10 watts peak output — SSB, AM, PM, CW.
SIDEBOARD SLICER $74.50

An SSB adapter that will improve any receiver.

Some Advantages of SSB Transmission
1. Harmonic VT�� virtually eliminated through the use of linear amplifiers.
2. No high power modulator and modulator power supply required.
3. SSB eliminates the heterodyning carriers that plague the overmodulated carrier bands.
4. Round-table operation of two independent QSOs on the same suppressed carrier freq., opposite sidebands.
New
UHF & VHF LEAD-IN

ADVANTAGES:
1. Lowest losses at UHF and VHF frequencies.
2. Great abrasion resistance and mechanical strength.
3. No time-consuming and seal required; easy to install.
4. No internal moisture to cause signal loss.
5. No kinking when used with antenna rotors.
6. Resistant to snow, ice, rain, and wind.
7. Resistant to ultraviolet rays from the sun.
8. Uses Belden Wellohm conductor for long conductor life.
9. Can be compacted tightly in stand-off insulators without crushing. No special fittings required.
10. Conductor spacing is constant even when the lead-in is transposed.
11. No stripping problem for attaching the conductor.

Thousands of separately sealed tiny cells, filled with inert gas, make this waterproof cable stable and efficient electrically.

This heavy wall of brown virgin polyethylene protects the cable against mechanical abuse and damage from ultraviolet sun rays.

...Cuts SIGNAL LOSS

This completely new 300-ohm line results from the development of a new cellular plastic core where each separate cell is filled with an inert gas to make an efficient cable with the lowest possible losses at both UHF and VHF frequencies. With this absolutely waterproof cable, no sealing of the ends is necessary. Celluline cable can be fixed in stand-off insulators without crushing. The thick outer wall of polyethylene serves to protect the cable from abrasion and sun damage.

By fusing only virgin polyethylene, the wall can be made smooth—absolutely free from rough spots—to prevent the adherence of dust and other impurities which would increase the losses.

The copper-covered steel strands, which make up the conductors, assure 49% greater resistance to breaking from flexing or stretching than any all-copper conductor.

8275 CELLULINE
TRANSMISSION LINE

by Belden
WIREMAKER FOR INDUSTRY
NEW • IMPROVED Model ‘B’ MOBILE-CEIVER
FOR 1955

MOBILE RECEIVER FOR CONVERTERS

In keeping abreast with modern electronics, S and W are happy to present the new Model "B" Mobile-ceiver for 1955...a completely new 3½, 6 and 9 KC tertiary I.F. system with narrow skirts to give you the sharpest selectivity, even on the most crowded bands. Compact and completely self-contained, the Mobil-ceiver is built to professional standards as preferred by Hams everywhere! The Mobil-ceiver has a built-in 6 and 12 volt power supply, noise limiter, BFO, speaker, RF gain control and T-R switch. It supplies filtered A, B+ and AVC for the converter. Combined with a converter the Mobil-ceiver is a double conversion superhet designed especially for mobile use...Inc. Excise Tax

$97.50 Complete

- Input adjustable 1400 to 1600 kc.
- Built-in self adjusting noise limiter.
- Sharp high Q 175 kc IF's.
- Separate RF and Audio gain controls.
- Stable built-in BFO.
- Transmit-Receive Switch.
- Provision for Transmitter Relay.
- Built-in Power Supply and PM speaker.
- Wired for 6 and 12 volt input.
- Filtered A, B+ & AVC for converter.
- Pull-out drawer type construction.
- Small size 4½" x 6½" x 7½".

See the New Mobil-ceiver at your favorite dealer today!

NEW! Mobil-Fone—a single frequency AM mobile receiver for commercial communication systems on 25-50 mc.

S & W Electronics
MANUFACTURERS OF MOBILE RADIO EQUIPMENT
3418 W. PICO BLVD. • LOS ANGELES 19, CAL.

by all. New officers of the SCRGN are WRT, net control; RHI, alt. net control; PGK, sacy., -tess.; OIL, business manager. BXV now is on 20 meters in Quartzman, WRT is net control for the Kern-Ranchamore Emergency Group, which in turn activates a new Gilbert County on the air. CFJ is building a TV transmitter. ZUF has a new beam for 10 meters. YEK (YJL) now is on 10 meters. In. Q, in Cedarville, is newly equipped with a 2-kw. generator. UBJ underwent surgery on his eyes. KPL has an acute case of matrimony. PUV and WCN are now a pair. The Athens, Cedar Valley, and System Clubs now are affiliated with the League. AREC organization in this section is growing daily. If you are not a member but are interested in joining your local ARES or SCM. Traffic: K42AR 325, FCI 438, WAO'C 115, K9Q 92, ZRT 40, BWD 98, MA 20, MTS 20, NS 16, ZD 9. WEST INDIES—SCM, William Werrn, AB2L, SEC; H2, ZD, Ramey AFB, registered in the AREC. National Guard station WAO received new John Champion transmitter and NC-125 receiver. CQ is Radio Officer of the Air National Guard. F1 and ZK have a daily sked on 3925 kc. so that ZK can talk to out ZJ. WV’s operating is being reviewed by CI. DV is assembling a pre-fab aluminum shack. GP is back on 75 meters. RD is building an 813 transmitter. KVAA air-conditioned the shack. MI is C.D. Combs. Officer. ZJ operates mobile with Kmaex receiver and transmitter. WV and WY have B+W transmitter. NY required 75-meter folded dipole. KD has a 350-watt 500-watt 20-meter Mini-bom. RM puts up a folded dipole for 3925 kc. BQ bought a 500-watt transmitter from RC. RC is using THS90. VPAA was new to K6F. Now K6F is new ARES affiliate. The San Gabriel Valley RC meets Tues. at 8 p.m. They say that TCO now has its General Class license. Fiday, of the Club and West AFA fame, is back in the sweep on a DXpedition to Mexico over Labor Day by WYO, WSS, and WOC. The Rio Honda Radio Club announces meetings will take place 7:30 p.m. the first Monday of each month at the Youth Center in Palm Park, courtesy of the Whitter Dept. of Recreation, according to UC. From the Observer, of the Associated Radio Amateurs of Long Beach, comes word that our KAM BIIG and his wife sent to the rescue of some people to the road near Tulare. Hank’s radio gear was working OK; however, nobody in Tulare was on the air so Hanks literally had to blast his way for help with his auto horn. The Lockheed ARC, via its News Notes tells of the arrival of distinguished visitors, Commissioner L. M. Webster and others. The station call of the Radio 50 Club of Whittier is HUV and Jim Ashby is president. Secretary honors go to EYP, and the treasurer is the son of BLY. The group is one of the best clubs in the section, holding activities with the local police on at least once a month during the year. BFG now equipped with one-below wattage emergency power at 287.5 v.a.c., single phase. MBW uses a 300 watts output on 813 on LS9N. LYG has a Gomet 20-meter beam and a Rocket-Quad on 2 meters. NJU has started at UCLA. K6CFX, the wife of GKL, selected XA5 for her QTH, and successfully, AM’s Chile rhombe is in a state of repair because of a thawing machine. RNN, EC for E.L.A. District of Area 12, is the trustee for MIL nationality, club station at the Bell Amateur Radio Assn. Operation is on 100, 10, and 2 meters. ARES at present. Skyhooks in use are a 204-ft. flat-top and 1000-ft. 2-meter ground-plane antenna. MAO, 30, KLAV, 733, W6LXG 544, CMN 235, KGCX 124, BWD 96, KUSY 92, MBW 81, FMG 70, K6COP 26, KB58B 23, CR 19, NGA 10, EBX 10, ZA 7, A6, K6BVE (Annett) K5BWD 110. ARIZONA—SCM, Albert H. Steinbrecher, WFLYR — (Continued on page 118)

SOUTH WESTERN DIVISION
LOS ANGELES—SCM, Howard C. Bellman, W6YVJ — News of the month is the excellent job done by the LSN gang in bringing about the "new" Southern California Net, which has acted almost as a slot in the arm for the traffic. CMN, BIIG, and GJF are heading the show in SCN. Radio clubs have sent in reports like mad, including bulletin created by members, KFC, TX, Upland City, now K6J, is a new ARES affiliate. The San Gabriel Valley RC meets Tues. at 8 p.m. They say that TCO now has his General Class license. Friday, of the Club and West AFA fame, is back in the sweep on a DXpedition to Mexico over Labor Day by WYO, WSS, and WOC. The Rio Honda Radio Club announces meetings will take place 7:30 p.m. the first Monday of each month at the Youth Center in Palm Park, courtesy of the Whitter Dept. of Recreation, according to UC. From the Observer, of the Associated Radio Amateurs of Long Beach, comes word that our KAM BIIG and his wife sent to the rescue of some people to the road near Tulare. Hank’s radio gear was working OK; however, nobody in Tulare was on the air so Hanks literally had to blast his way for help with his auto horn. The Lockheed ARC, via its News Notes tells of the arrival of distinguished visitors, Commissioner L. M. Webster and others. The station call of the Radio 50 Club of Whittier is HUV and Jim Ashby is president. Secretary honors go to EYP, and the treasurer is the son of BLY. The group is one of the best clubs in the section, holding activities with the local police on at least once a month during the year. BFG now equipped with one-below wattage emergency power at 287.5 v.a.c., single phase. MBW uses a 300 watts output on 813 on LS9N. LYG has a Gomet 20-meter beam and a Rocket-Quad on 2 meters. NJU has started at UCLA. K6CFX, the wife of GKL, selected XA5 for her QTH, and successfully, AM’s Chile rhombe is in a state of repair because of a thawing machine. RNN, EC for E.L.A. District of Area 12, is the trustee for MIL nationality, club station at the Bell Amateur Radio Assn. Operation is on 100, 10, and 2 meters. ARES at present. Skyhooks in use are a 204-ft. flat-top and 1000-ft. 2-meter ground-plane antenna. MAO, 30, KLAV, 733, W6LXG 544, CMN 235, KGCX 124, BWD 96, KUSY 92, MBW 81, FMG 70, K6COP 26, KB58B 23, CR 19, NGA 10, EBX 10, ZA 7, A6, K6BVE (Annett) K5BWD 110. ARIZONA—SCM, Albert H. Steinbrecher, WFLYR — (Continued on page 118)
New CENTRAL ELECTRONICS
Model 20 A Multiphase
Bandswitching SSB Exciter
Has new performance features, plus the proven characteristics of the popular Model 10A. 10 watts peak output — $249.50
In Kit Form — $199.50
MULTIPHASE EXCITER 10B—10 watts peak output — $55, AM, PM, CW. $179.50
In Kit Form — $139.50
SIDEBAND SLIDER — an oscillator that will improve any receiver — $74.50

The Viking 'ADVENTURER'
Will fill the bill perfectly for Novices and General Class amateurs who prefer low power CW operation or as an extra, standby transmitter to more elaborate rigs. Specially engineered for the amateur with little or no construction or operating experience. Features include:
- TVI Suppressed
- Crystal Control
- VFO Tuning
- Single Knob Bandswitch — 10, 11, 12, 15, 20, 20A, 30 and 80 meters
- 50W Input — 807 Output Tube
- Wide Range Pi-Output Tuning
- Dual Service, Self-Contained Power Supply — Has Receptacle for providing power to other equipment.
Amateur Net, including tubes — $54.95

Lightweight URANIUM FINDER
Model RDN
Extremely simple to operate, the Uranium Finder detects ores with as little as .01% uranium. This sensitivity is greater than is available with any instrument in this price range.
Visual and audible indicators are provided: flashing neon and headphone. Geiger tube is built-in. Employed standard type, long-life batteries. Operates with single switch and detects beta and gamma rays, X-rays and cosmic rays. Weighs only 3 3/4 lbs.
Complete with headphones, batteries and instructions — $59.50

SUPERIOR POWERSTATS
Smooth, efficient voltage control, 0-135 volts output from 15 volts AC line. Models also for 230 volt input. Write for free literature. Models for table and panel mounting.
Type 10, 1.25 amps — $8.50
20, 3 amps — $12.50
114B, 7.5 amps, table model — $20.00
116D, 7.5 amps, panel model — $23.00
1126, 15 amps — $50.00
1156, 25 amps — $110.00
Complete Stock Always On Hand For Immediate Delivery

- We're Generous On Trade-Ins
- If You Want To Talk SWAPS and DEALS write... or call W2DIO

New CENTER LOADING COIL
Cuts Your Antenna Length in Half
For shortened horizontal wire-type dipole antennas. Matches RG/BU cable exactly. 40 or 80 meters — $14.95 each

HARVEY is known the world over... wherever Hams operate... as a reliable source for Ham Equipment... assuring fast service and prompt deliveries.
WHO'S... WHO on the band
WHAT... spots are free
WHERE are replies to your CQ's

YOUR ANSWER:

NEW PANADAPTOR

MODEL PR-1

the eyes of your receiver

For amateur operation featuring Panoramic reception on a 3-inch CR Tube.

Why operate "blind"? The new PANADAPTOR MODEL PR-1 provides visual monitoring over a band of frequencies up to 200 kHz for eyesight... everything from the other fellow's frequencies in three-way or round robin QSO's to replies to your CQ's. You see it all on a 3-inch CR Tube which also simplifies frequency setting and station monitoring, facilitates network operations, assists in making adjustments of transmitters and antennas, enables identification and interpretation of transmitter signal characteristics (your own and others'), selects QRM free spots for sending and listening.

Once you've used the PR-1 on your rig—once you've gotten the "feel" of the over-all bond picture, seen continuously—you'll never again want to feel your way without these eyes!

FEATURES

- Visual displays up to 200 kHz wide
- 3-inch Cathode Ray Tube
- Phone output for use of PR-1 as a second unsignalled aural receiver
- Cathode Ray Tube connections for use as external scope.

ONLY $199.75 NET

See it, try it, at your dealer, or write us for further detailed information.

14 South Second Ave.,
Mount Vernon, N. Y.

Our new SEC, VRB, with his full kw, and a pair of 813's has been very busy reorganizing the entire AREC and has divided Arizona into 15 sections, with the following ECs covering the sections shown: BFA—Prescott, LAD—Tucson Section, KUJ—Ajo Section, LSK—Flourtown Section, NYN—West Phoenix Section, and UBX—East Phoenix Section. In addition, the above, we have been appointed assistant to the SEC, and UZ5 is the SEC for Noc Novice Operations. There still are openings for EC appointments in the Kinney, Douglas, Maricopa, and Whipple Sections. It is suggested that those interested in these appointments and in joining the AREC contact VRB, or the ECs in their respective sections, and listen to 3885 kHz for more information. The OP 2MPO now issues WAT (worked all Tucson) certificates for 15 or more Tucson contacts to those living outside the city. Contact VRB for further information.

Who's... Who on the band?
WHAT... spots are free
WHERE are replies to your CQ's

NEW PANADAPTOR

MODEL PR-1

the eyes of your receiver

For amateur operation featuring Panoramic reception on a 3-inch CR Tube.

Why operate "blind"? The new PANADAPTOR MODEL PR-1 provides visual monitoring over a band of frequencies up to 200 kHz for eyesight... everything from the other fellow's frequencies in three-way or round robin QSO's to replies to your CQ's. You see it all on a 3-inch CR Tube which also simplifies frequency setting and station monitoring, facilitates network operations, assists in making adjustments of transmitters and antennas, enables identification and interpretation of transmitter signal characteristics (your own and others'), selects QRM free spots for sending and listening.

Once you've used the PR-1 on your rig—once you've gotten the "feel" of the over-all bond picture, seen continuously—you'll never again want to feel your way without these eyes!

FEATURES

- Visual displays up to 200 kHz wide
- 3-inch Cathode Ray Tube
- Phone output for use of PR-1 as a second unsignalled aural receiver
- Cathode Ray Tube connections for use as external scope.

ONLY $199.75 NET

See it, try it, at your dealer, or write us for further detailed information.

14 South Second Ave.,
Mount Vernon, N. Y.
**For a Ham's Xmas!**

**WORLD TIME CLOCK**

**AUTOMATIC, ELECTRIC 24-HOUR CLOCK WITH HUGE 10" DIAL, SWEEP SECOND**

At a single glance this fabulous clock tells your favorite Ham the exact time in every zone of the world. Key cities and countries are shown on inner dial. 0100-2400 hours and 1-60 seconds are shown in separate bands! Gray metal with chrome-plated bezel. Self-starting, Convex crystal. A unique clock of time-proven quality at a modest price that hasn't risen with inflation! Order No. 32-870-Q.

**ONLY**

$12.50

(Plus $1.25 U.S. Tax)

**REG. $18.50**

**FAIRCHILD ¼" DRILL**

$9.95

Lowest price for a famous make ¼" electric drill we've seen in a blue moon. Brand new FAIRCHILD "Electric Industries" drill with die-cast aluminum pistol grip and gear case, trigger switch with side locking button, 6½ ft. rubber cord. Fairchild's world-famed 1/10 hp 110-120V AC-DC motor delivers no-load 1200 rpm, full load 700 rpm. Hobbed steel spur gears, armature wound with triple formex wire. 3-spring-collet hand chuck (also available with geared Jacobs chuck, see below). Ship. wt. 3 lbs. Order No. R-570

**WITH GEARED JACOBS CHUCK:**

Above Fairchild ¼" drill with the fabulous Jacobs, geared chuck including gear key and rubber holder which holds key onto drill shank! Anyone who knows the regular price of this precision chuck can see the savings. Anyone who knows prices will tell you a drill with this chuck has never sold this low! Ship. wt. 3 lbs. Order No. R-570.

**REG. $2.50 ACCESSORY KIT!**

Sander-polisher kit for Fairchild or other drill, includes: lambs wool bushel, molded rubber disc, sandpaper, countersunk screw and other requisite hardware. Ideal for use with furniture, cars, silverware, hobby and shop, metal, plastics, drill press, lathe, etc. Ship. wt. 1½ lb. Order No. R-5270.

**13 PIECE TWIST DRILL SET!**

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NEW MEXICO — SCM, G. Merton Sayre, W5JIT — SEC: KCM, W. V. BLM; VHF: PAM, W. V. BLM; FMR, W. V. BLM; NMEFN meet on 3038 Tues. and Thurs. at 1800, Sun. at 1300; the NM Breakfast Club every morning except Sun., 0700-0900, on 3036, the NM VHF Group, on 3603 ke, at 1900; the NM Radio Society, on 3038 cc, the NM VHF Group, on 3603 cc, at 1400, Mr. Herbert Moran, Regional C.D. Communications Officer, has conferred with New Mexico officials regarding a RACES plan for the State. The Portales Clubs adopted a constitution and elected the name Tapa-Re, with 25 charter members, ARK talked to Alberquerque, Kansas on "Ham Radio." KNGG is attending hamfests at Portales. W5MSA ECQ and ECR are active from Gallup. CIN reports Farmington has a BC-610 with emergency powers, also five modules. Scores of new calls in the V.H.F. G6O Party were FAG 24, WWV 10, EXR 7, NSJ (on 142 Mc) 2. Novemberers on 144 Mc are OLJ, WBA, Y9M, 69VYV, 9WGG/TV, and HF. KCM is active on 144. During the Percus Valley flood on Oct. 7-8, AK provided communications for Hagerman; ARD, CXC, and EET for Dexter; DSP, and URS for Artesia, VHF, 1200, 144, and ZGZ for Carlsbad; ALQ, BZA, BZB, FAB, FCJ, QGQ, RB, TSB, TDB, UP, VM, WWU, and ZU for Roswell. Mobiles especially active were BZA, BZB, CXC, UP, WPA, and YVN. Traffic: (Sept.) W5HHQ 146, BT9 20, WPA 17, CEE 9, CXC 9, ZU 8, EET 7, BZF 4. (Aug.) W5JIT 21.

CANADIAN DIVISION

MARITIME — SCM, Douglas G. Johnson, VE1OM; A. SCM, P. Weil, MIB, SEC; B. SCM, W. M. McGee, VE1OC, VORN; ECQ: VE1DQ, VE6UU. New appointees: VO7W as PM, VO7U as EC, VO6X as RM, W1UBW as OM, and OJ6B as OHS. Congratulations to those who made such a wonderful contribution to traffic handling during Hurricane Edna. Outstanding were the gals at VE1DQ and VE1FQ, who operated with emergency power and manned stations on all ports throughout the storm. Recent visitors to VE1 were VE1BVE and VE1BXX. Best wishes to VE1LJ, NR, and ex-B6I on their recent marriages. LC is giving the new Tidex beam a workout on 14 Mc. Officers of the N.B. Amateur Radio Assn. are W6K, pres.; ADU, vice-pres.; UD, sec.; and OHS, treas. The organization has directors from the N.B. counties, a good membership, and is off to a fine start. EC VO7U and the ARAEC are getting their 10 watt Operation DeW Drop and covered the Goose Bay Area with operations on 51 Mc. VO7W, ex-VE6T, is active at Gander. Also heard in the Gander Area were G6O, G5A, and G6O. Congratulations to all of you who are keeping your community prepared for emergencies! Contact SEC VE1DR for details on forming your Emergency Corps now. Traffic: (Sept.) VORN 26, VO7U 27, VOR 26, VO6U 27, W5HHQ 27, VE77 87, VO6H 55, VO6H 31, VE4M 27, VE1E 24, VE1V 26, VE1DQ 26, VE1B 20, VE1U 20, VE1M 24, and VE1Z 20. (Aug.) VO7L 11.

ONTARIO — SCM, G. Eric Farquhar, VE8IA — Congratulations to the following recently licensed YLs in the (Continued on page 116).
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TO GIVE YOU THIS
GUARANTEE

NEW
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"RANGER"
Transmitter
Exciter Kit
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$179.50
Factory,
Wired, less
Tubes
$258.00
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— seven bands— 75 Watts
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mitter/Exciter ever built
for amateurs!

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Only 10% Down
Easy Terms
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Personal Service
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We want you to be satis-
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Now for the first time,
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bandspread calibrated
for either amateur or
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filter, an S-Meter, an RF
stage and 2 IF stages.

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Down
18 monthly pay-
ments of $8.00
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B & W 5100........442.50
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PMR12A............134.50
Elmac AF67...........177.00
Viking 11 kit........279.50
Viking 11 factory
wired ................319.50
Morrow 5BR.........74.95
Morrow 5BFR .........67.95
Morrow FTR ..........128.40
Hammargrub........174.50
HQ140X ............264.50
Collins 32V3 ........775.00
Collins 75A3 &
spkr. ............550.00
Babcock MT5B ......119.50
National NC98 ......149.95
National NC88 ......119.95
National NC105 ......199.95
National NC183D ...383.50
National HR060 ......533.50
Hallcrafters SX98 595.00
Hallcrafters SX71 249.95
Hallcrafters S76 199.95
Hallcrafters S408 119.95
Gonset Super-6 ......52.50
Gonset Super-10 ....119.50
Clevor ................119.50
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cator 11 ............229.50

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Small Size, 5.0 long, 4.5 wide, 3.4 deep....An Excellent Buy of Component Parts Enables Us to Sell at These Low Prices...We Guarantee Satisfactory Results.

Additional Details in QX Magazine: Page 32, Dec., 1953

North Bay Area: BVE, DIZT, BRJ, DYO, DUV, and DNY. Hornbal and official are grateful to the Ontario Fone Club for the generous donation, which will assist in further work on behalf of children. QL is manager of TRN, DRM, name is listed A. The Belleville Club meets in the YMCA. ARF pumped out a good signal from lake QTH. NZ caught some help.

NOW IN STOCK VIKING RANGER

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Radio and Electronic Supplies
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BRIEFS

The Toledo Radio Club is sponsoring the "Worked Toledo, Ohio" award. The WOTO certificate will be given to any radio amateur submitting confirmation of contacts with fifteen amateurs in the Greater Toledo area. The onlying consists of the name and address of each. The Dayton Radio Club, JR, 2901, E. Monroe St., Dayton 5, Ohio, has scheduled a meeting on December 8th. The Dayton Radio Club, JR, 2901, E. Monroe St., Dayton 5, Ohio, has scheduled a meeting on December 8th. The Dayton Radio Club, JR, 2901, E. Monroe St., Dayton 5, Ohio, has scheduled a meeting on December 8th.
Now add extra convenience to your rig with BUD Golden Glow Sliding Drawer Assembly

The new BUD S.D. 1717 Sliding Drawer Assembly is easily and quickly assembled and installed in any standard rack. Can't fall out, can't tilt... perfectly safe mounting for any object placed on it. Slides easily in and out on ball bearing suspension in the same manner as the drawers in the most expensive steel filing cabinets.

Here Are Some of the Many Uses of the BUD Sliding Drawer Assemble

1. Mounting for record player
2. Base for portable typewriter
3. Mounting for apparatus or instruments
4. Base for writing table
5. Handy drawer space

In addition, there are many other handy uses for this practical drawer.

LOOK AT THESE CONSTRUCTION FEATURES

Chassis formed from one piece 14 gauge aluminum.
Electrowelded. Chassis size 16¾" x 14" x 3" with ½" flange top and bottom.
Support brackets formed from one piece ⅛" aluminum.
Brackets accurately punched to conform with standard panel mounting holes.

Slide rail fastens securely to chassis, slides easily in and out on ball bearings in channel.
Stop screw on slide rail prevents drawer from falling out of channel.
Support brackets and channel finished in etched aluminum.
Chassis and slide rail finished in gold-tone, will support up to 50 pounds.

Also available, aluminum plate which may be fastened to top of chassis as shelf, desk top or support; or attached to bottom of chassis to form drawer. Size 16½" x 14". Made of 14 gauge aluminum, Gold finish, Punched with four mounting holes. Catalog No. T.P.—1718.

Catalog No. S.D.—1717 Sliding Drawer Assembly
Amateur Net........................................... $10.65

Catalog No. T.P.—1718 Drawer Plate
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An ideal Christmas Gift
that lasts forever!

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FAST HOME STUDY!
PASS COMMERCIAL AND AMATEUR CODE EXAMS, YOUR FCC LICENS!
No. 1—NOVICE CODE COURSE. You get and keep 10 recordings
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and receive code the simplest, fastest way plus charts to check
your receiving accuracy; plus an album; all for the low price
of only .................................................. $7.95
No. 2—SENIOR CODE COURSE. You get and keep every-
thing given in the Novice Course except that you get 22 re-
cordings (alphabet through 18 W.P.M.), plus typical FCC type
code exams for General class and 2nd class commercial telegraph
licences. All this for only ........................................... $12.95
No. 3—COMPLETE RADIO THEORY COURSE. A com-
plete, simplified home study theory course in radio covering
the Novice, Technician, conditional, and general classes— all under
one cover— with nearly four hundred typical FCC type ques-
tions and answers. Edited so that any student can make license
he needs. Also, 10 recordings (alphabet through 18 W.P.M.)
required. You also get, FREE, a guide to setting up your own
Ham station. All for the amazing low price of .................................. $12.95
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THE VIBROPLEX CO., Inc. 333 Broadway, New York 3, N. Y.

120-Watt Modulator
(Continued from page 10)
sounds, in view of the fairly large capacitance
tolerances that are usually associated with paper
condensers. The ideal method would be to mea-
sure the capacitances and pad them out to the
correct values, and if the facilities are available
to do this it is a recommended procedure. How-
ever, even quite wide departures from the theo-
eoretically correct values do not greatly affect the
performance from a practical standpoint—that
is, in the way the transmitter sounds or in the
suppression of splatter. A reasonable procedure,
therefore, is to pick out a standard value of ca-
pacitance that lies somewhere on the load re-
sistance line between the 2500- and 3500-cycle
curves.

It will seldom be possible to find an iron-ored
choking having exactly the required inductance.

However, it is easy to modify a "television" power
supply filter choke for the purpose. These
usually have ratings from 1 to 2 henrys at 200
or 500 ma. Measurements on a "1-henry 300-ma."
choking (Stanley C-230B) showed its inductance
to be about 1.0 henry, without d.c. and
with small applied a.c. voltage. Removing the
entire stack of laminations reduced the
inductance to 0.53 henry. Calculations based on
the total resistance and the wire size (No. 28)
showed that the choke had about 22 layers, so
that these were unwound and the inductance
was then measured with various air gaps, using paper
and cardboard spacers. The measured values
are shown in Table I.

In the course of making measurements it was
found that the presence of the "finishing" la-
nations that overlap the I sections on each side of
the core had a very marked effect on the inductance
and Q. These end pieces cause a pronounced
increase in inductance for a given air gap, as com-
pared with the inductance when the end pieces
are not assembled with the regular core pieces.

They also reduce the Q of the coil to less than
half the value obtained when they aren't used,
primarily because of flux concentration in the
small cross section of the overlapping part.

They were therefore not used in making the
measurements in Table I, nor in reassembling
the choke shown in the photograph, the whole
works being held together by clamps made from
tempered Preswood. The Preswood mounting
also serves to insulate the core from the chassis,
which should increase the coil-to-chassis break-
down voltage.

Table I shows that for air gaps above 0.020
inch, the inductance changes fairly slowly with
the thickness of the gap, so in this range—
roughly 0.25 to 0.5 henry — this particular type
of choke as modified can easily be adjusted to any
value required for Class C loads ranging from
2000 to over 5000 ohms. This covers most of the
practical cases. Measurement of the inductance
is desirable but not necessary if the thickness
of the spacer used in the air gap can be measured
with moderate accuracy.
For a rig you can rely upon
Use dependable

**OHMITE** RESISTORS

Dividohm® adjustable resistor

When you're on the air... and your rig goes dead... what can be more exasperating? Make sure it isn't resistor trouble by standardizing on OHMITE resistors, with a world-wide reputation for dependability. Available in wire-wound, vitreous-enamedle type; fixed (5 to 200 watts); and adjustable "Dividohm" (10 to 200 watts). Also "Little Devil" composition resistors (½, 1, and 2 watts in all RETMA resistances), plus many others for special and experimental uses.

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(Suburb of Chicago)
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Type DGC
1000 Watts
Length 4 3/4" Width 3"

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FIXED

FEATURES:
1. AG types entirely free of hum, guaranteed equally as silent as DC. Transistor contact pressure now increased to over 100 grams; receiver contacts 45-50 grams.
2. Causes negligible change in a.w.r. up to 100 mc.
3. Special type receiver connector automatically grounds receiver contacts inside of connector during transmit and protects receiver from RF — (Optional — not available for DKG).
4. External SPDT switch available (Optional).
5. Relays supplied with UHF connectors — type 'N' on request. Add $1.00 for SPDT external switch. Add $1.00 for special receiver connector.
6. AG types (All voltages). Amateur net
7. DC types (All voltages). Amateur net

See your distributor — if he has not yet stocked Dow Co-axial relay, order from factory. Send cheque or money order, or will ship COD. Price net POH Warren, Minn. Shipping weight 9 oz. Dealers' Inquiries invited — literature on request — Watch our aids for line of open type relays, using our new magnet.

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COMPLETE
EASY TO ERECT
STANDS ANY WIND

WRITE TODAY FOR COMPLETE FREE INFORMATION AND PHOTOGRAPHS

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North Kansas City, Mo.

The inductance of a choke varies with the a.c. voltage applied to it as well as the direct current flowing through it. Because of the rather large air gap that is used in this application the d.c. component is of practically no consequence. Checks showed, however, that the inductance increased about 15 per cent at a.c. levels representative of full audio output from the modulator as compared with bridge measurements made with a low-voltage source. An allowance of this order can be made in determining the proper air gap. The figures in Table I are based on bridge measurements of inductance.

Performance Data

The over-all frequency response of the system including the splatter filter is such as to tend to emphasize those frequency components that contribute most to effective speech transmission, without sacrificing that refulous thing called "satisfactory quality." Judged by listening tests, the balance between highs and lows is quite satisfactory; also, there is no difficulty in identifying sibilant sounds such as "s" and "f," which often become indistinguishable when the highs are cut too much. The response curve is essentially flat (within ± 2 db.) between 350 and 2800 cycles with the components and values given in the diagrams, and using a splatter filter designed for working into a 5000-ohm load (measured values, 0.47 henry and 0.01 µf.). Compared with the level at a 1000-cycle reference, the response is down 6 db. at 200 cycles and 12 db. at 100 cycles. At 3000 cycles the response is down 4 db. below the same reference, and drops at a uniform rate of 20 db. per octave above 3000 cycles.

Practically all of the attenuation at the high-frequency end is in the splatter filter. The modulator and speech amplifier are intentionally cut only at the low end and the response stays fairly uniform out to 5000 or 6000 cycles. On the premise that the frequency components that cause splatter will practically always be generated in the modulator or Class C amplifier, as discussed earlier, the ones generated in the modulator obviously have to be suppressed between the modulator and Class C amplifier. Reduction of high-frequency response elsewhere in the audio system accomplishes little or no splatter reduction — since the legitimate high-frequency components in the ordinary voice are of low amplitude — and simply causes a loss of intelligibility and naturalness. In other words, there is no point in cutting the high end unless it is done in a splatter filter, located in the right spot to catch not only the legitimate components outside the needed band but also the spurious components.

The measured power outputs at various voltages were mentioned earlier. The power supply filtering, plus low-frequency cutting, result in a hum level that is largely masked by the first-stage noise, without voice input and gain at maximum. At maximum output with a pure tone signal the hum increases because of the heavier drain on the power supply, and appears practically entirely in the modulator output and not in (Continued on page 188)
That “WARM” Feeling!

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This outstanding transmitter has been acclaimed as the greatest performer throughout the world. It’s excellent for home station, portable or mobile operation. It’s designed for plug-in units, as used by experimenters - never obsolete - will take any new tube! ideal for general amateur, novice, CAP, WFT, MARSH, broadcast, marine and airport communications. An outstanding buy, direct from our factory, ready to operate.

The 240 is a 200 to 600 watt phone-CW rig for any freq. from 1.0 to 50 mc, complete with 16 x 18 x 21 cabinet, A.C. power supply, 40 meter coils and crystal and tube: 6560, 807 final, 50/40 grid, 6879 crystal mike amp., 687 phase inverter, 6-6-6 P.P. for excellent audio quality. Weight 30 pounds. TVI instructions included. 90 day guarantee. Price $79.95.

$25 deposit with order — balance C.O.D. 80, 20, 10 meter coils $2.91 per band, 160 meter coils $3.66.

MODEL 130 FOR 120 TO 130 WATTS
MODEL 242 FOR 2 METERS — 45 WATTS INPUT
LET'TINE VFO AND ANTENNA TUNER

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YOU'LL SAVE DOLLARS AND TIME
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A PRODUCTION TOOL—and for Repair Men and Handy Men

Here’s the right tool for tightening and loosening knurled finish nuts. Specially designed for electrical products using toggle, chain, push-button reaters, etc. Finish nuts also “rust” into the jaw, and when KNURL-TITE is used, these surfaces of panes are not scratched, marred or damaged. With the small average thickness of knurled finish nuts, it is difficult, or almost impossible, to positively “set” a knurled nut with any other wrench because “no other wrench holds like a KNURL-TITE.”

KNURL-TITE (Pat. Pend.) is simple to use. When a knurled nut is slipped into the collet-type precision jaws, a quick, quarter handle-turn locates it tightly. It is light, compact, sturdy Tool Kit Tool with a shock-proof, high impact resisting handle and non-rusting nickel plated body section. The hollow collet barreled accommodates the long shanks of toggle switches.

CONVENIENT SIZES

<table>
<thead>
<tr>
<th>Size</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>KR-9</td>
<td>1/8&quot; diameter nut</td>
<td>$3.25</td>
</tr>
<tr>
<td>KR-10</td>
<td>1/4&quot; diameter nut</td>
<td>$3.25</td>
</tr>
<tr>
<td>KR-12</td>
<td>3/16&quot; diameter nut</td>
<td>$3.50</td>
</tr>
<tr>
<td>KR-15</td>
<td>5/32&quot; diameter nut</td>
<td>$3.75</td>
</tr>
</tbody>
</table>

Each KNURL-TITE has up to 1/16" adjustment to take nuts slightly larger or smaller.

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BUY FROM YOUR SUPPLIER.
IF HE CANNOT FURNISH, ORDER DIRECT
CHASE MANUFACTURING CO.
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the earlier stages. At this level the signal-to-hum ratio is over 30 db. With voice input and gain adjusted for full output on peaks the drain on the supply is considerably less and hum is not observable.

With sine-wave input, the plate current at full output is 240 ma. when the load is adjusted to the appropriate value for the plate voltage in use, as listed earlier. This maximum current is practically the same at all plate voltages listed, since the plate dissipation rating of the 6146 does not permit using a bias value that gives a very large value of no-signal plate current. The grid bias should be adjusted for a total plate current that represents a no-signal input of slightly under 50 watts at the particular plate voltage used.

The voltage gain from the microphone input to the modulator grids is such that full output can be secured with an input voltage of about 3 millivolts, r.m.s. This is the order of one-tenth the voltage available from a crystal microphone with close talking.

**Technician Rig**

(Continued from page 30)

a microphone and apply power. With the gain control advanced, talk into the microphone and check to see that the lamp load brightens with modulation. The gain should be set so that normal speaking close to the microphone produces a just-perceptible flicker in the bulb.

The rig is now ready for connection to an antenna. Suitable types for both bands are described in the v.h.f. antenna chapter of recent *Handbooks*. Open-wire line or 300-ohm ribbon is suitable for the transmission line, and either can be connected directly to the antenna socket. The operating frequency should be checked again after the antenna is connected, as it may be shifted in the process. Antenna coupling should be the minimum necessary to transfer energy satisfactorily. A simple field-strength meter is suitable for both 220 and 420 Mc. was described about a year ago in *QST*. It is suggested that modulated oscillator operation be confined to 221 to 224 and 421 to 423 megacycles, leaving the remaining frequencies for crystal-controlled rigs. Be careful to avoid the band edges.

About 8 watts input may be run on either band. When the coupling loop is adjusted for 8 watts on 220, however, the input will be about 5 watts on 220. This will provide about equal output on the two bands because of the different efficiencies. About 1½ watts output can be expected.

In working stations using broad-tuning receivers, set the audio gain to the point that gave an appreciable brightening of the load lamp. When the fellow you’re trying to work has a selective communications receiver, your audio level will have to be much lower. A high level of modulation will swing your transmitter frequency too much for him to be able to understand you.

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(Continued from page 81)

can be calibrated when the modulating tone is changed to 600 cycles.

Although the receiver b.f.o. can be used for this purpose, a separate b.f.o., built for the purpose, will provide greater accuracy and convenience. Fig. 1 shows a suitable circuit. The tuning circuit is one that permits adjusting the frequency range accurately to cover the desired band.

$C_3$ is the calibrated bandspread condenser. $C_1$ is a zero-temp, fixed mica or trimmer condenser. $C_2$ is an air variable to aid in accurate adjustment of the tuning range. Slug-tuned coil $L_3$ limits the tuning range in the low-frequency direction. The values shown in the diagram are approximate.

As an example of adjustment, for 455 kc, set the slug of $L_3$ about half-way in. Set $C_2$ and $C_3$ at about half capacitance. Then adjust $L_1$ to tune the circuit to 455 kc. Then use $L_1$ to set the low-frequency limit, and $C_2$ to set the high-frequency limit of the tuning range of $C_3$. By careful trimming of all four components, the range may be set at the desired point.

The unit should be sturdily built, of course, and be provided with a large-size vernier dial of good quality. The unit should be shielded to prevent harmonics from getting into the front end of the receiver, and a shielded injection lead should be used. Both the receiver and the b.f.o. should be well warmed up before using, of course. With care, it should be possible to make readings to an accuracy of 50 cycles at any frequency with this system.

Conversion Attachment
(Continued from page 88)

can be brought through and is most easily connected to Pin 4 of the second i.f. tube. Near the front goes the B+ 105-volt regulated lead. This is best picked up from the screen terminal, Pin 6 of the second i.f. tube. If in some sets this screen terminal is not connected directly to the VR tube, then, of course, the 6BE6 plate voltage should be taken directly from the anode of the VR tube.

Adjustments

Turn on the set and shunt the dropping resistor for the regulator tube until this tube lights. About 5000 to 10,000 ohms at 5 watts will probably be right. It is desirable at this point to check the approximate frequency of the oscillator section of the converter tube. Its signal can be picked up on a communications receiver and it should oscillate over a range in the vicinity of 10,245 kc. Put the cover on the outboard unit and allow the whole works to warm up for some thirty minutes before proceeding with the alignment.

A signal generator covering 455 kc. and 10.7 Mc and an output meter are essential. The latter may be an a.e. voltmeter with a blocking

(Continued on page 180)
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condenser of about 0.05 μF. Connect it from the plate of the audio tube to ground. Or it may be a 20,000-ohms-per-volt or a vacuum tube voltmeter connected from the a.v.c. bus to ground. First align the 455-kec, section. The final alignment of these circuits should be made with the signal generator connected to the oscillator grid, Pin 1, of the 6BE6 converter tube. Keep the signal generator output as low as possible for the final touching up. After these circuits are aligned, under no circumstances whatsoever touch them again.

The signal generator can then be shifted to the signal grid, Pin 7 of the converter tube, and the frequency set at 10.7 Mc. Adjust the oscillator frequency with the slug-tuned coil to bring this signal through. Check that the converter oscillator is at 10,215 kc, on the low side of the signal, not 11,155 kc, on the high side. Now connect the generator to the first mixer grid, Pin 2 or 7 of the 12AT7 mixer. The 10.7-Mc. i.f. cans now be aligned. The final trimming should again be done with the signal generator output as weak as can be used.

Remove the generator, replace the cover on the bottom of the set and, without an antenna connected, tune the receiver across its range to see if any birds show up within the band. Should one appear, change the second oscillator frequency (with the slug-tuned coil) to a lower frequency, if the birdie is at the low end of the band, or higher if at the other end. Reconnect the signal generator to the signal grid, pin No. 7 of the 6BE6 converter, and, keeping the signal as weak as possible, retune the generator for maximum output. Then following the earlier procedure, realign the 10.7-Mc. i.f. transformers to whatever frequency the generator is now set. Continue this procedure, if necessary, until the birdie is outside the band.

Should i.f. oscillation occur, it will probably be in the 10.7-Mc. circuits. It can be tamed usually by judicious dressing of the plate, the B+ and the 455-kec. grid leads inside the receiver. These can be shielded from each other with the disk ceramic condensers scattered around the tube sides. If this is not sufficient, a 33-ohm composition resistor can be placed between cathode and ground of the first i.f. tube. Leave this resistor unby-passed.

The details given here are for the Sonar SR-9. For other sets, the procedure will vary but the following basic points will hold. Use only one stage of low frequency i.f. The front end stability will probably not permit greater sharpness. For mobile use, a second conversion to 1500 kc might allow easier tuning and will help if the first local oscillator is not too stable under road shock. Use 105 volts, regulated, on both plate and screen of the converter tube, not only to gain stability but to save a screen-dropping resistor and its associated by-pass. Use a high-C oscillator; from 150 to 200 μf, is about right for the tank condenser, which should be a silver-mica or other high-stability type. Do not apply a.v.c.
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See Page 158

to the converter tube grid as this will tend to shift the local-oscillator frequency. Use a reasonably low-gain converter such as the 6BQ5. Don’t hesitate to cut the i.f. gain for stability. The extra gain of the converter stage will compensate. It is not necessary to use the grid resistor and blocking condenser between the 455-ke. transformer and its i.f. tube. The a.v.e. can be brought to the ground lead of this transformer through a decoupling network consisting of a \( \frac{1}{2} \) megohm resistor and a 0.01-\( \mu \)f. condenser.

On two receivers so modified, the over-all gain was increased about 10 db. while the background noise of man-made QRM was greatly reduced. This improvement meant the difference between communications or not over the difficult circuits on which these units were used.

Grounded-Grid Amplifiers

(Continued from page 83)

plate lead. The lead from the grid to the grounding capacitor was as short as possible, and was made out of 1/4-inch copper strap. No fusing was necessary and the amplifier was completely stable. It is suggested that the 301-7L be mounted so that the internal grid shield is about on the same level as the chassis, and that the clearance hole be made not larger than necessary to clear the tube envelope at that point. Due to the protruding grid terminal, the tube must be wiggled a little to get it through the hole, but once the grid terminal is through, there should be ample play so that the tube may be inserted in the socket without difficulty.

Linear Operation

A question of major interest whenever linear amplifiers are used is how linear are they? It can be easily shown that when small-signal operation is considered, there are good reasons for expecting the grounded-grid amplifier to be more linear than a comparable grounded-cathode amplifier. It would seem reasonable, then, to expect some perhaps smaller improvement when large-signal operation is considered.

To try to get some numerical data on this point, a series of runs was made using a 4-250A as a zero-bias amplifier, both grounded-grid and grounded-cathode. Comparable operating conditions were used in both cases.

The usual trapezoidal oscilloscope pattern is not sensitive enough to indicate differences in linearity of the small magnitude under consideration, so a technique was used based on the fact that if a modulated signal is applied to a slightly nonlinear amplifier, the nonlinearities will cause spurious modulation products to appear in the amplifier output. The magnitudes of these spurious products compared with desired products give an indication of the amount of nonlinearity in the amplifier.

The actual procedure is as follows: The driver is amplitude-modulated with a steady audio tone.

(Continued on page 180)
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Its output will then consist of a carrier and two sidebands, the sidebands being spaced on each side of the carrier by an amount equal to the audio modulating frequency. This signal, when passed through the slightly nonlinear amplifier, will be distorted, and the distortion will appear as extra sidebands on the output signal spaced at multiples of the modulating frequency from the carrier. The ratio of the amplitude of the first undesired sideband to that of the desired sideband (nearest the carrier) is a convenient measure of the distortion.

To get accurate data, the receiver used to detect and measure the sidebands must have enough selectivity to separate them properly, and it must have an accurate S-meter. The selectivity problem is made easier if a relatively high audio modulating frequency is used, as this increases the separation between sidebands. The S-meter situation is not so good, as for if any, receivers give really reliable signal strength indications. If a signal generator having a calibrated attenuator is available, the S-meter may be calibrated against it.

Using this technique, the general conclusion reached was that the grounded-grid arrangement consistently gives slightly better performance than the grounded-cathode circuit. Improvements of the order of 3 to 6 db. were noted (6 db. corresponds to a reduction of the amplitude of the distortion by a factor of 2).

**Plate Modulation**

One check run was made driving the grounded-grid amplifier with a steady signal and plate modulating it in the usual fashion. The question is whether the unmodulated signal from the driver which feeds through to the output will substantially reduce the percentage of modulation. This unmodulated signal, the same one discussed earlier in connection with Fig. 1B, appears in the output regardless of the amplifier plate voltage. As plate modulation simply consists of varying the amplifier plate voltage, the output of a plate-modulated grounded-grid amplifier will consist of the regular modulated signal plus an unmodulated signal from the driver.

It is to be expected that the tubes which require the least r.f. driving voltage would be the most free of this effect. The 4-250A was set up as a zero-bias amplifier, with about 500 watts d.c. plate input, and plate modulated. It was found that the unmodulated part of the signal only amounted to about ten per cent of the total output power, which was consistent with the estimated driver output of about 50 watts. The resultant small decrease in modulation would not be noticeable in most cases.
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Recent Equipment
(Continued from page 41)

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Used as a linear for m.s., the manufacturers suggest using speech clipping in the modulator of the low-level modulated stage at about 90 per cent modulation and adjusting the linear for slightly less than 100 per cent modulation capability. This is a worthwhile suggestion that boosts the capability of the amplifier so that it can be run with a carrier output of around 80 watts.

We didn’t have an opportunity to see the instruction book, but we understand that it goes into detail on the use of the excitation control and the rectified r.f. output indicator in tuning up a linear, which should be a big help to those who are coming face to face with linear-amplifier operation for the first time.

— B. G.

40-Watt Rig
(Continued from page 12)

others, and by adjusting C5 it is possible to get more output. When using a 7.1-Me. crystal and tripling in the oscillator, one can expect to get a 2- to 3-ma. reading in the grid position.

Shown at Fig. 2 is an antenna system for two-band operation, 7- and 21-Me. The 67-foot length is actually a compromise between the 21-Me. longwire dimension of 68 feet 5 inches, and a half-wavelength of 65 feet 2 inches for 7 Me. However, the 67-foot compromise shows a low standing-wave figure and worked out well in actual operation. On-the-air tests produced some excellent contacts and reports. When the 21-Me. band is “open,” one can easily “work the world” with the power available from this rig.

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W1WFB/1 Milford Amateur Radio Club .................................. 309- AB-14- 2730
V3BHN/73 Scepter Amateur Radio Club .................................. 276- A-14- 2700
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W3PR/7 Acme Amateur Radio Club .................................. 367- B-15- 2352
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W6BB/6 Longview Amateur Radio Club .................................. 298- B-11- 1878
W1HS/1 California Amateur Radio Club .................................. 306- B-10- 1848
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W9FG/6 Venus-Burter Radio Club .................................. 140- AB-14- 1494
W9B/3 Annapolis Radio Club .................................. 314- A-10- 1431
VO1X/2 Newfoundland Radio Club .................................. 134- .......................... 128
VE17ND/7 Tonet Amateur Radio Club .................................. 140- AB- 8- 1288
W1HN/1 Great Bay Amateur Radio Assn. .................................. 154- ABC-9- 1088
W1GCC/1 Lowel Radio Club .................................. 133- ABC-7- 1011
W1HEG/4 Clinton County Amateur Radio Club .............................. 327- AB-16- 875
W6YJ/6 Pioneer Radio Amateurs .................................. 325- AB- 9- 751
W1BM/1 Central Massachusetts Amateur Radio Assn. .................. 117- B-13- 711
W3EE/3 Pico Central Radio Club .................................. 101- B-15- 608
W3JY/2 (Novelty club) .................................. 55-ABC-55- 309
V9EA/3 Lukelake Amateur Radio Club .................................. 86- BC- 5- 308

Five Transmitters Operated Simultaneously

WEQ7/5 Royal Order of Stuads .................................. 1028- A-20- 1071
W2RVL/2 Naseau Radio Club .................................. 720- A-30- 0786
W2KQJ/2 Watchling Valley Radio Club .................................. 279- A-25- 0759
W3GB/3 York Road Radio Club .................................. 740- A-27- 0714
W1AA/3 Lake Success Radio Club .................................. 710- A-19- 0669
W6MCG/6 Helix Amateur Radio Club .................................. 712- A-14- 0633
W7DK/7 Radio Club of Tacoma .................................. 604- A-23- 0579
W6NA/3 DX Club .................................. 749- A-16- 0331
W6BA/9 St. Clair Amateur Radio Club .................................. 605- AB-15- 0428
W8ACW/8 Genessee County Radio Club .................................. 660- AB-27- 0426
W6NCL/6 Skyriders .................................. 720- A-15- 0377
W6KA/6 Pasquadra C. D. Net .................................. 617- AB-10- 0221
V1EBR/3 Clinton Amateur Radio Club .................................. 443- A-12- 0412
W2FPQ/2 Huntington Radio Club .................................. 584- AB-26- 0414
W2GM/2 Alban Amateur Radio Assn. .................................. 466- AB-25- 0387
W6LU/6 Santa Barbara Amateur Radio Club .................................. 148- A-16- 0279
W6CF/5 Klondyke Club .................................. 547- B-22- 0242

(Continued on page 180)
NOW FOR THE FIRST TIME the amateur can select from a full line of professionally engineered short antennas. You can pick a 3 element or 2 element rotary beam, or short dublet to fit your most EXACTING requirements. All PRE-TUNED and PRE-ASSEMBLED at the factory.

**The New -- 20 METER SHORTBEAM**

**...3 ELEMENT ROTARY BEAM**

Complete—Pre-Assembled!

Pre-assembled at the factory. All complete—Coils, elements, cross arm, stand-offs and "U" bolts are assembled as one unit. Attach the three elements to boom and you are ready! You get "top-man-on-the-frequency" results even in a limited area installation.

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Amateur Net</th>
</tr>
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<tbody>
<tr>
<td>RS-2-15</td>
<td>New 15 Meter 2 Element SHORTBEAM</td>
<td>$44.95</td>
</tr>
<tr>
<td>RS-2-20</td>
<td>New 20 Meter 2 Element SHORTBEAM</td>
<td>$49.95</td>
</tr>
<tr>
<td>RS-2-40</td>
<td>New 40 meter 2 Element SHORTBEAM</td>
<td>$74.95</td>
</tr>
<tr>
<td>RS-3-15</td>
<td>New 15 meter 3 Element SHORTBEAM</td>
<td>$54.95</td>
</tr>
<tr>
<td>RSD-80</td>
<td>New 80 meter SHORT DUBLET</td>
<td>$14.95</td>
</tr>
<tr>
<td>RSD-40</td>
<td>New 40 meter SHORT DUBLET</td>
<td>$14.95</td>
</tr>
</tbody>
</table>

Radio Specialties Inc.
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FOR 20 YEARS

Types, shapes, sizes, and mountings proved in the most exacting military, aviation, and industrial communications systems.

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STANDARD PIEZO COMPANY
Carlisle, Pa.
Pioneers of Modern Crystal Development

WIMHL/1
Waltham Amateur Radio Club
345- A 18-3330

WTMX/7
Canton Radio Club
198- B 14-3136

WTLJ/7
North Attleboro Amateur Radio Club
440- AB 18-3084

W6LUF/6
Mount Dora Amateur Radio Club
422- AB 25-2946

K6CF/7
Burlington Civic Defense Radio Council
296- AB 12-2926

W4NYY/4
Radio Radio Club
386- AB 22-2746

W6GGO/8
Huron Valley Amateur Radio Assn.
430- AB 29-2649

VE2AD/2
South Shore Amateur Radio Club
296- A 20-2529

W2NFU/2
Northern Indiana Amateur Radio Club
280- A 25-2520

W4IBR/4
Nevada Amateur Radio Assn.
350- H 20-2250

W7YV/7
Lake Radio Club
348- H 10-2238

W7HCL/4
Oregon Amateur Radio Society
314- H 16-2034

W7KVC/7
Portland Amateur Radio Club
186- A 10-1854

W3CAR/3
Washington Radio Club
254- A 10-1154

W8SL/8
Drexel University Amateur Radio Club
166- H 12-1052

W8BNW/2
Tyler Radio Club
241- AB 19-1545

W8TA/1
Rutland C.N. and Phone Radio Club
62- AB 9-146

Six Transmitters Operated Simultaneously

K6HAQ/6
Pueblo Amateur Radio Club
1709- AB 17-11065

W2VJ/2
Lakeland Amateur Radio Club
1188- A 21-10917

W9PC/6
Cresta Valley Radio Club
1151- A 25-10584

W6EM/6
North St. Paul Amateur Radio Club
1013- A 30-9696

K6FR/2
Morris Radio Club
843- A 26-7812

VE3EM/1
Joseph Amateur Radio Club
730- A 30-8765

VE3JJ/3
West Side Radio Club of Toronto
790- AB 25-7396

KMAIR/8
(Scendir group)
765- AB 25-7396

W5MLI/6
Coronado Radio Club
636- A 22-5319

W8ZIM/1
Westchester Amateur Radio Club
701- AB 20-5184

K9FST/7
Illinois Valley Radio Club
554- A 20-4986

W4Q/E/1
Champaign Radio Club
499- A 15-4286

W6PJ/5
Toledo Radio Club
458- A 19-4140

W6WSW/6
Chicago Suburban Radio Assn.
412- A 30-3053

K6ER/6
Sacramento Amateur Radio Club
410- A 42-3771

WS2MF/8
Lake Geneva Amateur Radio Club
610- B 30-3496

WIECO/1
Suburban Signal Amateur Radio Club
410- AB 30-3953

W4VTA/4
K0FM/2
Correspondent Signal Corps
476- AB 10-3292

Y6HJX/3
Brantford Amateur Radio Club
346- A 19-3114

WTRMT/7
Browning School Amateur Radio Club
456- AB 7-3499

Z22/2
Falmouth Radio Club
373- AB 34-3018

W6JL/7
North Central Hills Amateur Radio Club
468- AB 12-2961

W6BNX/6
Turlock Amateur Radio Club
461- AB 16-2901

W6ERH/6
Johnson County Amateur Radio Assn.
331- AB 19-5943

K6AY/6
Helm Radio Club
321- AB 15-5743

W7PX/7
Valley Radio Club
314- A 30-2466

W4FJ/4
Blue Granite Radio Club
396- AB 20-2466

W6FDF/6
Western Michigan Amateur Radio Club
310- A 16-2250

W2AV/2
Hammond Town Radio Assn.
310- H 19-2166

W6LMM/6
San Mateo County Amateur Radio Club
212- AB 16-1707

W8WTT/8
Tulare Mobile Radio Assn.
219-ABC11-1146

Seven Transmitters Operated Simultaneously

W4FU/6
Ohio Valley Amateur Radio Assn.
1570- AB 20-14355

W6LE/6
Lockheed Amateur Radio Club
932- AH 60-7695

W1WKN/1
Old Colony Amateur Radio Assn.
557- A 17-5256

W1AI/1
Yankee Radio Club
576- AB 24-3749

W6PCK/4
Blue Ridge Amateur Radio Society
325- B 23-3300

W7BKZ/3
Quinta Amateur Radio Club
498- AB 20-3174

W8BB/6
Corena Ganz
523- A 11-3907

Eight Transmitters Operated Simultaneously

K6DT/4/8
West Valley Radio Club
1420- AB 26-10473

W6RBN/3
Rock Creek Amateur Radio Assn.
1018- A 6-6312

W1OIC/6
Concord Ham Radio Club
1996- A 20-9819

W6TO/6
Downey Radio Club
1326- AB 30-8550

W6OY/6
Palo Alto Amateur Radio Assn.
947- AB 27-8292

K5EM/6
Westchester Amateur Radio Assn.
1085-ABC30-6738

W1NF/1
Hartford County Amateur Radio Assn.
642- A 16-6057

W6EG/6
Oakland Radio Club
756- AB 25-6030

W6BZ/6
San Francisco Radio Club
861- A 31-5790

(Continued on page 18)
Elmac AF-67 Mobile Transmitter with Palco Model 6A Power Supply .................. $226.50
Elmac PMR-6A Receiver (less speaker) .................. 134.50
Elmac 6 or 12 V. Receiver Power Supply ............. 24.50

Cornell-Dubilier Dictator Model 6/12D5
Designed to operate dictating machines or other AC devices such as shavers, phono turntables or small amplifiers in automobiles or boats. Delivers 110 V. AC 60 cycle power up to 50 watts continuously, and handles loads up to 75 watts on a short-time basis. Operates from either 6 or 12 volt battery.

Cornell-Dubilier D.C. to 110 V. AC Converters

<table>
<thead>
<tr>
<th>TYPE</th>
<th>INPUT</th>
<th>WATTS OUTPUT</th>
<th>NET PRICE</th>
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<tbody>
<tr>
<td>6/12D5</td>
<td>6-V</td>
<td>50–75</td>
<td>$26.53</td>
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<tr>
<td>6R10</td>
<td>6-V</td>
<td>100–125</td>
<td>40.25</td>
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<td>12R8</td>
<td>12-V</td>
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<td>32.81</td>
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<tr>
<td>110R10</td>
<td>110-V</td>
<td>100–125</td>
<td>27.02</td>
</tr>
</tbody>
</table>

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Wiring Entirely Printed! Drop in the Parts and Solder
All Parts Supplied
Less Tubes and Crystal

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CLASS B

Grouped in this special listing are the scores of stations
manned by one or two operators. Where two persons
participated, the call of the assisting operator is given following
that of the amateur whose call was used. Figures following
the call listings indicate number of contacts, power and
final score.

One Transmitter

WX2EO/2 375- A537 B5ADT/8 163- C485
WX2F 857/2 111- A2B5 W8ON/7 53- A492
WX2F9/3 111- A286 W8ON/5 53- A492
WX3BU/6 125- A147 W8ON/1 53- A487
WX3BU/5 125- A147 W8ON/1 53- A487
WX3BU/4 125- A147 W8ON/1 53- A487
WX3BU/3 125- A147 W8ON/1 53- A487
WX3BU/2 125- A147 W8ON/1 53- A487
WX3BU/1 125- A147 W8ON/1 53- A487
WX3BU 125- A147 W8ON/1 53- A487
WX3BU/6 125- A147 W8ON/1 53- A487
WX3BU/5 125- A147 W8ON/1 53- A487
WX3BU/4 125- A147 W8ON/1 53- A487
WX3BU/3 125- A147 W8ON/1 53- A487
WX3BU/2 125- A147 W8ON/1 53- A487
WX3BU/1 125- A147 W8ON/1 53- A487
WX3BU 125- A147 W8ON/1 53- A487
WX3BU/6 125- A147 W8ON/1 53- A487
WX3BU/5 125- A147 W8ON/1 53- A487
WX3BU/4 125- A147 W8ON/1 53- A487
WX3BU/3 125- A147 W8ON/1 53- A487
WX3BU/2 125- A147 W8ON/1 53- A487
WX3BU/1 125- A147 W8ON/1 53- A487
WX3BU 125- A147 W8ON/1 53- A487
WX3BU/6 125- A147 W8ON/1 53- A487
WX3BU/5 125- A147 W8ON/1 53- A487
WX3BU/4 125- A147 W8ON/1 53- A487
WX3BU/3 125- A147 W8ON/1 53- A487
WX3BU/2 125- A147 W8ON/1 53- A487
WX3BU/1 125- A147 W8ON/1 53- A487
WX3BU 125- A147 W8ON/1 53- A487
WX3BU/6 125- A147 W8ON/1 53- A487
WX3BU/5 125- A147 W8ON/1 53- A487
WX3BU/4 125- A147 W8ON/1 53- A487
WX3BU/3 125- A147 W8ON/1 53- A487
WX3BU/2 125- A147 W8ON/1 53- A487
WX3BU/1 125- A147 W8ON/1 53- A487
WX3BU 125- A147 W8ON/1 53- A487

(Continued on page 140)
NEW!

Johnson Viking ADVENTURER CW Transmitter Kit

Work around the world with the ADVENTURER . . . the perfect transmitter kit for both novice and experienced amateurs. Completely self-contained.

Loaded with new features:
- Power Input — 50 Watts
- Effectively YVI suppressed
- Pi-network output tunes the antenna tuner needed
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- Extremely compact in size — only 17¾" wide x 8¾" deep

No. 240-181-1 VIKING ADVENTURER Kit with tubes, less crystals and key. Complete with easy assembly directions and operating instructions.

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TERMINAL Regularly Stocks these Famous JOHNSON Ham Favorites:
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- Viking II
- Viking VFO
- Viking Mobile VFO
- all in either Kit Form or factory wired
- Johnson's Civilian Defense Viking II — Low Pass Filter
- Standing Wave Ratio Bridge
- Signal Sentry
- Matchbox
- Bi-Net and Whipload as well as Johnson parts.
Contact W2BUS for information, data sheets and quotations.

NEW!

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A new complete Transmitter which, besides functioning as a regular Transmitter becomes a single sideband Transmitter at the twist of a knob.

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$177.00

NATIONAL NC-98 RECEIVER


$149.95

WRITE W2BUS FOR COMPLETE INFORMATION
CLASS C

Grouped in this tabulation are the scores of entrants in the mobile class. Figures following the call indicate number of contacts, power and final score.

<table>
<thead>
<tr>
<th>Call</th>
<th>Final Score</th>
<th>Power</th>
<th>Contacts</th>
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<tbody>
<tr>
<td>KAASK/6</td>
<td>298-3-3653</td>
<td>12A-275</td>
<td>29-15-729</td>
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<tr>
<td>W1JUL/5/9</td>
<td>146-4-3701</td>
<td>6A-1675</td>
<td>20-25-675</td>
</tr>
<tr>
<td>W2B8K/6</td>
<td>221-2-2977</td>
<td>6A-2175</td>
<td>20-25-675</td>
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<tr>
<td>W9AJJ/I-5</td>
<td>91-2-2727</td>
<td>6A-2175</td>
<td>20-25-675</td>
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<tr>
<td>W9GQ/6</td>
<td>43-3-2406</td>
<td>12A-275</td>
<td>29-15-729</td>
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<td>W9GQ/6/6</td>
<td>172-2-2675</td>
<td>12A-275</td>
<td>29-15-729</td>
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<td>W9BQP/6</td>
<td>102-2-2389</td>
<td>12A-275</td>
<td>29-15-729</td>
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<td>W9FVE/6</td>
<td>124-2-2477</td>
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<td>W9ERB/8</td>
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<td>29-15-729</td>
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<td>W9LH/LX/6</td>
<td>192-2-2417</td>
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<td>29-15-729</td>
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<td>W9LJD/5</td>
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<td>29-15-729</td>
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<td>W9LJD/5/6</td>
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<td>W9LJQ/6</td>
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<td>W9SLF/I-5</td>
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<td>29-15-729</td>
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<td>W9NYG/6</td>
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<td>12A-275</td>
<td>29-15-729</td>
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<tr>
<td>W9RXG/5</td>
<td>152-2-2417</td>
<td>12A-275</td>
<td>29-15-729</td>
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<tr>
<td>W9SM/6</td>
<td>49-2-2417</td>
<td>12A-275</td>
<td>29-15-729</td>
</tr>
<tr>
<td>W9SM/6/6</td>
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<td>W9SM/6/6</td>
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<td>12A-275</td>
<td>29-15-729</td>
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<td>W9SN/6</td>
<td>66-2-2417</td>
<td>12A-275</td>
<td>29-15-729</td>
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<tr>
<td>W9SN/6/6</td>
<td>66-2-2417</td>
<td>12A-275</td>
<td>29-15-729</td>
</tr>
</tbody>
</table>

EARL W. SPRINGER AIRCRAFT RADIO CO.
Sky Harbor Airport, Route 11, Box 330
INDIANAPOLIS 19, INDIANA

CLASS D

Grouped in this tabulation are the scores of home stations operated from emergency power.

<table>
<thead>
<tr>
<th>Call</th>
<th>Final Score</th>
<th>Power</th>
<th>Contacts</th>
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<tr>
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<td>W1ZEV/5</td>
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<tr>
<td>KX8EX</td>
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<td>W1WZ</td>
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CLASS E

Grouped in this tabulation are the scores of home stations operated from commercial power sources.

<table>
<thead>
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<th>Contacts</th>
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<tbody>
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<td>833</td>
<td>W4KVD/5</td>
<td>129</td>
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<tr>
<td>W4ZJ/4</td>
<td>300</td>
<td>W4WQ/5</td>
<td>113</td>
</tr>
<tr>
<td>W4WQ/5</td>
<td>250</td>
<td>W4NQ/5/6</td>
<td>113</td>
</tr>
<tr>
<td>W4VEZ/5</td>
<td>212</td>
<td>K6CW/5/6</td>
<td>104</td>
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<tr>
<td>W4TER/6</td>
<td>186</td>
<td>W4KQ/5</td>
<td>104</td>
</tr>
<tr>
<td>W4WQ/5</td>
<td>100</td>
<td>W4R3/5</td>
<td>97</td>
</tr>
<tr>
<td>W4R3/5</td>
<td>80</td>
<td>W4R3/5</td>
<td>97</td>
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<td>W4R3/5</td>
<td>60</td>
<td>W4R3/5</td>
<td>97</td>
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<tr>
<td>W4R3/5</td>
<td>40</td>
<td>W4R3/5</td>
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<tr>
<td>W4R3/5</td>
<td>20</td>
<td>W4R3/5</td>
<td>97</td>
</tr>
</tbody>
</table>

(Continued on page 14R)

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Service to hams • "YOUR FRIENDLY SUPPLIER" by hams. Nationally accepted brands of parts, tubes and equipment. Trade-ins and time payments. Write W1BFT.

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W1HKE, Paul W. Muller, Salem Depot, N. H.
W1QPR, Thomas P. McDonald, Jr., Beverly, Mass.
ex-W2BAG, F. Austin Libbary, Niagara Falls, N. Y.
ex-W3FIA, Henry P. Wagner, Catasauqua, Penna.
W4SEZ, Buell Vincent, Franklin, Ky.
W4TUT, Mayor Ivan C. Kelly, Somerset, Ky.
W1QZQ, George H. Searsboro, Spartanburg, S. C.
W8RR, ex-W8DNN, ex-HC2OT, B. E. M. Stevenson, Houston, Texas.
W5LIF, Ralph A. Grogan, Fort Worth, Texas
W6JCE, Earl P. Patrick, Coronado, Calif.
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W8BPI, William Everett Janes, Chiliicoto, Ohio
W8SDL, Thomas Thomas, Dayton, Ohio
W8SML, John J. Meissler, Detroit, Mich.
W9DDB, Harold W. Davis, Libertyville, Ill.
W8CRM, B. P. Piper, Wayward, Mo.
W8DWR, Frank J. Whalen, Kansas City, Mo.
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143
Novice Round-up
(Continued from page 61)

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

3) QSOs: Contacts must include certain information sent in the form as shown in the example. QSOs must take place on the 80-, 40-, 15-, or 10-meter bands. Crossband contacts are not permitted. C.W. to 'phone, c.w. to c.w., 'phone to 'phone, 'phone to c.w. contacts are permitted. Valid points can be scored by contacting stations not working in the contest, upon acceptance of the number and section and receipt of a number and section.

4) Scoring: Each exchange counts one point. Only one point may be earned by contacting any one station, regardless of the frequency band. The total number of ARRL sections (see page 6 of this QST) worked during the contest is the "section multiplier." A fixed scoring credit may be earned by entrants who hold ARRL Code Proficiency certificates. If an entrant does not hold a CP award he can apply for credit by attaching to his Round-up report a copy of qualifying run from W9OWP, December 4th or January 7th, or from W1AW, December 16th or January 14th. CP credit equals the w.p.m. speed indicated on the latest certificate or sticker held by the entrant. The final score equals the "total points" plus "Code Proficiency credit" multiplied by the "section multiplier."

5) Reporting: Contest report must be as shown in the sample form. Reports forms and a map of the United States will be sent gratis upon request. Indicate starting and ending times for each period on the air. All Round-up reports become the property of ARRL and must be postmarked not later than February 14th, 1955.

6) Awards: A certificate award will be given to the highest-scoring Novice in each ARRL section.

Disqualifications: Failure to comply with the contest rules or FCC regulations shall constitute grounds for disqualification. ARRL Contest Committee decisions are final.

Happenings
(Continued from page 68)

What is the formula for calculating the total inductance when two or more inductors are connected in series? In parallel?

What is the formula for calculating the reactance of an inductor?

What is the formula for determining the total resistance of two or more resistors connected in series? In parallel?

What is the formula for determining the total capacitance of two or more capacitors connected in parallel? In series?

What is the formula for determining the characteristic impedance of a parallel conductor transmission line?

What is the formula for determining the standing wave ratio in a transmission line?

What is the formula for determining the wavelength of radio waves?

What is the formula for finding the resonant frequency of a tuned circuit?

In a series-resonant circuit, if the value of inductance is kept constant, what must be done to the value of capacitance to double the resonant frequency?

In a series-resonant circuit, what must be done to the value of the inductance-capacitance product to halve the resonant frequency?

Draw a schematic diagram of a high-pass filter with constant-ε, pi section, balanced type.

Draw a schematic diagram of a low-pass filter with constant-ε, pi section, unbalanced type.

Draw a schematic diagram of a power amplifier stage having parallel feed.

Draw a schematic diagram of a wattmeter with an indicating device.

Draw a schematic diagram of a Colpitts oscillator circuit.

(Continued on page 149)
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"ITV" FILING

At its May meeting, the ARRL Board of Directors voted to file comment in Docket 9288 supporting the action of the Federal Communications Commission in proposing maximum radiation standards for certain devices such as television receivers. The text of the League's filing follows:

FEDERAL COMMUNICATIONS COMMISSION
Washington, D. C.

In the Matter of
Amendment of Part 15 of the Commission's Rules Governing Restricted Radiation Devices

COMMENTS OF THE AMERICAN RADIO RELAY LEAGUE, INC.

Pursuant to Paragraph 12 of the Notice of Proposed Rule Making in Docket 9288, the American Radio Relay League files these comments on behalf of the more than 42,000 licensed amateur radio operators who are members of the League.

The interest of the American Radio Relay League in the present proceedings arises from the fact that stations in the amateur service have, since the inception of television broadcasting, been plagued with disruptive interference due to spurious radiation from television receivers. The amateur service is undoubtedly the single communications service most adversely affected by this unnecessary interference, inasmuch as amateur stations are located almost exclusively in residential areas; in other words, the distribution of television receivers follows closely the distribution of amateur stations in any particular area.

The American Radio Relay League has heartily supported the past actions of the Commission in dealing with this general problem, and endorses the present effort of the Commission to require manufacturers of television receivers to turn out products which are in reasonable conformity with the necessities of their users to live harmoniously together with other services provided for under international treaty and licensed by the Commission.

The League wishes to record its appreciation of the efforts made by the Radio-Electronics-Television Manufacturers Association, through its committees, to bring to the attention of manufacturers the need for better receiver design and construction to meet today's spectrum requirements. While the proposals of the Commission for maximum radiation limits, which we assume are based on the Association's recommendations, will not by any means solve all of the problems of interference to the amateur service and therefore leave much to be desired, they are a step in the right direction. The League is pleased to see that the Commission, in Paragraph 10 of its Notice, recognizes this fact and indicates an intention of progressing to stricter limits as may be required to protect the various services it licenses.

AMERICAN RADIO RELAY LEAGUE, INC.
By PAUL M. SEGAL
Its General Counsel
A. L. BURLINGTON
Its General Manager
October 9, 1954

FEED-BACK

In the caption under the diagram of the CD-10-TX 10-meter transmitter-converter on page 33 of the November issue, the references to the crystals, X1 and X2 are reversed. X2, of course, is the converter crystal.

In the article describing the mobile modulator, starting on page 21, the length of the chassis is given as 6 3/8 inches. This dimension should be 6 5/8 inches.
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for the Amateur Operator . . . the most complete transmitter-exciter and receiver combination at popular amateur prices.

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(Continued from page 88)
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An Open Letter to Hams About Antennae
(Refer to page 121 — Oct. '54 issue — QST)

We have been told in many ways that our rig is no better than the skyhook we tie it to. We try for maximum transfer of energy for transmitting as well as for receiving the other o.m.l. These are true facts and especially vital to us, but we string up the best wires we can, regardless of their effect upon one another because we want to work more than one band — especially when one goes out! What then is our problem? To design and build a SINGLE antenna which shall be erected in the smallest possible space over the best ground we can produce: which will give us a maximum transfer of energy for both transmitting and receiving; using one feed line; and enable us to work not one, but four or more bands without loading coils or capacitors at the antenna; without special relays; or WITHOUT HAVING TO MAKE ANTENNA ADJUSTMENTS! This would be the ideal skyhook, especially in most cases, if the radiation could be the same in all directions. It sounds IMPOSSIBLE. But it is being done now through a principle known as ELECTROMAGNETIC DECOUPLING and these antennae are available to you in six different models at a far lower cost than you could produce your own even if you had a complete workshop and the many different materials required.

One of the antennae, for example, is the A.E.C.'s V-37 which comes in two models—Deluxe and Economy. With this antenna, several ground radials and 50-ohm coax you are AUTOMATICALLY on 75/80, 40, 20, 15, 11 and 10 meters as fast as you can change your transmitter — and with absolutely no adjustments of any kind at the antenna!

The price for the Deluxe V-37 is $299 while that of the Economy V-37, where you supply guy-wires, radials and other immediately-available material (which you may already have) is $199! The rest of our story is told on Page 121 of the October issue of QST. Write us. You'll be glad you did!

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Replaces old type 4-125A. Features heavy, zirconium coated graphite anode for high overload capacity. Powdered glass stem for strength eliminates external “heat-trap” base.

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This Freed circuit incorporated several changes from the original Williamson circuit to provide optimum performance at high and low frequency extremes. It is rated at 10 watts with triode connected output tubes. However, by connecting the screen grids of these tubes to taps provided on the Freed KA-10 output transformer, it is possible to double the power output for a given distortion percentage.

Recommended power supply is choke-input type with a two-section L-C filter to maintain constant D.C. output and to improve filtering to the voltage amplifiers.

The required 550 volts AC for the rectifier can be furnished by a Freed KP-10 power transformer.

FREED KP-10 POWER TRANSFORMER
FREED KA-10 OUTPUT TRANSFORMER
FREED KC-10 FILTER REACTOR
FREED KC-11 FILTER REACTOR

A DETAILED TECHNICAL SHEET AND PARTS LIST IS AVAILABLE ON REQUEST
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HERE IS AN EFFECTIVE HIGH PASS FILTER TO SUPPRESS TELEVISION INTERFERENCE!

The Regency Model HP-45 High Pass Filter is a constant "K" type filter with a cut-off frequency of approximately 45 mc, in a 500 ohm balanced line. Attenuation at 29 mc is approximately 20db. At frequencies of 14mc and below, the attenuation is 40db or more. Signals above 85mc are passed through the filter without loss. Simple to install--full instructions included with each unit.

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THERE'S MONEY IN
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LAMPKIN 105-B MICROMETER FREQUENCY METER.
Heterodyne type, uses only one crystal to measure all transmitters 0.1 to 175 mc., crystal-controlled transmitters to 500 mc. Precision CW signal generator for receiver final alignment above 20 mc. Weight 12 1/2 lbs. Width 13". Price $220.00.

LAMPKIN 205-A FM MODULATION METER. Tunable 25 to 500 mc in one band. Direct indication of peak voice deviation, 0 to 25 kc positive or negative. Relative field-strength meter. Built-in speaker. Weight 14 lbs. Width 12 1/4". Price $240.00.

MAIL COUPON TODAY!

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Mfg. Division, Bradenton, Florida
Please rush me more dope on the 105-B and 205-A.

Name
Address
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LAMPKIN LABORATORIES, INC. BRADENTON, FLORIDA
Be Sure of Your Transmitter to Antenna Match with the new CoAx Ratiometer (S.W.R.)

Install a CoAx Ratiometer in the line between your transmitter and antenna (or tuner) and stop guessing at a proper match. In this new device, well-established principles are applied to produce a unique answer to the problem of measuring standing wave ratios. The result is a design of exceptional accuracy and simplicity.

There are no condensers to balance, no resistors in line to dissipate your power. The unit handles frequencies from 2 to 200 M.C.S, power loads from 10 to 1000 watts (so it can't be overloaded). Rugged construction, but so compact it can easily be permanently installed inside your transmitter. Free mounting bracket included with every unit.

Sensing unit may be purchased with or without the easy-to-read remote indicator. Complete instructions include how to make your own remote indicator. See your favorite distributor today. If he hasn't heard about the CoAx Ratiometer, send us his name and your check. We'll ship direct to you, postpaid.

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QST

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He won’t have to exchange it for one with longer sleeves.
He won’t read it once and shove it out of sight.
It won’t shrink.
And he’ll like it whether he smokes or not.

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$4.25 In Canada
$5.00 elsewhere

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38 LaSalle Rd.
West Hartford, Conn.

(Continued from page 148)

Spain: U.R.E., P.O. Box 220, Madrid
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Sweden: S.S.A., Stockholm
Switzerland: F.S.K.A., Postbox 1203, St. Gallen
Syria: P.O. Box 35, Damascus
Tiradentes: P.O. Box 301, Tiradentes, F.T.T.
Trinidad: John A. Hoford, VP4TT, P.O. Box 554, Port-of-Spain
Tripoli: 5A2TZ, Box 372, Tripoli
Uruguay: R.C.U., P.O. Box 37, Montevideo
U.S.S.R.: Central Radio Club, Postbox N-88, Moscow
Venezuela: R.C.V., P.O. Box 2993, Caracas
Virgin Islands: Richard Spenceley, Box 403, St. Thomas
Yugoslavia: S.R.J., Postbox 48, Belgrade

How’s DX?

(Continued from page 6)

CMIRU, EA6AX, FASLH, HCIFGF, K17s AR2 AYIM
BEZ, LT5DBD, QAGN, T60 2RRK, 2WLC 5CAP 5RM
8FC, VK9RM, Y11MX, YV5BD and ZL3BE.
Eighty c.w. provided DU7SV (255), JA1CR (24) and
K66IX (25) for W7JLU........... K2BZT picked up many
Europeans, EL2X (5) 0-1 8B7, KV4A4 two, LU12S (13)
0 and YV1AD (12) 19-20 ...... 80-meter dots at random
points — IF 850; heard ZD2DCP (7) 22-23 8B7,
worked VKs 29L 32HI, V44LZ, 7W4C:V; mailed that
ZD9, IF9AP 7/8; an Lf "32" feller, PY4AR ....
VCPRE was W4BRB’s 1135 3.5-Mc. DXCC-style country;
VE11ZZ also passed the 80-meter century mark.
Fifteen ‘phone rode the erratic m.u.f. crest in such fine
style that 21-A3C converts popped up by the dozens. A
4-hour-and-20-minute WAC is included in this W4D0
roster: CNSM8M 14 8B7, a DLI1 and G5, VP3YG 14, a W7,
ZC4AI 11-12, ZL2LY 16 and 4X4BL 10-11, all on ‘phone.
Here also caught ELs 18A 1D4, VO4 2PL AE5 and ZB2E.
Heard to be active on 21-Me. A3 by W4D0 but still
sought are F8BCC, FQ8AT, FR7ZA, VK0BS, VP8 5EK
6L 8CB, V81FE, ZBAM, Z8A1AU 2V, ZC8 4AD 7B1,
ZD9B AB AC 100 and 4X7LY. W0RBI’s first
tangle with 15 meters netted CB6H, a Z1 and 4X4BL
1........ LUS8B collided with EA8AC and SV8WO ....... CP5AB, CX5AF, VP2KB, VQ4RF, Y11AA, YS1RA and
ZP6AM gave in to W4UWC ....... W6ZZ’s 21-8. mg.
log reveals CB2HJ, HC1LW, K4B8O, P2820, T2B8X, VTA
and Z1a galore. VP6WR, Z80DW and enough mobiles
moves to clinch him MM-diplomas No. 79 .... CB4BP
(242), CA68 CS CX, ML3A, OIKTL, VP5SC, VQ2DT
and Z59G (310) are recommended by W0WCI.
So there you are. The bands are jumpin’—pick your
megacycle, throw the switch, and let the prefixes fall where
they may!

HAMFEST CALENDAR

NEW YORK—The Yonkers Amateur Radio Club will hold its 5th annual Hamfest-Dinner on Friday, December 3rd, 7 p.m., at Schmidt’s Farm Restaurant, Fort Hill Road (west of Central Park Ave.), Greenwich, N. Y. The Dinner will be a choice of turkey or swordfish steak. There will be a good time in store for all, with flowers for the YLs and XYs. A dance will also be held. Tickets are $4.50 each and may be ordered in advance from the club treasurer, Kern Bowyer, W2GHH, 1 Midland Gardens, Bronxville 8, N. Y. Make checks payable to Kern Bowyer. No tickets will be sold at the door.

MEMBERSHIP CHANGES OF ADDRESS

Four weeks’ notice is required to effect change of address. When notifying, please give old as well as new address. Advise promptly so that you will receive every issue of QST without interruption.
COLLINS 32V, new condition, in original carton, $600. 75A, new, unused, with 800 and 3 Kc. mech. filter, retail coils, and speaker. Contact: $900, P.O. Box 131, Lake Arrowhead, Cal., Richard Kari, Box 256, Leelanau Ave., Chicago, Ill.

MISCELLANEOUS for sale. Call or write for list. Some free to beginners. For list, send 1 cent postage. Write 1 cent for list, Box 26, Tel. 7-3393.

ZENITH, Model 745H, 500, $25.00. J. S. Frank, 2228 B St., Lincoln, Nebr.

RCA 105A, single. J. B. Farnsworth, 502, San Diego, Cal.

WANTED: 120X, 120A, or 120G, 20.00. Also similar.
WANTED: One Heathkit ATL transmitter. S. Booth, 1326 Roseville St., Oklahoma City, Ok. 73106. Phone 485-5578. 25.00
REQUEST the following back issues of QST: 1952; October, November, December, 1953; January, February, May and June. Claude M. Phillips, 152 North Wabasso Dr., Peoria, Ill. 61603. 25.00
HRO-60 table model,ystal calibrator, coils, perfect, 745.00; BC-90 receiver, 145.00. 25.00. WBDY, 10900 Aquin
Road, Edmonds, Washington.

1 tube 8-bie Mosley receiver. Best offer. Roger Freeney, 3107 Maryl

FOR SALE: HRO501, aprx. A, AA, AC, B, C, D, E, F, G coils, $35.00. VFO mod-ulator, 100/1000 cal, $25.00. BFO mod-ulator, 100/1000 cal, $25.00. Reduktor, $10.00. Wo-
Mariana, Ga.

SOLD: NEC-LW 2-meter, crystal controlled receiver, $12.00. Re-
certified cathode modulator kit, $10. New VFO kit. Power sup-
y, $10. Better offer. WGOKS, 798 She-
burrow, St. Paul, Minn. 55105.

WANTED: Viking II or similar transmitter. VFO bus and Match-
bobbin. $20.00 each. Better offer. H. S. Backett, 1234 EX-
AR-B. Zilll Crowell, W3JZ, J. Pinto Paxton Ave., Harrisburg, Pa. 17101.

HAYE Surplus Vibrapacks, clean and fully guaranteed, 6vDC input 1000-1000A, output size 31/4 x 3 x 6", about 6 lbs. complete in

SOLD: MX-8 in good condition, $12.00. 6CSA's metal, 12.5, Speed-X straight keys, $40.00. See 500VDC personal ad in CQ 1954. $30.00. No PST antenna tap switch, $10.05. Gallagher's Service, W3QAL, Boiseville, N. Y.


BARGAINS: with new guarantee: R-5, $14.95; Gornet Tube, $8.00; Strober K-90, $6.00; NEC-LW, $36.00; RME-63, $49.00; Lyco 600, $99.00; S-27, $99.00; SX-34, $19.00; HRO-90, $19.00; BC-90, $275.00; HT-17, $52.50; EX Shifter, $99.00; Globe Trotter, $49.50.

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Hammarlund HQ-140-X. 540 kc-31 mc in 6 ranges. Crystal filter, ANL, 6 sel. positions, electrical bandspread, etc. 98 SX 766. Net...$264.50
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National NC-98. 550 kc-40 mc coverage. Crystal filter, S-meter, separate HF osc. 98 SX 732. Net...$149.95

National NC-98 SW. As above, but with bandspread for 17, 19, 25, 31, 49 meter SW BC bands. 98 SX 720. Net...$149.95
98 SX 722. Matching 6" speaker. Net................ $11.00

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National HRO-60. Dual conversion: 1.7-30 mc; bandspread on 80, 40, 20, 11-10 meters. 2 RF stages; ANL; S-meter, 6-step crystal filter, etc. 97 SX 722. Net...$533.50
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ANTENNAS — GENERAL

“All-Band” Antenna (H & K) ............... 39, Dec.
Checks on 10-Meter Mobile Whips, Some (Plummer and Seidel) ................. 34, Aug.
Contract Beam for 40 and 20 Meters, A (Turner) ............... 17, Jan.
Contract Two-Element Diversity, A (Gebeau) ............... 19, Jan.
Electric Fence Wire for Antennas Use (H & K) ............... 55, Nov.
High-impedance Folded Dipoles (Eisen) (Technical Correspondence) ............... 43, Mar.
Impedance Characteristics of Harmonic Antennas (Wrigley) ............... 57, Nov.
K.F. Bridge Impedance-Matching Transformer, An (Gauthier) ............... 29, Nov.
Simple 2-Element Beam for 20 (Bauer) ............... 24, Mar.
Slow Clamp for Mobile Antennas (H & K) ............... 83, Jan.
Transmitter Hunting with the D.F. Loop (Norberg) ............... 33, Apr.
Unusual 25-Meter Mobile Antenna, An (Baunton) ............... 43, Jan.
VP (Vest Pocket) Beam, The (Hemmen and Flagg) ............... 27, May

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Coupling to Coaxial Lines (Technical Topic) ............... 43, May
Dressing Up the Antenna Coupler (Neid) ............... 29, Mar.
Standing Waves and TVT (Technical Topic) ............... 44, Jan.
Tin Can Low-Pass, The (McCoy) ............... 29, Sept.

AUDIO-FREQUENCY EQUIPMENT & DESIGN

A.M. Equivalent of Single Sideband, The (Grammer) ............... 19, Jun.
Audio for the Mobile or Fixed-Station R.F. Assembly (Chambers) ............... 21, Nov.
Feed-back ............... 140, Dec.
Delay-Line Phase Shift (Griffis and Freykind) ............... 12, Mar.
Improved Volume-Compression Circuit, An (Broseau) ............... 27, Oct.
Phase-Modulation Exciter for the V.H.F. Man (Southworth) ............... 39, Aug.
Post-Phase Distortion (Technical Topic) ............... 40, May
Principles of Radiotelephony, Some (Goodman) — Part I ............... 37, May
Part II ............... 18, June
Part III ............... 34, July
Part IV ............... 22, Oct.
Addendum ............... 40, June
Radical Approach to Improved "Phone Reception, A (Rapp) ............... 37, May
Revamped Audio Circuit for Viking Transmitters (H & K) ............... 30, July
Single-Sideband Economy (Technical Topic) ............... 43, May
120 Watts of Audio Without Driving Power (Grammer) ............... 15, Dec.

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Basic Tool Kit for the Novice, A (McCoy) ............... 40, Jan.
Beginner’s Code-Practice Set, A (McCoy) ............... 39, Feb.
Crystal Control on 220 Mc. (Tilton and Southworth) ............... 16, Feb.
Examination Committees (editorial) ............... 9, Sept.
Gadgets for the 6-6 (McCoy) ............... 44, Nov.
Getting the Most Out of Your Receiver (Goodman) ............... 29, Aug.
Let’s Go VFO (McCoy) ............... 23, Apr.
Let’s Meet Mr. Ionosphere (McCoy) ............... 36, Aug.
Low-Cost Transistorized Code-Practice Oscillator, A (Hingham) ............... 24, June
Novice and DX (editorial) ............... 9, Feb.
Principles of Radiotelephony, Some (Goodman) — Part II ............... 37, May
Part III ............... 34, July
Part IV ............... 25, Oct.
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Selection and phone Reception (Goodman) ............... 26, Mar.
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Two-Dial Receivers and 100-Mc. Signals ............... 34, Oct.
What’s with Your Log? (McCoy) ............... 52, Mar.
40 Watts on the 7- and 21-Mc. Bands (McCoy) ............... 11, Dec.

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Double-Back ......... 140, Dec.
Civil Defense Control-Station (Hart) ............... 32, Nov.
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Part II ............... 25, Sept.
Communications in Civil Defense (Morris) ............... 35, July
Off the RACES (Garr) ............... 69, Jul.
1963 SETShindig, The (Hart) ............... 47, Apr.

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Homemade Guy-Wire Insulators (H & K) ............... 54, Nov.
Homemade Holder for surplus Radar Crystals (H & K) ............... 140, Apr.
Inventing Never—Never Land (Peters) ............... 30, July
Make Your Own Potted Circuits (Baker and Maynahan) ............... 19, July
Making Large Round Chassis Holes Without a Punch (H & K) ............... 124, Feb.
Miniature Low-Loss Connectors (H & K) ............... 63, Jan.
Mounting and Taping B & W Miniductors (H & K) ............... 46, Mar.
Now Shielding Trick (H & K) ............... 55, Nov.
Preventing R.F. Leaks with Aluminum Foil (H & K) ............... 122, Feb.
Protecting Chassis Finish During Construction (H & K) ............... 39, Sept.
Reducing Talk-Conditioner Minimum Capacitance ............... 29, July
Removing Hot Tubs (H & K) ............... 39, Dec.
Restoring Ceramic or Isolante Components (H & K) ............... 54, Nov.
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Starting Hard-to-get-at Machine Screws and Nuts (H & K) ............... 46, Mar.
Use for Old fluorescent Starters (H & K) ............... 49, Apr.
Utilizing Burnt-Out Metal Tubes as Cable Plugs (H & K) ............... 42, June
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Communications in Civil Defense . 55, July


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V.H.F. QSO Party . 49, Jan.

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June Results . 54, Sept.

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West Virginia QSO Party . 90, Mar.

Wisconsin Section QSO Party . 79, Dec.

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CONCORD, N. H.
JUDGING from the comments on the air and
the letters we have received, the page I wrote
for the October issue of QST touched on a
delicate subject. To clear up some of the mis-
understandings, we would like to make the
following statements:

1. The purpose of the tests was to determine
the feasibility of incorporating selectable sideband in new receiver designs where
reception of double sideband AM signals is a consideration.

2. The fact that our test indicated better readability with the crystal filter does
not mean that we will not consider the use of selectable sideband since reception
of SSSC signals is another important consideration.

3. The Single Sideband converter used for the tests is not available to Amateurs.
It is a recent development for the military service. No single sideband converter
presently in production for the Amateur market was tested.

4. The signals were clean, without evidence of frequency modulation.

5. The reception with the crystal filter was essentially exalted carrier selectable
sideband, with the characteristics of the crystal supplying the peak to exalt the
carrier and the notch to reject the undesired sideband. See page 65 of the Feb-
ruary 1954 issue for the tuning details necessary to produce these results.

6. Our point was this: In the purchase of an NC-183D or HRO-60 receiver, a
means of carrier exaltation and sideband selection of double sideband AM signals
is built in if the time is taken to get familiar with it.

7. It does not necessarily follow that this performance will be obtained with all
receivers containing crystal filters since there are other considerations.

8. All the operators used in making the test were thoroughly familiar with the
equipment and the problem.

Since the last discussion of selectable sideband, I have had the pleasure of
using a SSSC exciter at my home QTH. To say that I am enthused is putting
it mildly — even twenty CW was omitted from my operating schedule last
weekend. This is something coming from a DX hound.

National Company has expanded its activities which includes a program of
more diversified Amateur products. This will include in addition to new equip-
ment, a larger selection of components designed for the constantly changing
market.

Certainly Single Sideband equipment and components will be among the
new items.

Ed Harrington, W1JEL
...for high power output at lower plate voltages

High perveance—a basic design feature of RCA power tubes—makes it practical to get the power you want at substantially lower plate voltage. Here’s how this important feature pays off for you: (1) It enables you to use more reasonable values of pi-network components; (2) it reduces the need for very high-voltage plate transformers and high-voltage-rated filter capacitors; (3) it permits you to use lower-voltage-rated tank circuits; (4) it simplifies your rf and dc insulation problems.

RCA High-Perveance Tubes—power triodes and beam power types—are available at your RCA Tube Distributor. For technical data write RCA, Commercial Engineering, Section L37M, Harrison, N. J.