UTC Ultra compact audio units are small and light in weight, ideally suited to remote amplifier and similar compact equipment. High fidelity is obtainable in all individual units, the frequency response being ± 2 dB from 30 to 20,000 cycles.

True hum balancing coil structure combined with a high conductivity die cast outer case, effects good inductive shielding.

<table>
<thead>
<tr>
<th>Type No.</th>
<th>Application</th>
<th>Primary Impedance</th>
<th>Secondary Impedance</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-10</td>
<td>Low impedance mike, pickup. 50, 125/150, 200/250, 50 ohms or multiple line to grid</td>
<td>33, 500/600 ohms</td>
<td></td>
<td>$16.00</td>
</tr>
<tr>
<td>A-11</td>
<td>Low impedance mike, pickup. 50, 200, 500 ohms or line to 1 or 2 grids (multiple alloy shields for low hum pickup)</td>
<td>50,000 ohms</td>
<td></td>
<td>$18.00</td>
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<tr>
<td>A-12</td>
<td>Low impedance mike, pickup. 50, 125/150, 200/250, 50,000 ohms overall, or multiple line to grids</td>
<td>33, 500/600 ohms</td>
<td></td>
<td>$20.00</td>
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<tr>
<td>A-14</td>
<td>Dynamic microphone to one 30 ohms, or to two sections, or to two grids</td>
<td>50,000 ohms overall, or two sections</td>
<td></td>
<td>$24.00</td>
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<tr>
<td>A-20</td>
<td>Mixing, mike, pickup, or multiple line to grid, 33, 500/600 ohms</td>
<td>33, 500/600 ohms</td>
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<td>$16.00</td>
</tr>
<tr>
<td>A-21</td>
<td>Mixing, low impedance mike, 50, 200/250, 500/600 ohms, or multiple line to grid, or to two grids (for low hum pickup)</td>
<td>50, 200/250, 500/600 ohms</td>
<td></td>
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<tr>
<td>A-16</td>
<td>Single plate to single grid 15,000 ohms</td>
<td>15,000 ohms, BA unbalanced D.C.</td>
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<tr>
<td>A-17</td>
<td>Single plate to single grid, As above</td>
<td>As above</td>
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<td>$20.00</td>
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<tr>
<td>A-18</td>
<td>Single plate to two grids, 15,000 ohms, BA balanced D.C.</td>
<td>15,000 ohms, BA balanced D.C.</td>
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<tr>
<td>A-19</td>
<td>Single plate to two grids, As above, or to two sections, or to two grids</td>
<td>15,000 ohms, 33, 500/600 ohms</td>
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<td>$20.00</td>
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<tr>
<td>A-24</td>
<td>Single plate to multiple line, 15,000 ohms, or to two sections, or to two grids</td>
<td>15,000 ohms, BA balanced D.C.</td>
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<tr>
<td>A-25</td>
<td>Single plate to multiple line, 15,000 ohms, or to two sections, or to two grids</td>
<td>15,000 ohms, BA balanced D.C.</td>
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<tr>
<td>A-26</td>
<td>Push pull low level plates to 3,000 ohms, or to two sections, or to two grids</td>
<td>3,000 ohms, or to two sections, or to two grids</td>
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<td>$20.00</td>
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<tr>
<td>A-27</td>
<td>Crystal microphone to mains 100,000 ohms, or to two sections, or to two grids</td>
<td>100,000 ohms, BA balanced D.C.</td>
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<tr>
<td>A-30</td>
<td>Audio choke, 250 henrys 5 SMA 5000 ohms, D.C. 65 henrys, or 10MA 1000 ohms, or D.C.</td>
<td>250 henrys, 5 SMA 5000 ohms, or 10MA 1000 ohms, or D.C.</td>
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<tr>
<td>A-32</td>
<td>Filter choke 60 henrys or 15 MA 2000 ohms, or D.C. 15 henrys, or 20 MA 500 ohms, or D.C.</td>
<td>60 henrys, or 15 MA 2000 ohms, or 15 henrys, or 20 MA 500 ohms, or D.C.</td>
<td></td>
<td>$12.00</td>
</tr>
</tbody>
</table>

**Type A Case**

1/2" x 1 1/4" x 2" high

**UTC OUNCER** components represent the acme in compact quality transformers. These units, which weigh one ounce, are fully impregnated and sealed in a drawn aluminum housing 1/4" diameter...mounting opposite terminal board. High fidelity characteristics are provided, uniform from 40 to 15,000 cycles, except for 0-14, 0-15, and units carrying DC which are intended for voice frequencies from 150 to 4,000 cycles. Maximum level 0 DB.

**Type**

<table>
<thead>
<tr>
<th>Type No.</th>
<th>Application</th>
<th>Price</th>
</tr>
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<tr>
<td>0-1</td>
<td>Mike, pickup or line to grid</td>
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<td>0-2</td>
<td>Mike, pickup or line to grid</td>
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<td>0-3</td>
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<td>0-4</td>
<td>Single plate to 1 grid</td>
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<td>0-5</td>
<td>Plate to grid, D.C. in Pri.</td>
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<td>0-6</td>
<td>Single plate to 2 grids</td>
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<td>0-7</td>
<td>Plate to 2 grids</td>
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<td>0-8</td>
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<td>Plate to line, D.C. in Pri.</td>
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<td>Push pull plates to line</td>
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<td>0-11</td>
<td>Crystal mike to line</td>
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<td>0-12</td>
<td>Dynamic mike to 1 grid</td>
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<td>Reactor, 300 Hys., 50 Hys., 1 MA, D.C.</td>
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<td>0-14</td>
<td>50 henrys or line to grid</td>
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<tr>
<td>0-15</td>
<td>15 MA 2000 ohms, or D.C.</td>
<td>$50.00</td>
</tr>
</tbody>
</table>

**Ouncer Case**

1/2" Dia. x 1 1/4" high

ISO VANICK STREET NEW YORK 13, N.Y.
EXPORT DIVISION 12 EAST 40th STREET, NEW YORK 16, N.Y. CABLES: "ANLAB"
NEW G-E MINIATURE TRIODE-PENTODE!

Saves you purchase money
layout space
a second socket
leads between sockets

- **Economy rides high** with the new 6U8. This dual miniature will replace a triode like the 6AB4 plus a pentode like the 6AG5. Two-tube performance—one-tube compactness!

**The single base and socket** simplify your chassis layout... also reduce lead inductance, for in Type 6U8, triode and pentode occupy one envelope, with the leads between the two sections measured in small fractions of an inch.

**Ideal for converter applications.** Commercially the new 6U8 is serving as an oscillator-mixer tube in TV front ends. Here's evidence that the tube will do a bang-up job in a 10, 6, or 2-meter converter of your own design!

**Useful in transmitters.** You can put the triode section of the 6U8 to work as an oscillator, and make the pentode half a doubler or amplifier—for each tube section is electrically independent... Frequency? High enough for the 2-meter band and above.

**Your G-E tube distributor** will be glad to quote the low price and tell you more about the new 6U8. See him today! General Electric Company, Electronics Division, Schenectady 5, New York.

---

**G-E MILESTONE:**
Dependable tubes in quantity!

- Way back in 1918, General Electric built 100,000 radio tubes for the armed forces. These tubes—which performed to the highest standards then known—stood for manufacturing techniques ahead of their time. In the years since, there has been further step-by-step improvement in G-E tube-building know-how. Today, as a user, you benefit from G.E.'s long history of progress in translating tube design into performance. The millions of G-E tubes currently built, are dependable because of 34 years' experience in large-scale precision manufacture!
Never before in amateur history has there been available a transmitter as thoroughly engineered as the KW-1 — putting the entire world within the operator’s reach. Its efficient high and low level filtering, and low level peak clipping, permit high average modulation without splatter. Its kilowatt input not only gets out, but is easier to copy. The KW-1 is truly an investment in satisfaction.
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the littlefone®

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A new Hallicrafters product—the "littlefone"—is now ready for thousands of important uses in hundreds of industries.

This light, rugged, dependable radio-phone will be offered through Hallicrafters distribution organization—by the men who know communications best.

USES OF "LITTLEFONE" CHALLENGE YOUR IMAGINATION!

There are literally thousands of industrial uses for the "littlefone" radio—anywhere where powerful, dependable, "on the move" contact is required.

AMONG THE MORE IMPORTANT PRESENT USES ARE:

- Lumbering
- Police & Fire Control
- Disaster Emergencies
- Factory Inspection
- Forestry Control
- Inter-City Buses
CENTRAL STATION
HT-23 (25-50 Mc.)   HT-24 (150-174 Mc.)

- AC-operated Central Station
- Audio-amplifier, providing one watt of audio for loudspeaker
- Power consumption is 35 watts
- Plugs in any AC outlet (117 Volts)

Where one or more extra stationary receiving stations are desired, H已licrafters economical S-81 receivers may be added.

HAND CARRY
HT-21 (25-50 Mc.)
HT-22 (150-174 Mc.)

- FULL TWO-WATT ANTENNA OUTPUT*
- Weighs only 14 pounds!
- Complete, self-contained 2-way radio-telephone station!
- Powered by Dry, or Wet Rechargeable Batteries (can be recharged from car battery or 117 Volts AC)
- Rugged, weatherproof
- 22 sub-miniature tubes!

*On 25-50 Mc. • One-Watt output on 150-174 Mc.

10 lb. lower powered models also available

hallicrafters
"The Radio Man's Radio"

World's Leading Manufacturer of Precision
Radio and Television — Chicago 24
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<thead>
<tr>
<th>Region</th>
<th>State</th>
<th>City</th>
<th>State Member</th>
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<td>Pennsylvania</td>
<td>W3FX</td>
<td>John H. Dubois</td>
<td>7955 E. Eldredge St.</td>
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<td>W3OMN</td>
<td>James W. John</td>
<td>3941 Eastwick St.</td>
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<td>W3LW</td>
<td>Lloyd L. Greene</td>
<td>1550 Marple Ave. &amp; Martin Pk.</td>
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<td>W3MN</td>
<td>Edward Grad</td>
<td>81 King St.</td>
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<td>W3XWL</td>
<td>Ernest J. Black</td>
<td>906 Needwood Ave.</td>
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<td>Clifford C. McGuyer</td>
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<td>Rena W. Goetch</td>
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<td>406 South 8th St.</td>
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<td>W9BN</td>
<td>J. W. Sulkowski</td>
<td>900 South Medora Ave.</td>
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<td>W9X</td>
<td>Charles M. Bone</td>
<td>1611 B. L. Lake St.</td>
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<td>Dr. John L. Stockton</td>
<td>2406 N. 4th Ave.</td>
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<td>W5GRH</td>
<td>Robert L. Harr</td>
<td>1240 Massachusetts Ave.</td>
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<td>6172 W. 6th Ave.</td>
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<td>W7MS</td>
<td>Lawrence Sebring</td>
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<tr>
<td>Hawaii</td>
<td>W16LE</td>
<td>John A. Sanders</td>
<td>(602) 358-2255</td>
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<tr>
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<td>W7BZW</td>
<td>Carroll W. Short, Jr.</td>
<td>1008 Arizona St.</td>
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<tr>
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<td>W6ZL</td>
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<td>7 Longwood Blvd.</td>
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<td>W6JQ</td>
<td>Roy G. Collis</td>
<td>1000 Cortis St.</td>
<td>Albany 6</td>
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<td></td>
<td>W6CVK</td>
<td>Willie Van de Kamp</td>
<td>241 Clinton Ave.</td>
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<td>W6CVD</td>
<td>Edward H. Hawke</td>
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<td>ROCKY MOUNTAIN DIVISION</td>
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<td>Colorado</td>
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<td>W9KDR</td>
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<td>H. Edgar Lindauer</td>
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<td>A. J. Gidds</td>
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<td>Alabama</td>
<td>W4JG</td>
<td>Dr. Arthur W. Woods</td>
<td>2101-16th Place, South</td>
<td>Birmingham 3</td>
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<td>W4WZ</td>
<td>John W. Hefflier</td>
<td>9000 Springfield Blvd.</td>
<td>Jacksonville</td>
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<td>W4MS</td>
<td>Edward J. Collins</td>
<td>1903 E. Blitzen St.</td>
<td>Pensacola</td>
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<td>W4ADZ</td>
<td>James P. Born, Jr.</td>
<td>35 5th Ave., N.E.</td>
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<td>W4GUD</td>
<td>William W. White</td>
<td>563 Ramon I. Arrieta</td>
<td>Philadelphia</td>
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<td>K4DID</td>
<td>Robert W. Freeman</td>
<td>2455 49th St.</td>
<td>Rio Piedras, P. R.</td>
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<td>CANAL ZONE</td>
<td>W752W</td>
<td>Everett R. Kimmel</td>
<td>Box 264</td>
<td>Gamboa, C. 2.</td>
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<td>SOUTHWEST DIVISION</td>
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<td>Los Angeles</td>
<td>W4ERA</td>
<td>Samuel A. Greencrest</td>
<td>11072 Hollywood Blvd.</td>
<td>Manhattan Beach</td>
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<td>W7MID</td>
<td>Jim Kennedy</td>
<td>4511 N. 8th St.</td>
<td>Phoenix</td>
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<td>W6YWM</td>
<td>Mrs. Ellen White</td>
<td>9673 Whitehaven St.</td>
<td>San Diego</td>
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<td>WEST GULF DIVISION</td>
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<td>Texas</td>
<td>W5KRE</td>
<td>William A. Green</td>
<td>1934 University Blvd.</td>
<td>Amarillo</td>
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<td>W6CVR</td>
<td>Jesus H. Langford</td>
<td>2055 W. Oklahoma Blvd.</td>
<td>Odessa</td>
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<td>W5FRF</td>
<td>Dr. Charles Ferranghich</td>
<td>618 Medical Arts Bldg.</td>
<td>Houston 2</td>
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<td>W5XNE</td>
<td>Robert W. Freeman</td>
<td>235-49th St.</td>
<td>Los Alamos</td>
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<td>MARITIME DIVISION</td>
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<td>Maritime</td>
<td>W5J1Q</td>
<td>A. M. Crowell</td>
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<td>VE1DQ</td>
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<td>Ontario</td>
<td>VE1HJ</td>
<td>C. E. Farquhar</td>
<td>16 Emerald Crescent</td>
<td>Burlington, Ont.</td>
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<td>QUEBEC</td>
<td>VE2GL</td>
<td>Gordon A. Lynn</td>
<td>R.R. No 1</td>
<td>Ste. Genevieve de Ferriolonds, P. Q.</td>
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<td>VANALTA DIVISION</td>
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<td>Alberta</td>
<td>VE5MI</td>
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<td>VE5UV</td>
<td>W. H. McCauley</td>
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<td>Lulu Island</td>
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<td>VE4AM</td>
<td>A. W. Morley</td>
<td>26 Lennox Ave.</td>
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<td>V6H</td>
<td>Harold H. Horn</td>
<td>1044 King St.</td>
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<td>Saskatchewan</td>
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* Officials appointed to act temporarily in the absence of a regular official.
In many respects, Crystals are like "diamonds." You can buy them from six-bits up. It may be difficult to tell quality from a distance, but measured under close-up of performance, accuracy and stability ... quality stands out. After all, your frequency control is the heart of your transmitter. When you trust your frequency to PR you know where you are... today, tomorrow and years from now. This is worth a great deal. In the long run the money you put in a crystal is not important... because even quality PRs cost little. When you buy a PR from your jobber you can get the exact frequency you want (within the amateur bands) at no extra cost. You can be where you want to be ... not within 5, 10 or 15 KC. but JUST WHERE YOU WANT TO BE! That means a lot.

20 METERS, Type Z-3, $3.75 • 40, 80 AND 160 METERS, Type Z-2, $2.75

CRYSRTALS

USE PR AND KNOW WHERE YOU ARE

PETERSEN RADIO COMPANY, INC.
2800 W. BROADWAY • COUNCIL BLUFFS, IOWA
is a noncommercial association of radio amateurs, bonded 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 fraternality 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 manu-
facture, sale or rental of radio apparatus is eligible to membership
on its board.

"Of, by and for the amateur," it numbers within its ranks practi-
cally 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; owner-
ship of a transmitting station and knowledge of the code are not
prerequisite, although full voting membership is granted only to
licensed amateurs.

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“It Seems to Us…”

THE BOARD MEETING

Last autumn — or in some divisions a year earlier — you selected a fellow-amateur to serve as your director and represent Full Members in your area in the government of the affairs of the League. We are now rapidly approaching the second major step in the system provided for democratic control of ARRL — the yearly meeting of the 16 elected representatives of amateur radio to discuss League and general amateur affairs, to consider problems and proposals, and to make decisions on them in accord with the majority sentiment.

Currently the directors are engaged in visiting clubs and attending hamfests, and many of them are using the mail to solicit expressions of opinion on one live subject or another. In this general manner the director becomes informed on the needs and desires of the members in his division, and is thereby enabled to reflect properly the net sentiment of his division in discussions which will occur at the Board table in May. So the grass roots in this system is you. And now is the prime opportunity for you or your club to express views to your director on matters of the day, or on a new pet idea or proposal of your own. His address is on page 8 of this issue of QST. He would like to hear from you.

NOVICE CHARACTERISTICS

At HQ, we make a special effort, through periodic spot surveys, to keep tabs on characteristics and trends in amateur radio. We gather all sorts of interesting and useful bits of information. A postwar check showed the average age of hams to be about 34 years; 71 per cent of all amateurs are married; the typical ham has been licensed for 12 years, a member of the League for 8; more than half of all amateurs either have completed a four-year college course or are in school aiming at that end; “Hints & Kinks” is about the most popular feature in QST; hams prefer rack- and panel transmitter construction two-to-one over table (cabinet) rigs; and so on.

We keep a particular eye on the newcomer. We know that, in pre-Novice days, the average age of the new licensees was 27.8; that most of them became interested in hamming through an amateur friend; that practically every one used our License Manual and about one-third took advantage of W1AW transmissions for code practice; that one-third (not the same third, we hope!) flunked the exam on an earlier try; that QST is read by 85 per cent of the newcomer group. And so on.

As you might expect, we were keenly interested in seeing how the Novices would shape up, and when we put a finger on the pulse of the first WNs to be licensed last year, the result most striking to us is the similarity between Novices and earlier newcomers via the regular channels. The average age of the Novice is 25.7 years; actual ages ranged from 15 1/2 to 80! Like their earlier counterparts, the Novices mostly became interested in hamming through an amateur friend, practically all used our LAM for examination study, and many used W1AW for code practice. Half the Novices required three months or less to prepare for their exam; the same time was needed for earlier newcomers to study for old Class B or C. Experimenting and ragchewing turn out to be the prime interests of both groups, although among Novices “DX” runs a strong third. As to power inputs, Novices break down almost equally between under 25 watts, 25-50 watts, and 50-75 watts; with no similar maximum for the other group of course no direct comparison is possible, but we note the majority of newcomers started with 75 watts or less anyway. And so far as equipment is concerned, the Novice is no different from his earlier counterpart or from any of the rest of us for that matter — he, too, in the ratio of one-to-one finds a manufactured receiver more to his liking and convenience than building one of his own. At the time of survey, about three months after license issuance, half the Novices already could handle 13 w.p.m. or more; in fact, one-fourth of them had already qualified for a General or Conditional Class license, while most of the remainder were going up for the exam shortly.

What gives us the warmest feeling, though, is that our survey indicates that QST is read by 93 per cent of the new WNs. That’s starting right, OM’s!
W4RAZ uses a new plastic liquid product, Krylon, to coat QSLs, certificates and the like with a preserving and washable finish. It is available clear or in a variety of tints.

At a recently conducted amateur examination held by FCC at the Ohio State School for the Blind, Columbus, Ohio, seven lads qualified for their Novice Class licenses.

Engineer R. J. Cotton of the Commission's Detroit office permitted code tests to be written in Braille; the copy was translated to him by a school instructor. Theoretical examinations were given individually by Mr. Cotton who received question answers in oral form.

Such special consideration has been FCC's policy for years with regard to blind, paralyzed or deaf amateur operator candidates. The Commission fully recognizes the benefit possession of an amateur license can be to the handicapped person and particularly to the shut-in.

Some of the old-timers are having a difficult time substantiating the fact that they held amateur licenses during or prior to April, 1917. The National Amateur Wireless Association used to publish bulletins which listed amateur licensees; the possession of some of these bulletins would help either ARRL or FCC give some of the Extra Class licensee applicants a hand. There may be other lists which would help these fellows out. We are particularly interested in information covering the period 1915-1917. Can anyone give us an assist?

No, you're not seeing double, you're seeing triple! Richard, Charles and Robert Fenwick, of Kentland, Indiana, who bear the calls WN9PKS, WN9PKU and WN9JS respectively, are probably the only identical triplets in the amateur ranks. Licensed last year, the boys are 15 and sophomores at Kentland High. The Fenwicks like contest work in the cw bands and also enjoy 2-meter operation.

HAMFEST CALENDAR

ILLINOIS — Friday through Sunday, May 22nd-25th, at the Hotel President, 2015 North Lincoln Ave., Chicago — a get-together of W9 YLs. The registration fee is $1.00, in advance. For details of the program and arrangements, write to W9GNE at the Hotel President address.

MASSACHUSETTS — Thursday, April 19th, at the Lafayette House, 20 miles south of Boston on U. S. Route 1 — a get-together of W1 YLs. For tickets to this luncheon and rag-chewing session, send $2.00 in advance to W1SCU, 545 Fisher Street, Waltham, Mass.

CALIFORNIA — Saturday, May 3rd, at the Fresno Memorial Auditorium — the 10th Annual Hamfest of the Fresno Amateur Radio Club. Dinner, entertainment, activities, and prizes. Preregistration tickets may be purchased from Grant Storey, 908 W. Pine, Fresno, Calif., at $4.00 each.

TEXAS — Sunday, April 20th, at East Texas State College — a hamfest sponsored jointly by the Bonham, Paris, Sulphur Springs and Texoma Clubs of Northeast Texas, and the East Texas Amateur Radio Club. The usual "grab-bag" drawing will be held. For further details, write to W5AJ, Route 1, Box 201-B, Pittsburg, Texas.

NEW YORK — Saturday, May 10th, at the Elks Club, Rochester — the Annual Hamfest of the Rochester Amateur Radio Association. Technical talks are scheduled for the afternoon, with separate entertainment for the ladies. Dinner in the evening will be followed by entertainment and a speaker. For reservations, write P. O. Box 1588, Rochester 3, N. Y.

NEW JERSEY — Saturday evening, April 19th, in the Terrace Room, Hotel Stacey-Trent — 8th Annual Old Timers' Nite Round-up and Banquet of the Delaware Valley Radio Assn. Turkey dinner will be served promptly at 6:30 p.m. Program includes talks by well-known radio personalities. Bring your oldest commercial or amateur tickets as awards will be made to those with the earliest dates, including a special award to the "Grand Old Man" in attendance. W2ZI's collection of old-time gear will be on display. Reservations may be obtained before April 15th from General Chairman Ed G. Raser, 315 Beechwood Ave., Trenton 8, N. J., at $5.00 per person. Tickets purchased at the door will be $6.00. Plan to bring as many guests as you wish; clubs and groups should request special seating arrangements well in advance. As in the past, the party will be big.

 PENNSYLVANIA — Sunday, April 26th, at the Lodge in North Park — annual hamfest of the Western Pennsylvania Emergency Network. This is a picnic-gathering, and there will be numerous competitive events. For further details, write to W3OBO, 1400 Creedmoor Ave., Pittsburgh 3, Pa.

OREGON — Saturday and Sunday, April 26th and 27th, at Eugene, Oregon — the Oregon Amateur Radio Convention, sponsored by the Valley Radio Club. Speakers will include ARRL Division Director Rex Roberts, and John Heinrots on screen-grid modulation. There will be model control demonstrations by W7HLB and W7LVN. Admission will be $6.50 for hams and $2.50 for XYLs and friends. For further information, write to W7FBA, 400 Howard Ave., Eugene, Ore.

WISCONSIN — Saturday, April 26th, at the Youth Building, Wausau — Annual Hamfest and Banquet of the Wisconsin Valley Radio Association. Starting at 6 p.m., a well-rounded program has been arranged, featuring an excellent banquet, entertainment, and hamfesting galore. Scheduled for the afternoon is a Wisconsin Section meeting at 3 p.m. followed by an organizational meeting of the Wisconsin Council of Radio Clubs. Please make reservations in advance to assist with meal planning. Tickets, $3.00, available from Lawrence Laplanche, W9BW, P. O. Box 170, Wausau, Wis.

COMING A.R.R.L. CONVENTIONS


June 28th-29th — West Gulf Division, Corpus Christi, Texas
The “Bandbox”—A Single-Control Frequency-Multiplier Unit

Compact Transmitter Subassembly for Six Bands

BY DONALD H. MIX, WITS

- The Bandbox is a four-stage frequency multiplier covering six ham bands, brought down to the size and convenience of a single stage. It is designed to work between a low-power VFO or crystal oscillator and an amplifier using an 807 or similar type. Changing bands is merely a matter of flipping the switch to the desired band and resonating at the desired frequency with the single control. It is a simple matter to transfer this component-size unit from one chassis to another when making alterations. The Bandbox should fit readily into any program of building or rebuilding a multiband rig.

For years it has been a not uncommon practice in constructing a multiband transmitter to lay all of the tubes and other components out on a chassis and then try to devise a means of switching or changing coils to give output on the desired bands as conveniently as possible. More often than not, this procedure leads to bulky and awkward mechanical arrangements, and a multiplicity of controls. When rebuilding becomes desirable, everything must be done over again. This includes the most time-consuming and complicated part of the job — the dismantling and reassembly of the frequency-multiplier stages which might have been doing an entirely satisfactory job in the old rig. The primary function of a frequency multiplier is to multiply frequency and, once a good design has been found, it should serve this purpose in one transmitter as well as in another. Following out this line of reasoning led eventually to the multiplier unit shown in the photographs.

The unit is a subassembly package containing all tubes and circuits necessary for multiplying frequency from any low-power 1.75- or 3.5-Mc. VFO or crystal oscillator. It gives enough output on any of the six ham bands from 3.5 to 28 Mc. (including the 21- and 27-Mc. bands) to drive any amplifier tube such as the 2E26, 807 or the new 6146. Thus a multiband rig could consist of an oscillator of the desired type, this multiplier unit and one of the above amplifiers. For higher power up to a full kilowatt, only a second beam tetrode stage would have to be added. The unit is of sufficiently small dimensions and so designed that it can be mounted on a chassis almost as easily as a tank condenser or other similar single component might be. It can be transferred from one chassis to another simply by removing a half-dozen mounting screws and unplugging the external connections. Furthermore, the four stages are shielded as a unit and the TVI filtering job, once done, doesn’t have to be repeated for the next project. There is only one tuning control for all bands. Changing from one band to another is simply a matter of clicking a switch and resonating with the single control for maximum grid current to a following amplifier. In operation, no further metering is necessary. An inexpensive 70-amp. unit will easily take care of the powersupply requirements.

The desirability of multiplying frequency at low power level has already been often stressed as an aid in reducing TVI, but there are other advantages as well. Since the practicably-obtainable efficiency of frequency multipliers is quite low, the over-all transmitter efficiency is improved by multiplying frequency in the low-power stages where the watts lost will be less. The necessary step-up in power can be obtained in a straight amplifier operating at much higher efficiency. Furthermore, inexpensive low-voltage components can be used and this saving can be appreciable in a rig of several...

April 1952
C1 — 170-μfd, mica.
C2, C3, C5, C6, C7, C16, C18, C19, C23, C25, C30, C40, C41, C42, C43, C44, C45 — 0.001-μfd, disc ceramic.
C7 — Approx. 65-μfd, variable (see text and accompanying footnote).
C8 — 100-μfd, silvered mica.
C9 — 220-μfd, mica.
C11 — 47-μfd, silvered mica.
C16 — Approx. 35-μfd, variable (see text and accompanying footnote).
C36 — 150-μfd, mica trimmer or 30-μfd, mica trimmer and 47-μfd, silvered mica in parallel.
C19, C23, C24, C30 — 30-μfd, mica trimmer; see text (Millen 27030).
C17, C19, C23, C25 — 100-μfd, mica.
C26, C34 — Approx. 25-μfd, variable (see text and footnote).
C38 — 47-μfd, mica.
R1, R3, R5, R7 — 22,000 ohms, 1/2 watt.
R2 — 33,000 ohms, 1 watt.
R3 — 220 ohms, 1 watt.
R4 — 2350 ohms, 2 watts (two 4700-ohm 1-watt in parallel).
R6 — 1940 ohms, 2 watts (3300-ohm 1-watt and 4700-ohm 1-watt in parallel).
L1 — Approx. 12 μh, — 24 turns No. 22 d.e.c., 1-inch diam., close-wound, or smaller wire spaced to length of 3/4 inch (see text).
L2 — Approx. 4.2 μh, — 22 turns, 3/4-inch diam., 17/32 inch long (B & W 8012 Miliindicator).
L3 — Approx. 1.8 μh, — 7 turns, 3/4-inch diam., 3/4 inch long, tapped at 6 1/2 turns from ground end; see text (B & W 3011 Miliindicator).
L4 — Approx. 0.4 μh, — 7 turns, 3/4-inch diam., 3/8 inch long (B & W 3003 Miliindicator).
J1 — Four-contact male power connector (Jones P-304-AB).
P1 — Four-contact female cable connector (Jones S-304-CCD).
RFC1, RFC2, RFC3, RFC4, RFC5, RFC6, RFC7, RFC8 — 2.5-mh, r.f. choke (National R-100-S).
S1 — 4-pole 6-contact rotary switch (see text for assembly procedure).
stages. Added to this is the advantage of compactness.

The Circuit

The circuit diagram is shown in Fig. 1. The first stage, operating at 80 meters, uses a well-screened tube, the 6AK6, because it is called upon to work as a straight amplifier when the oscillator output is in the same band. Type 6C4 triodes are used in the remaining stages not only to simplify the circuit and wiring but also because they are much more tolerant in regard to driving voltage. It is not necessary to adjust the excitation carefully in each stage to prevent overdriving in the next.

The tuning condensers of all stages are ganged to a single control. Broadband circuits were considered but finally discarded because the relatively low efficiency would make larger tubes with higher dissipation rating almost a certain requirement. The 80-meter circuit is designed to cover only the required tuning range for that band — 3500 to 4000 kc. C8 is a bandspread padder. However, when the bandswich is turned to the 7-Mc. and higher-frequency positions, C11 adds enough capacitance across the 80-meter tank circuit to shift its lowest frequency to about 3350 kc. so that the harmonics will include the 11-meter band. This is permissible, of course, since the frequencies at the high end of the 80-meter band are not needed for multiplying to the other bands. It is to this second range that the following stages are tracked. The 21-Mc. band is reached by tripling frequency in the stage otherwise used for 14 Mc. The tuning range here is automatically shifted by the bandswich which shorts out an appropriate portion of L2 for 21 Mc.

The trimmers, C18 and C28, are to compensate for the difference between the input capacitance of the 6C4s and the larger capacitance of the screen-grid tube to be used in the amplifier, thereby automatically maintaining proper conditions for tracking. C26, C24 and C28 adjust the range over which the tuning condensers will tune.

Parallel plate and grid feed is used throughout so that the tuning condensers need not be insulated from the chassis. All tubes are protected against excessive dissipation, when not being driven, by the use of cathode biasing resistors. To keep the circuit as simple as possible, capacitive coupling is used between all stages and the unit is designed for capacitive coupling also at the input and output.

Construction

If dimensions are to be kept to a minimum, it will be necessary to make a special shielding enclosure of sheet aluminum. However, if size is not considered an important factor, a standard 5 × 6 × 9-inch box can be used. If this is done, it would be advisable to keep the length of the chassis about the same as described here. Otherwise, it may be difficult, if not impossible, to get the unit, with its shafts projecting, into the box. The width of the chassis should be made 5 inches to match the width of the standard box, but the components should not be spread out accordingly. It might be possible to make use of a standard 1 1/2 × 4 1/2 × 8-inch chassis, fastening it flush against the front of the box and using spacers to anchor it to the rear, but the lips on the standard chassis will make it more difficult to do the necessary work underneath.

The chassis is made from sheet aluminum about 1/8 inch thick. It is 4 1/2 inches wide and 7 1/2 inches long, with 3/8-inch lips bent down along the longer edges for fastening to the sides of the box. The box is made to fit the chassis as closely as possible and has an inside height of 4 3/4 inches. The front and the two sides are made from a single piece, with 3/8-inch lips bent along both top and bottom edges. Similar lips are bent along all four edges of the removable back. The two rear corners of the chassis must be notched out for these lips.

The chassis is placed in the box with its top surface 2 1/2 inches down from the top of the box and a row of 1/4-inch holes is drilled along each side of the box, just above the chassis level. The top cover also is perforated. The box and chassis are assembled with No. 4 machine screws tapped into the aluminum, although self-tapping screws can be substituted. The bottom plate is made 1 inch wider than the box to provide a 1 1/2-inch flange along each side for fastening down to a chassis. To provide clearance for the heads of the screws holding the bottom plate, a pair of aluminum-sheet spacing strips, about 1/4 inch wide and the length of the box, can be placed under the flanges.

The input and output terminals are 'phone-tip jacks centered 3/4 inch up from the bottom on the right-hand side of the box. The output terminal is about 1 inch from the rear and the input jack 1 5/8 inches from the front. At the rear, the power connector is centered 7 1/2 inch from the left edge and 1 1/2 inches up from the bottom.

The bandswich is made up from Centralab Switchkit parts. The index assembly is Type P-123 and the ceramic wafers are Type X having 6 positions, 5 of which are used. The switch is mounted on aluminum brackets (with the tie rods in a vertical plane) to bring the center of the shaft 1 1/2 inches below the chassis. In the bottom-view photograph, the first wafer at the top (80) is spaced 1/4 inch from the index head, with its point contacts to the left. The second wafer (40) is spaced 1 inch from the first with its point contacts to the right. The third wafer (20 and 15) is spaced 2 inches from the second with its point contacts to the left. The last wafer (output) is spaced 1 inch from the preceding one with its point contacts also to the left. The rear mounting bracket is spaced 1/4 inch behind the last wafer. The front mounting bracket is fastened to the index head at the shaft bushing.

The tube sockets are placed 7 1/4 inch in from the edges of the chassis. The 6AK6 and the 14-Mc. 6C4 are to the right, spaced 1 1/4 and 4 3/4 inches respectively back from the front edge of the chassis. The 7-Mc. and 28-Mc. tubes are to

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the left, spaced back 2½ and 6½ inches respectively.

The shafts of the two tuning-condenser units 1 are coupled together with a Millen type 39003 rigid coupling. It may be necessary to file down the front end of the coupling close to the setscrew hole to permit the setscrew to get a good grip on the short tail shaft of the front condenser. In the first condenser section at the front (80), the last 5 rotor plates are removed. In the second section (40), the first 9 rotor plates are removed. In the third section (20 and 15), the first 4 rotor plates are left in and the remainder are removed. The fourth stator plate of this section also is removed, but the rest of the stators are left in. In the last section, all rotors except the last four are removed.

The condenser gang is mounted on top of the chassis with its front mounting hole ½ inch from the front edge of the chassis. In assembling the unit, the condenser gang should be mounted first with screws at the two inner mounting holes only. Then the switch gang underneath should be positioned and the mounting holes in the brackets drilled to match the front and rear mounting holes of the condenser gang. In other words, the switch brackets should be fastened to the chassis by means of the front and rear condenser-mounting screws. After the holes have been drilled in the switch brackets, remove the front bracket, fasten it down with the front condenser-mounting screw, slide the front of the switch into the front bracket, fasten with the shaft nut, and then fasten the rear switch bracket with the rear condenser-mounting screw.

Mount the tube sockets with the plate terminals toward the nearest switch washer. The r.f. chokes are mounted in pairs on either side of the tube sockets, centered about an inch from the centers of the tube sockets, with the grid choke toward the front and the plate choke at the rear. The one exception is the 40-meter grid choke which is fastened with the same screw holding the 80-meter coil form. The form is centered 1¼ inches from the front of the chassis.

The two grid trimmers, C1g and C2g, are mounted vertically underneath, C1g just to the rear of the second wafer and C2g immediately behind the third wafer. Half-inch holes are drilled in the sides of the box and the chassis lips are notched out so that these condensers can be adjusted from the outside. The three plate trimmers are fastened on top of the chassis, using the nearest choke-mounting screw to fasten the grounded side to the chassis. The other terminal of the trimmer is soldered directly to the appropriate tuning-condenser stator terminal. These condensers can be adjusted through one of the ventilating holes in the top cover. It should be mentioned that some brands of 30-pud. trimmers have a mounting hole on one side only. If the mounting hole is used to ground the condenser in these types, the adjusting screw will be "hot," necessitating the use of an insulated screwdriver for adjustment.

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1 The condenser gang is made up of two dual-section Hammond type HFD midget variable condensers. Type HFD-100 (100-pud.-per-section) is necessary for the section tuning 3.5 and 7 Mc. Either the same type or Type HFD-50 (50-pud.-per-section) may be used for the rear condenser tuning the other bands. If these condensers cannot be obtained locally, they are listed in the latest catalog of Allied Radio Corp., 883 W. Jackson Blvd., Chicago 7, Ill. Other types of condensers may be used, of course, but some cut-and-try may be necessary for proper frequency range and tracking.

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Top interior view of the frequency multiplier showing the tubes, coils and the tuning-condenser gang. The 80-meter coil is in the foreground with the 6AK6 to the right. The 10-meter coil and plate trimmer are behind the 6AK6 with the 7-Mc. 6CL to the left. In the second section to the rear, the 15-Mc. coil with its 21-Mc. tap is to the left, followed by the 28-Mc. plate trimmer and tube. The 20-meter 6CL, its plate trimmer and the 28-Mc. coil are to the right. The lips along the top edges of the box are duplicated on the bottom.

QST for
It is preferable to use a type that has a mounting hole at each terminal so that the outer plate, instead of the inner, can be grounded.

**Coils**

Approximate inductance values for the coils are given under Fig. 1 for the benefit of those who must wind their own. However, the use of the B & W Miniductor coils has the advantage that the original coil dimensions can be duplicated closely. This is necessary if pruning of the coils for tracking is to be avoided. The 80-meter coil, $L_1$, is wound on a Milten bakelite 1-inch diameter form, fastened to the chassis. The other coils are supported by their leads which are soldered directly to the condenser terminals. The 21-Mc. tap on $L_2$ should be made with a piece of wire about 3 inches long. When the outer ends of the coil are soldered across the condenser terminals, this tap, which near the top of the seventh turn, should be bent in a sweeping curve around the outer side of the coil (counterclockwise as viewed from the front) to the end of a wire from the bandswitch, coming up through a hole in the chassis drilled alongside the condenser frame. The tap is soldered to the end of this switch wire. Don’t clip off the excess tap length until adjustments for tracking, described later, have been made.

Very little actual wiring is necessary, the resistor and by-pass leads alone being more than adequate in most instances. Short shielded heater and high-voltage leads are run down each side of the chassis, terminating at the power connector at the rear. These leads are by-passed at each stage by the method described in QST for April, 1951. The condenser is soldered with the shortest leads possible between the inner and outer conductors of the wire. The outer shield is then grounded to the chassis at the nearest possible point. Tube-terminal

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**Bottom view of the multiplier chassis showing the bandswitch, r.f. chokes and other small components.** The 80-meter circuit is at the top, the 10-meter circuit at the bottom. The 20-meter grid trimmer is to the right and behind the second switch wafer. The 10-meter grid trimmer is to the left of the third wafer. This view also shows how the removable back of the enclosure is made. The text describes a somewhat different and simpler method of mounting the switch.

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Mounting the Unit in a Transmitter

In mounting the multiplier unit on a chassis with other stages, it is not necessary, of course, that it be placed close to the panel. By using extension shafts, it can be placed as far to the rear as desired. However, since the amplifier is coupled capacitively to the output of the unit, the length of leads to the amplifier grid and cathode will have considerable influence on the tuning and the power delivered to the grid of the amplifier, especially at the higher frequencies. The unit should be fastened securely to the chassis and the amplifier tube mounted close to the output terminal. The grid of the amplifier should be connected to the output terminal of the multiplier unit with a short wire well spaced from the chassis, and the cathode of the amplifier should be grounded or by-passed immediately to the chassis. If the grid wire, or the path from the amplifier cathode to the multiplier box is much over 6 inches long, there may be a noticeable loss in output at 38 Mc., and it may not be possible to resonate the higher-frequency multiplier circuits.

It is preferable also to have the oscillator located on the same chassis as the multiplier unit so that the coupling leads will be short. However, if the oscillator has the power and tuning range to spare, a piece of coax cable can be used, as shown in Fig. 2. In order to do this, it must be possible to retune the oscillator output circuit to compensate for the capacitance of the cable. With VFOs having only link-coupled output, it may be possible to obtain sufficient drive to the 6AK6 simply by connecting the link line to the input of the multiplier unit. It all depends on how much output the VFO has to spare. It may help in such a case to shunt $C_1$ (Fig. 1) with a 0.001-$\mu$F, capacitor. If this doesn't work, it will be necessary to make a connection to the oscillator tank circuit.

Power Supply

A power supply delivering 375 to 380 volts at 60 or 70 ma. is required to operate the unit. To assure adequate output, the supply voltage should be close to this figure. The actual plate voltage — voltage between plate and cathode — will be 49 to 90 volts less than the supply voltage. A suitable circuit is shown in Fig. 3.

Adjustment

Until the unit has been tuned up, no plate or screen voltage should be applied to the amplifier. Means should be provided for checking the amplifier grid current, or the voltage across its grid leak. While it should be possible to make adjustments without metering the multiplier unit, the job will be a little easier if a milliammeter is inserted in the high-voltage lead to the power supply, at least.

With the switch in the 80-meter position, turn on the oscillator and tune it to 3500 kc. (1750 kc. if the oscillator output is at 160 meters). If the oscillator is crystal-controlled, use the lowest-frequency crystal at hand. Now resonate the multiplier for maximum drive to the amplifier. With the multiplier tuned to resonance, adjust the coupling to the oscillator to give maximum drive to the amplifier. The 6AK6 is rather critical as to excitation. Maximum output should occur with the oscillator developing a bias of 15 to 30 volts across the grid leak of the 6AK6. If no other means is available, the drive to the 6AK6 can be reduced by inserting a mica condenser of proper size in series with the wire to the input terminal of the multiplier unit, as indicated in Fig. 2. If a VFO is used, the multiplier should be checked at both 3500 and 4000 kc. to make sure it is covering the proper frequency range. (The multiplier must always be retuned, of course, for any appreciable change in oscillator frequency.) It may be necessary to spread out the last few turns of $L_1$ on the coil form to get the circuit to hit both ends of the band. Drive to the amplifier should be essentially the same anywhere in the band, providing the output of the oscillator is reasonably constant.

With the 80-meter stage working properly, the switch should be turned to the 7-Mc. position. Set the VFO to 3500 kc. and resonate the multiplier. If there is no indication of drive to the amplifier, it may be necessary to adjust the 7-Mc. trimmer, $C_{16}$, a little bit at a time, retuning the gang, until an indication of output is obtained. As an aid, a milliammeter in the high-voltage lead should show a dip when $C_{16}$ is tuned through resonance. When an indication is obtained, tune the gang for peak drive and then (Continued on page 128)
Automotive Radio Noise Elimination

Up-to-date Methods Based on Engineering Research

BY BROOKS H. SHORT,* W9DPI

Every automobile includes a number of sources of radio interference. The function of the electrical components makes them potential producers of noise, and to eliminate the sources of noise would mean rendering the vehicle inoperative. There is nothing more sorry than a car that will not run, unless it is a rig that will not put out.

In 1938 the Engineering Department of the Delco-Remy Division of General Motors Corporation went to work to see what could be done to reduce the undesirable radiations from vehicles using their electrical equipment. A group of qualified engineers has been working on the problem since that time; and, although it has not been completely solved, we have made a lot of progress. It is the purpose of this article to acquaint the mobile ham with the few simple steps that in some cases will completely eliminate his interference, and in others will reduce it to negligible magnitude. In considering the noise sources and their suppression, we will break the automotive electrical system down into its component parts, as this attack makes for clarification of the problem.

The Ignition System

There are three sources of noise in the ignition circuit. The first is of little importance to the amateur, but will be discussed in the interest of giving the complete story. After the contacts have been opened and after ignition has occurred, the condenser in parallel with the breaker points becomes charged to the full potential of the car battery. When the contacts close to build up energy in the coil primary for the next ignition impulse, that condenser is shorted by the breaker points. The energy that had been stored in the capacitor now proceeds to send current through its lead, the breaker points, the ground plate, and the capacitor mounting bracket. Since each part of the path has physical dimensions, there is an appreciable amount of inductance in series with the capacitor. That inductance combined with the capacity of the condenser forms a resonant circuit tuned to a frequency in the broadcast band. There is nothing we can do to eliminate this source of noise other than nesting the components well down in the distributor bowl, where the natural shielding of that bowl prevents the noise from becoming objectionable. Such positioning has been done in the Delco-Remy distributors.

The second source of noise in the ignition system lies in the distributor proper and operates each time the gap between the rotor and a cap insert breaks down. The amount of noise formed here is proportional to the value of the voltage before the gap breaks down, and the frequency spectrum generated is a function of how long it takes to break the gap down completely. Students of advanced electrical engineering have a concept that is very applicable here. They call this operator a "unit function," and what it means is that up to the instant when the unit function acts, the circuit was operating under one group of conditions, and after the unit function operated an entirely different group of conditions obtained. For example, let us imagine we are entering a dark room. We turn on the light switch or let the unit function operate, and we have current in the wires and have light. Every time a gap breaks down, we think of it as a unit function operating, with a new group of conditions obtaining.

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Fig. 1 — Ignition system with recommended suppression methods.

conditions following the operation. In all subsequent discussion we will talk about circuit changes that are capable of producing noise as operations of the unit function. In this source of noise, the ignition coil is raising the potential of the wire from the coil high-tension terminal to the distributor center terminal along approximately a 2500-cycle-per-second wave. When the potential gets to approximately 8000 volts, the distributor gap breaks down and an arc is established between the rotor electrode and the cap insert. When this arc is established the capacitances of the high-tension lead, from the distributor to the corresponding spark plug, and that of the spark plug itself are connected to the secondary. The sudden increase in capacitance causes the voltage to fall to a very low value. This change in voltage is the source of the radio noise under consideration.

To suppress this second source of ignition noise we have found suppressor resistor units to be very effective. The source of noise may be thought of as a battery or generator. To prevent that generator from sending high-frequency currents into either wire we insert suppressors so that the generator is locked toward high impedance, which discourages the source from sending out interference. We have found that 5000-ohm suppressor units in each of the spark plug towers of the distributor, along with a 10,000-ohm suppressor in the distributor center tower, does a good job of suppressing this noise.

There are a number of effective suppressor units available. A good suppressor element should be molded of material having low capacitance. The resistor material should have the same resistance, or near it, at high voltage as at low voltage. We have found the Erie model L7VR-10ME 10,000-ohm units and the L7VR-5ME 5000-ohm units to be very effective.

The third source of noise in the ignition system occurs at the spark plug. The spark plug has been raised to some voltage between 8000 and 22,000; the plug then breaks down, and the voltage persists at approximately 1500 volts. This change in potential occurs very rapidly, creating a noise of great magnitude over a wide frequency spectrum. Again we have found suppressors the best way to reduce noise. A 10,000-ohm unit should be used at each spark plug. There are a number of considerations from the academic viewpoint why the resistor slug should be built into the spark plug. There are also reasons why it should be an external unit. From a practical view, we would not differentiate between the two approaches. Ten thousand ohms at the plug, either built into the spark plug or mounted externally, should do a comparable job.

Any of the three sources of noise may be reflected into the secondary of the ignition coil, sent to the primary through the capacity of the coil, and then appear at the battery terminal of the coil with enough energy to drive the wires of the 6-volt system with noise. This is important since all light wires are connected to the 6-volt battery along with the ignition supply lead. To discourage such transients from driving the 6-volt leads, some kind of filter seemed to be indicated. A rather complete study was made of the filtering effects of by-pass condensers, and it was found that the usual 0.3-mfd. condenser was of little value. Referring to Fig. 2, we show a 0.3-mfd. capacitor with a total lead length of 1 inch. We hardly see how the condenser could have much less lead length. The by-passing action of this capacitor is shown in Fig. 3. We find at 203 megacycles this unit is very effective, but by the time we get to 4 megacycles the capacitor is of negligible value as a by-pass.

To get around the difficulties with such capaci-

Fig. 2 — Conventional type by-pass capacitor. Because units of this type have considerable inductance, their by-passing effectiveness is poor except for a narrow range in the vicinity of 2 Mc., as shown in Fig. 3.
Fig. 4 — Construction of the coaxial or feed-through type by-pass condenser. A typical attenuation curve for this type of unit is shown in Fig. 5.

...tors, a number of engineers in different organizations arrived almost simultaneously at a by-pass unit having very low inductance. Their reasoning was that if we could cancel the inductance out in the same way we do when we wind a noninductive resistor, we could make a by-pass unit that would be effective to a much higher frequency. Such a by-pass unit is shown in Fig. 4, with its attenuation or noise reduction characteristics shown in Fig. 5. In the construction, the core diameter should be large and the winding should be as thin in the radial direction as is possible, to get the best inductance cancellation.

The photograph shows some coaxial capacitors as manufactured at Delco-Remy. Most capacitor manufacturers are now making these feed-through capacitors, and at least one has been featuring his product in a national advertising campaign.

One of these coaxial capacitors should be mounted as close to the battery terminal of the coil as practical, with the core of the capacitor inserted in the lead from the ignition switch to the ignition coil. Such installation will usually discourage any high-frequency energy from getting back into the low-voltage wiring of the vehicle. In stubborn cases, two feed-through capacitors may be used with a radio-frequency choke between them. The value of the choke has to be determined by trial-and-error for the particular installation. In making such a choke, be certain that the wire used has sufficient cross-sectional area to carry the current with negligible drop.

In some particularly stubborn installations, even more suppression is required to clean out the ignition noise. The only known way to clean out the residual after all the above steps have been taken is to use metallic shielding. Double-braid shielding may be pulled over the high-tension leads to take care of this residual.

When so used, be sure to ground both ends of the shielding to a satisfactory ground.

Packard Electric Division and Pontiac Motor Division of General Motors Corporation have given us a way to do away with the suppressors at the distributor cap and at the spark plugs. They have made use of a special nonmetallic high-tension cable. This “wire” has approximately 3500 ohms per foot of length, and is used for all high-tension leads in the 1951 Pontiac product. This cable is somewhat superior to “lumped” constants. If the lead lengths as used on the 1951 Pontiacs will fit your car, these leads do a beauti-ful job of suppressing ignition noise. Do not attempt to shorten these leads as they have terminations at each end, and trying to shorten them will result in disgustingly short life.

The Generator

The generator includes two sources of noise. The first is of interest to us because it is the reason why automotive brushes last so long. Referring to Fig. 6, we have two brushes carrying current to and from the commutator. The accepted theory is that the brushes are not in mechanical contact with the commutator, but are held away by a film of gas. The current is conducted between the two elements by a group of parallel arcs. If more current is carried, we have more arcs. The arcs are continually forming and dying out so that no one arc persists for very long. As each arc forms, it acts like the unit function we considered in

Fig. 5 — Attenuation curve for a feed-through type by-pass condenser. This is representative of units having a capacitance of 0.1 to 0.25 μfd.

The second source of noise arises from the commutation. In Fig. 7, (1) and (2) indicate con-

Fig. 7 — In commutation, conductors 1 and 2 reverse their positions with respect to the brushes. A rapid reversal of the direction of current flow takes place while a coil is shorted by a brush.

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1 Delco-Remy does not have a distributor set-up for selling such capacitors to individuals, but similar units may be obtained from a number of capacitor manufacturers that sell through regular radio distributors.
ductors on opposite sides of an armature. When wire (1) is at A it will be carrying current into the page, and the wire (2) at B will be carrying it out of the paper. If we take a later period of time, when the armature has rotated through 180 degrees, we find wire (1) now at B, and so carrying current out of the page, and (2) will be at A, and will be carrying current into the page. In other words, sometime during the rotation the current in the coils has been reversed or commutated. This commutation took place while the coil was shorted by the brush. If we look in our textbooks we find a picture similar to that of Fig. 8 at a. This is known as linear or perfect commutation. This kind of commutation can be had in a generator designed for one output voltage, one output current, and operated at one speed. Our automotive generators operate over wide speed ranges and are called upon to deliver widely varying currents and voltages. For that reason we sometimes get currents like those of B of Fig. 8. When such operation is had we must in practically no time change the current by 50 per cent of its normal value. This rapid change is again a producer of radio noise.

Both of the sources of noise in the generator may be eliminated by using a 0.1- to 0.25-μfd coaxial capacitor in the generator armature circuit. This condenser should be mounted as near the armature terminal as is possible and must be mounted directly on the generator frame.

There is one other effect in the generator that is of interest. The generator armature shaft and lamination assembly is positioned by an insulating film of oil or grease at each bearing. For a number of reasons, that armature during rotation picks up an electrostatic charge. The charge proceeds to grow and raise the potential until the film of oil breaks down. At breakdown, radio frequencies are produced as determined by the size and shape of the generator considered as a cavity resonator. To eliminate this “shaft hash” we have found an arrangement similar to Fig. 9 to be desirable. A brass ring or flange is pressed upon the shaft. This ring is then grounded by a spring-loaded grounding brush. To be effective, this shaft grounding device must be on the drive or pulley end. This effect is probably of negligible importance unless the mobile rig is being operated on two meters.

**The Regulator**

The regulator unit is charged with more noise than any other component in the automotive electrical system. The energy for the so-called “regulator noise” comes from the field of the generator. Referring to Fig. 10, we have drawn the circuit diagram of the generator and the portion of the regulator that has to do with noise generation. After a certain minimum speed has been reached, either the current regulator contacts or the voltage regulator contacts vibrate. Let us consider what happens during one cycle of that vibration. To examine the circuit we must assign values to the circuit components. Let us assume the voltage output of the armature is 7.2 volts, the field resistance is 3.6 ohms, and the regulator resistance is 45 ohms. With the contacts closed we have a field current of 7.2/3.6 or 2 amperes. This 2 amperes also represents an amount of energy that has been stored in the magnetic field of the generator. We like to think of the stored energy in terms of money that has been deposited in the bank. Circuits are just like people, in that they do not like to undergo change and are willing to expend their savings in order to oppose any change. Thinking along this line, let us now consider the circuit of Fig. 10. Let us assume that the voltage regulator contacts open, placing the regulator resistor in series with the field. At the instant of opening, the field sees a change coming and doesn’t like that change—it reasons that it is willing to expend its savings to oppose that change, and for the first instant at least it does oppose the change and does sustain the 2 amperes that was flowing before the points opened. Looking at the regulator end we find that the 2 amperes must now flow through the 45
ohms, resulting in an instantaneous rise in voltage of 2 × 45 or 90 volts. This source of noise is very ragged sounding, since the regulator contacts do not have a fixed frequency of operation but operate only as called for by the load on the generator or the condition of the battery.

To eliminate regulator noise we have found the use of two coaxial condensers and a small resistor capacitor to be effective. Place a 0.1- to 0.25-mfd coaxial capacitor between the battery terminal of the regulator and the battery, with its case well grounded. Use a second capacitor of the same size in the lead between the armature terminal of the generator and the generator terminal of the regulator with its case also well grounded. The third unit should be connected between the field terminal and ground. This unit consists of a 0.002-mfd condenser with a 4-ohm carbon resistor connected in series. Never use a capacitor across the field contacts or between field and ground unless you also use the resistor, for such application will result in greatly reduced regulator life. A sketch of how the regulator may be suppressed is shown in Fig. 11.

Fig. 11 — The right way to install by-passes to reduce interference from the regulator. A condenser should never be connected across the generator field lead without the small series resistor indicated.

In some cases it is desirable to pull double-braided shielding over the leads between the generator and regulator. If the application of Fig. 11 does not reduce the noise to a sufficiently low level, it is suggested that such be done. Since the normal car wiring system has these leads braided in a group with other leads, it is suggested that the two leads between the generator and the regulator be replaced so that the shield can be applied to the two leads only. When such a shield is used it must be grounded well at both ends. In the most difficult cases even the shielding may not give the desired degree of suppression. When such is the case one may accomplish the desired quieting by insulating the regulator from the car chassis. The shield is then connected to the regulator case at one end and to the generator frame at the other. Noise cancellation is then obtained because the fields set up by high-frequency currents flowing in the armature or field leads are cancelled by fields set up by the returning current in the shielding. In the majority of cases the last two procedures are not necessary.

General

Most installations get power for the radio gear at some junction remote from the battery. This means that although we are supplying the receiver with pure d.c. from the battery, the lead between that junction point and the battery has considerable impedance at high frequencies. Quite often the IZ drop in the lead contains high frequency which gets into the receiver by the “back way.” When this condition is the cause of trouble, much can be accomplished by using a separate lead directly between the radio receiver and the “hot” battery terminal.

When suppressing a vehicle it is quite often desirable to be able to pick out the various noises. Ignition noise varies in repetition rate with engine speed and can be recognized, at least during the early stages of your work, by that characteristic. When you are nearly done, this noise takes on the sound of corn popping, and apparently does not follow engine speed. When you are at this point it is recommended that all leads be removed from the generator so that the only noise left are in the ignition system.

Regulator noise and generator noise may be detected by racing the engine and cutting the ignition switch. Since turning off the ignition switch kills all ignition noise, and since the generator and regulator continue to operate until the engine has coasted down to the “cut-out” speed of the generator, this is a way of getting only the generator and regulator noises. The generator noise may easily be distinguished since it is a somewhat musical whine, while the regulator interference is a ragged, rasping, irregular noise.

Some cars have electrical gauges that cause interference. If you have “thrown the book” at your car and haven’t reduced the noise to a satisfactory level, we would recommend that you examine the gauges. A small capacitor located near the gauge-sending unit will usually clean up such noise.

Good luck to you in your hunt and elimination of automotive electrical interference. But please don’t come back to us with the question of what do we do with the other guy’s car!

Silent Keys

It is with deep regret that we record the passing of these amateurs:

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VE5AKI, Carl G. Hellig, Oakville, Ont.
VE3N, James A. MacArthur, St. Thomas, Ont.

April 1952
An Elevator Mast
How To "Lower the Boom" in a Hurry

BY JOHN D. AVERY,* W1YVI

How many times after your 10- or 20-meter beam has been installed on top of a high tower have you wished changes could be made? Undoubtedly many times but, if you are anywhere near average, you have probably left it "as is" and not made the changes, because of the difficulty involved in working on the beam at any height. A 90-mile-per-hour gale brought down our old wooden tower, and we decided that the next tower would not only stay up but it would allow convenient working on the beam. This article will describe the solution we worked out and have used to our complete satisfaction.

The new tower was to be made of such material and construction that it would stand high winds, and it must allow convenient working on any part of the beam and rotator. It was finally decided that the only approach we could use was one that permitted the beam and rotator to be lowered to the ground with a minimum of effort and inconvenience. Several weeks of sketches and planning evolved the design to be described, and much of the drafting and mechanical work was done by my 16-year-old son, John Phillip, in his home workshop.

The Elevator Mast

The mast itself is a 40-foot steel Wincharger tower, set in a $5 \times 5 \times 3$-foot concrete base. Although these towers are self-supporting up to 10 or 50 feet when properly mounted, this mast is

* R.F.D. 1, Rockville, Conn.

The W1YVI beam at the top of the mast (upper left), on its way down (left center), and on the ground and ready for alterations (left bottom). Below: A close-up view of the hand-driven winch used for raising and lowering the carriage. The bottom set of guy wires anchors to the corners of the concrete base.
guyed at three places with No. 8 steel wire and turnbuckles. The bottom set of four guys is tied to anchor bolts set in the corners of the concrete base. The upper guys are sets of three each. When lowering the beam and rotator, it is necessary to unhook two each of the top and center guys, to permit the beam to pass. The ground anchors also have large eyes and it is a simple matter to loosen the turnbuckles and slip out the hooks.

The carriage plus the beam and rotator weighs close to 200 pounds, so heavy track was used to guide the carriage. With a lighter installation, a lighter track could be used. The track itself is made up of six 10-foot sections of Stanley overhead door track, which comes with ball-bearing trucks. The 80 feet of track and four ball-bearing trucks cost about $30.00 from a mail-order house. The other pulleys involved in the hoist are of the standard home-workshop variety and are made of nonrusting material. The cable for the hoist is 1/4-inch airplane cable, with a test strength of around 4000 pounds.

The carriage construction can be seen in Fig. 1. It was built up from $2 \times 2 \times 3\frac{1}{4}$-inch steel angle flame-welded together. The separation of the two trucks is about 12 inches, center to center.

The ties for the track were made by stacking $2\frac{3}{4} \times 1\frac{1}{4}$-inch lumber, as shown in Fig. 1B, and bolting it together. The rails are then held in place by pieces of strap iron, as shown in the sketch. The ties are placed every 5 feet up the

(Continued on page 184)

Fig. 1 — Two views of the elevator mast, showing details of the construction. (A) — Simplified sketch of the pulley system. (B) — Details of the track ties.
The Double-Spectrum Theorem

A Compatible System for 'Phone and C.W.

BY LARSON E. RAPP, WIOU

New frontiers are not easy to find in amateur radio. Thanks to the untiring efforts of ourollar scientists, practically no communications problem remains unsolved—save one. It was first presented by the late K. B. Warner in a QST editorial and received great acclaim as a problem, but no solution was offered at the time. The author had anticipated this problem and offered a straightforward and ingenious solution that, unfortunately, was never put into practice. It is a sound and workable answer but has the minor drawback of requiring complete cooperation between all of the amateurs in the world.

In all fairness, and for the complete documentation of this paper, it must be said that another solution has already been proposed, involving pulse modulation. This proposal met with little general acceptance, probably because it involved unfamiliar equipment. It was also suggested at the time that, being a wide-band technique, it would not be acceptable to high-selectivity addicts and manufacturers of sharp receivers, not to mention the fact that it is inferior to ordinary

c.w. for DX work. Perhaps its greatest drawback, however, was that it was not an amateur development, but merely a utilization of principles grown out of commercial work. For amateurs, this would never do.

Needless to say, the author had not lost sight of this problem, and a certain portion of each working month has been allocated to it since 1946. We are pleased to present a solution that should be acceptable to everyone, since it has none of the objections of the previous proposals.

Fundamental Theory

A recount of the many blind alleys that were followed would be of little interest to anyone except those who would care to repeat these many unsuccessful experiments, and thus it will be omitted. The first glimmer of hope came in 1948, when several references were made in the literature to "positive" or "upward" modulation. Heretofore most normal 'phone men had considered modulation to be something that required both upward and downward swings, but this was merely a convenient concept. However, with this eulogization about "positive" modulation, it was not too difficult to postulate a spectrum with "positive" modulation for 'phone signals and "negative" modulation for c.w. signals. Although the author is considered to be a fairly unemotional type, it must be confessed that the first realization of the importance of this invention reduced him to a nervous condition popularly described by the expression "as jittery as a June bride."

This, then, was an approach worth investigating. With positive modulation for 'phone, and negative modulation for c.w. all that was required was a receiver that would respond only to positive or negative modulation, but not to both. Negative modulation, for obtaining the c.w. signals, presents no problem at all, obviously.

* Rippering-on-the-Charlies, Mass.
positive or negative modulation will be short-circuited by the crystal diode, and only the modulation of opposite polarity will reach the grid of the amplifier. Note that this requires d.c. coupling from the diode load resistor, \( R_1 \), and the absence of a coupling condenser is deliberate. There is some difference in performance among the crystal diodes, and the new rhythmic 1N2N proved to be the best in this particular application.

When you want to receive "phone signals, switch \( S_1 \) (Fig. 3) to "PH", and only signals with positive modulation will come through. If code is your pleasure, switch \( S_1 \) (Fig. 3) to "C.W." and tune in your favorite "CQ DX." One of the first things you will notice, after you have grown accustomed to the use of this adapter, is that you will occasionally hear "phone signals when \( S_1 \) (Fig. 3) is in the "C.W." position, or c.w. signals when \( S_1 \) is turned to "PH." This indicates that the "phone (or c.w.) signal is not using pure positive or pure negative modulation, and the operator will doubtless welcome a call that tells him his equipment is slightly out of adjustment.

A few astute readers may have noticed that

**Receiving the Double Spectrum**

Fortunately, the receiving system represents no new or unfamiliar techniques, and many receivers are already in a suitable condition for receiving "phone (or c.w., but not both) signals of this new type. There are many limiters in receivers that work on the positive (or negative) peaks, and all that is required is a combination limiter that will work on one or the other. The circuit in Fig. 3 shows one way that it can be done—no doubt many other possibilities will occur to discerning readers. This circuit can be built as a separate unit and coupled to any receiver between the detector and the first audio stage, or it can be built into the receiver.

The operation of the receiver circuit is easy to follow. Depending upon the position of \( S_1 \), all like the previous proposal, this solution requires the cooperation of all amateurs in switching over to these new methods of modulation, for complete success. However, since many "phone men are already embracing positive modulation techniques, we feel certain that this proposal will meet with instant acceptance. You can change your transmitter over now and modify the receiver later (accepting some QRM in the meantime), or you can go whole-hog and immediately enjoy the fruits of a double spectrum.

**Fig. 3 — The receiver adapter circuit.**

- \( C_1 \) — 470-\&mu\text{f}d. mica or ceramic.
- \( C_2 \) — 10-\&mu\text{f}d. 25-volt electrolytic.
- \( C_3 \) — 0.02-\&mu\text{f}d. 400-volt paper.
- \( R_1, R_2 \) — 1.0 megohm, 1\&frac{1}{2} watt.
- \( R_3 \) — 47,000 ohms, 1 watt.
- \( R_4 \) — 1000 ohms, 1\&frac{1}{2} watt.
- \( R_5 \) — 1.0-megohm volume control, linear taper.
- \( S_1 \) — D.p.d.t. rotary switch, low-loss.
- \( T_1 \) — I.f. transformer.

It is recommended that readers who do not fully appreciate the significance of the present disclosures wait for a subsequent article on complete alignment and tune-up procedures before building the equipment. -En.}
A V.H.F. Transmitter for the Novice or Technician

An Easily-Adjusted Rig for Use on Either 145 or 220 Mc.

BY EDWARD P. TILTON,* WIHDQ

A hard fact of transmitter design the beginner soon discovers is that it is rarely possible to build a rig that has everything. If one lists the characteristics he wants in a piece of equipment and then tries to build them all into one “dream rig” he is likely to find some conflict between his aims. We can design a simple rig, a low-cost rig, a highly-efficient rig, or a beautiful one, but the chances are good that we won’t be able to roll all these objectives into one.

The aim in this case was ease of adjustment, so the inexperienced constructor would not run into trouble when he tried to get the rig going. We wanted operation on either 145 or 220 Mc., to take care of both Novice and Technician. Other desirable characteristics were subordinated to these two. If parts similar to those used in the original model are obtained, and the general layout shown is followed, even the beginner should have little trouble in duplicating the rig successfully.

Basically, the transmitter consists of a 12AU7 dual triode, as a combined overtone oscillator and frequency multiplier, a 5763 pentode doubler, and a pair of 5763s in a “push-push doubler” final amplifier. Crystals in the same general frequency range can be used for either band; in fact, for operation between 146.08 and 147 Mc. or 220.03 and 220.5 Mc. the fellow who has both Novice and Technician tickets can hit both these ranges with a single crystal. Choice of crystal frequencies can be made from Table I.

The rig is not intended for quick band-changing between 220 and 145 Mc. Plug-in coils are practically out of the question for the frequencies for which this job is designed, but the change from one band to the other can be made in a matter of minutes by soldering another set of inductances in position for L4, L5 and L6. Output in the 144-Mc. band is comparable to that obtainable with the popular SCR-522, about 10 to 15 watts. On 220 Mc. the efficiency drops, as might be expected, but it is still possible to develop up to about 4 watts output. This is enough to drive an 832A or similar amplifier, or the rig may be used by itself. Even 3 to 4 watts is capable of covering a good many miles on 220, if it is put into a good antenna system.

Mechanical and Electrical Details

In laying out this transmitter a principle was followed that is recommended for all beginners, and it’s not such a bad idea for the rest of us, either. A chassis much larger than absolutely necessary was used. This makes for an open layout that is easy to wire, and it is good insurance against failures from shorts and other mechanical troubles. The rig could be built in one-fourth the space — if one wishes to try it.

The chassis is aluminum, for easy working, 7 by 13 by 3 inches in size. (Johnson No. 194-361.) Layout of parts is not extremely critical, but the in-line arrangement shown provides a symmetrical wiring job, with short leads in the circuits.

* V.H.F. Editor, QST.

A transmitter for use on 145 or 220 Mc. Stages, from left to right, are 12AU7 oscillator-multiplier, 5763 doubler, and a pair of 5763s in the final.
where these characteristics are important. Looking at the top-view photograph, we see the oscillator-multiplier tube at the left, with the crystal and oscillator tuning adjustment, $C_1$, between it and the edge of the chassis. The first 5763 is just to the left of the middle, with the multiplier plate tuning, $C_2$, between it and the 12AU7. Next comes the 5763 tuning adjustment, $C_3$, the two 5763s, and their plate tuning control, $C_4$.

The crystal socket at the far right is the antenna output terminal. On the front wall of the chassis is a jack ($J_3$) connected between the 5763 cathodes and ground, for measuring the cathode current, or keying the transmitter for c.w.

Remembering this line-up, it is a simple matter to identify the major components in the bottom view. The inductances, from left to right, are the oscillator coils, $L_1$ and $L_2$, in one unit, the multiplier plate coil, $L_3$, 5763 plate coil, $L_4$, and the final plate and antenna coupling windings, $L_5$ and $L_6$. Power leads made with shielded wire are brought out to an 11-pin fitting on the back wall of the chassis. Note that this is a plug-type chassis fitting; the matching socket goes on the power cable. This is a standard safety measure that should apply to all power supply cabling, preventing exposure of hot terminals if the cable is accidentally removed while the power is on.

Now let's consider circuit features, beginning with the oscillator. To hold down the number of stages required to get to the operating frequency, an overtone oscillator circuit was used. We will not discuss at length the principles on which this type of oscillator works, as this information is available in $QST$\(^1\) and in the Handbook.\(^2\) The crystal may be in the 6-Mc. range, oscillating on approximately three times the frequency for which it was ground, or it can be an 18-Mc. crystal, in which case the frequency of oscillation will be that marked on the holder. The 6-Mc.

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<table>
<thead>
<tr>
<th>Operating Frequency</th>
<th>Fundamental Crystal*</th>
<th>Overtone Crystal</th>
</tr>
</thead>
<tbody>
<tr>
<td>144.0</td>
<td>8.0</td>
<td>18.0</td>
</tr>
<tr>
<td>145.0</td>
<td>8.042</td>
<td>18.125</td>
</tr>
<tr>
<td>147.0</td>
<td>6.125</td>
<td>18.250</td>
</tr>
<tr>
<td>148.0</td>
<td>6.166</td>
<td>18.50</td>
</tr>
<tr>
<td>220.0</td>
<td>6.112</td>
<td>18.334</td>
</tr>
<tr>
<td>235.0</td>
<td>6.350</td>
<td>18.750</td>
</tr>
<tr>
<td>Both bands with</td>
<td>6.112 to 6.350</td>
<td>18.334 to 18.750</td>
</tr>
<tr>
<td>same crystal</td>
<td>6.125</td>
<td>18.375</td>
</tr>
</tbody>
</table>

* When fundamental-type crystals are used for overtone service, the resultant frequency may not be an exact multiple of the value marked on the holder. Crystals multiplying out close to band edges should not be used until the frequency of oscillation is checked accurately and found to be inside the band.

crystals are plentiful and inexpensive, but adjustment for third-overtone oscillation may be a bit critical. The 18-Mc. cuts cost a little more, and may have to be supplied on order, but they are especially designed for this type of operation, and are extremely easy to use. Any of the better-known crystal manufacturers can supply them, but they may not be on your dealer’s shelves.

Output of the oscillator is capacity coupled, through C5, to the grid of the other half of the 12AU7. This stage doubles the frequency to 36 Mc., if we are to work on the 144-Mc. band. If 220 Mc. is the aim, the stage is made to triple to about 55 Mc. Tuning to either of these frequencies is accomplished by making C5 large enough to cover this range with a single coil. It hits 55 Mc. near its minimum setting, and 35 Mc. at about two-thirds in.

The frequency is doubled again in the plate circuit of the 5763, to 72 Mc. for 144-Mc. operation, or 110 Mc. for the higher band. A large condenser could be used at C3, to permit covering these two frequencies with a single coil, but we need all the drive to the final stage we can get. Efficiency falls off rapidly as the plate tank capacitance is increased, so we use coils as large and tank capacitance as low as practicable, for both bands.

Balanced tank circuits are used in the last two stages. The split-stator or butterfly-type tuning condensers, C3 and C4, have their rotors grounded, and plate voltage is fed into the center of the coils. In the plate of the first 5763 this type of circuit provides drive to both final grids, with capacity coupling, and in the final stage it makes for a more efficient tank circuit than would be possible at these frequencies with single-ended circuitry. The trimmers C6 and C8 balance up the tank circuits, making up for the plate-to-ground capacitance that appears across the other side of these center-fed coils. In the model shown they are adjusted from below the chassis, but they could be mounted the other side up and adjusted from above, if access holes were drilled at the proper points.

The push-push doubler circuit used in the final stage has certain advantages, particularly for the beginner. It is relatively easy to drive, and its efficiency is nearly as good as that of a straight-through amplifier. But its most important attribute, for our purposes, is that the need for neutralization, always a tricky process at these frequencies, is eliminated. You can build a final amplifier that will be somewhat more efficient than this one, but you are not likely to find one that is more sure-fire or easier to adjust.

Why all the pins on the power fitting, J1? This allows metering of all necessary circuits for an accurate tune-up process without using jacks or meter switches. If one is well supplied with meters he can leave as many as he likes permanently connected, and thus observe the operation of several circuits simultaneously. If one meter is used the circuits can be checked one at a time, after which a jumper is connected between the proper terminals of the power cable socket, P1, and the meter moved on to the next stage. If the rig is wired as in Fig. 1, metering of the plate current in the oscillator and multiplier, the combined plate and screen current in the other stages, and the grid current in the final can be handled in this way.

**Construction**

Marking and drilling of the chassis is easier and neater if the wrapping paper is left on. The parts can then be spread out on the chassis experimentally to check the layout. Then draw the layout on the paper, marking hole sizes so that there will be no mistakes in drilling. Check the
hole positions for the sockets to be sure that the pins are going to be in position to make r.f. leads as short as possible. The 12AU7 and first 5763 sockets are mounted in similar positions, with Pin 1 at the upper right as seen in the bottom view. The two sockets for the final tubes are mounted with their center lines at a 45-degree angle with the center line of the chassis. They mount so that the No. 1 pins are toward the center line of the chassis, so they can be connected together with a very short lead. When the drawing on the paper is completed and checked, center-punch through the paper for all holes and proceed with drilling.

![Fig. 2 — Method of connecting modulator to the v.h.f. transmitter. If separate power supplies are used on modulator and final stages, connect as shown with solid lines. The dotted line shows connections for using same supply for both.](image)

Wiring the transmitter is very simple. Except for power leads, most of the connections are made with the leads that are part of the resistors and condensers themselves. It is important to see that leads in the last two stages are kept as short as possible. Use of tie points where needed for support makes a neat-looking job and facilitates servicing. They may be seen in the bottom view, serving as supports for the junctions of $R_1$, $R_3$, $R_4$, and $R_6$, and their respective power leads. A single-lug plate is used for $R_1$, and a two-lug plate for the other connections.

Use of shielded wire for power leads, nearly standard practice as a TVI prevention measure in equipment for lower frequencies, is a good habit to acquire. With u.h.f. TV stations coming up, prevention of harmonic radiation is going to be important for the v.h.f. man before long, and shielding of power wiring is the first step in this direction. To use shielded wire easily, cut the braid back a half inch or so, wrap the loose metal ends around the insulation, and run a little solder over the wrap. Where several shielded wires run parallel they may be soldered together, making a wiring job that will stay neatly in place indefinitely.

**Adjustment and Operation**

For testing we need a power supply capable of delivering 300 volts at 200 ma, but the initial adjustments can be made at 200 volts or less. The lower voltage is desirable as a protection against tube damage, in case operating troubles are encountered. A filament transformer giving 6.3 volts a.c. at 2.6 amperes or more is also needed. This can be built into the transmitter if desired, or it can be part of the power supply.

We check the operation of the oscillator first, with the rest of the tubes in their sockets, but no plate voltage on them. Connect the test supply to Pin 2 of the power cable plug, $P_1$, and a milliammeter (50 or 100 ma) between Pin 3 and Pin 2 temporarily to measure the oscillator plate current.

Apply plate voltage and turn $G_1$ from maximum toward minimum while watching the meter. Somewhere near the middle of the tuning range there should be a sharp dip in plate current, indicating oscillation. The current will rise gradually as the condenser is opened, and then it will swing up to the original value as oscillation stops. Best operation will be just on the low-capacity side of the point where oscillation started. We should now listen to the note to be sure that oscillation is crystal-controlled. This can be checked on about 18 or 36 Mc, if a receiver is available that covers these ranges, or it can be done on either 144 or 220 Mc.

Listening to the oscillator on about 18 Mc, there should be only a very slight change in frequency as $C_1$ is tuned; probably not more than the audio range. If there is a continuous and large change as $C_1$ is adjusted, the stage is oscillating by itself and not under control of the crystal. The indicated frequency change on 144 or 220 Mc, will, of course, be considerably more than on 18 Mc, but the difference between crystal-controlled and self-oscillation will not be hard to observe. The former will produce a pure note, whereas the latter will result in a rough sound, the frequency of which will jump markedly if a metal object is placed near the oscillator coil. Frequency change with vibration is another sign of self-oscillation.

Oscillation other than crystal-controlled indicates that there is too much feed-back. The remedy is to remove one turn at a time from the feed-back winding, $L_9$, until only crystal oscillation remains. If there is no oscillation it is usually because of insufficient feed-back, or it might be the result of a defective crystal. Much less feedback is required with 18-Mc. crystals, and as noted under Fig. 1 the feed-back winding can be reduced to three turns if only this type of crystal is to be used. Feed-back can be controlled by separating $L_1$ and $L_2$ mechanically and adjusting the position of $L_2$ with respect to $L_1$, but it is preferable to leave them as one unit if possible, in the interest of mechanical stability.

We can now connect a jumper between Pins 3 and 2 in the plug, $P_1$, and connect our meter between Pins 4 and 2, to check the multiplier portion of the 12AU7. Turn $C_3$ and watch the meter for a dip, as before. Near the middle of the range of $C_3$ there should be a pronounced dip, indicating the second harmonic of the oscillator frequency, and near minimum capacitance there should be a lesser dip for the third harmonic. If this cannot be found, but the one at 36 Mc shows up well, the coil $L_9$ is too large. Cut the end turn of $L_9$ away from the polystyrene strips that hold it in place, and bend it away from...
N.F.M. EXPANDED

Effective March 1st FCC has finalized its proposal, originating with ARRL, to open for narrow-band frequency or phase modulation the entire voice bands 3800–4000 kc. and 14,200–14,300 kc. N.f.m. can now be used on any amateur band where A3 is permitted, except in 1800–2000 kc. where considerations of loran operation block the n.f.m. privilege.

RENEWALS 'WAY BEHIND'

In recent months FCC's overloaded amateur licensing unit has been giving preference to issuance of new tickets and letting applications for modifications and renewals pile up. As reported last month, a relaxation of the modification requirements is expected to reduce the load from that source. And as concerns renewals, as also previously reported, the Commission has indicated that if an amateur applies for renewal before expiration date (and so notes the date of application in his logbook or other record) he may continue operation until he hears from FCC even though it is past the expiration date of his license. This concerns renewals only; not combined applications for modifications, change of privileges, etc. So if you applied for renewal even as long ago as last December (but before expiration of your ticket) don't be alarmed if you haven't had word from FCC as to its action; the staff is some months behind. Go ahead and operate. You'll be hearing from FCC eventually.

GRANDFATHER CLAUSE

As February QST was going to press we were able to include, on the basis of telephoned information, a brief announcement of the Commission's action in waiving the examination for Extra Class license for persons who were hammering before May, 1917. As a matter of general interest, we publish below the text of FCC's announcement:

At a session of the Federal Communications Commission held in its offices in Washington, D. C., on the 27th day of December, 1951:

The Commission having under consideration the Notice of Proposed Rule Making in the above-entitled matter in which it was proposed to amend Part 12, "Rules Governing Amateur Radio Service" to provide that the Amateur Extra Class of license may be issued to any person who qualifies for or currently holds a valid amateur operator license of the General or Advanced Class and who can show that he held a valid amateur operator or station license issued by any agency of the United States Government during or before April, 1917;

IT APPEARING, That, in accordance with the requirements of Section 4(a) of the Administrative Procedure Act, general notice of proposed rule making in the above-entitled matter, which made provision for the submission of written comments by interested parties, was duly published in the Federal Register on December 12, 1951, and that the period provided for the filing of comments has now expired;

IT FURTHER APPEARING, That comments were filed by some thirty amateurs, and that, for the most part, these comments were unanimously agreeable to and in favor of adoption of the proposed amendments, except that a few pensive expressed some disagreement with the amendments proposed on the grounds that the Extra Class of license is intended to provide an incentive to all amateurs to become highly proficient in all phases of the radio art and that no means is provided by the proposed amendments to test that proficiency or to distinguish between the pioneer amateurs who have demonstrated a high degree of ability in the field of amateur radio technique and those who let radio technique overtake and pass them, but that no request for oral argument was made;

IT FURTHER APPEARING, That the weight of comment is to the effect that any person who held an amateur license prior to April, 1917, and is still an amateur or has come back to amateur radio after a lapse of time may be recognized as a pioneer in the field of radio and in line with the practice of recognition of prior service in the issuance of such documents as registration certificate of Professional Engineers; may be issued an Amateur Extra Class Operator License:

IT FURTHER APPEARING, That authority for the aforesaid amendments is contained in Sections 4(d) and 309(c) and (r) of the Communications Act of 1934, as amended;

IT FURTHER APPEARING, That, since the amendments herein ordered relieve a restriction which otherwise

A distinguished visitor to League Headquarters in February was Captain Henrik Kurt Carlsen, W2ZXM, who was honored by a staff dinner party, following an inspection of the administrative offices and laboratory. Later in the evening, he visited the Headquarters station in Newington, and operated the equipment. In this picture, he is shown examining two of the W1AW kw. transmitters in company with Communications Manager F. E. Handy, W1BDI (left), and Technical Director George Grammer, W1DF. Captain Carlsen was accompanied on the weekend visit by his family. (Hartford Times photo)
would be applicable this order may, pursuant to Section 4(c) of the Administrative Procedure Act, be made effective upon publication or at any date thereafter;

IT IS ORDERED, That, effective January 1, 1952, Sections 12.21(a) and 12.46(d) of Part 12, "Rules Governing Amateur Radio Service" be amended as set forth in the attached appendix.

FEDERAL COMMUNICATIONS COMMISSION
T. J. Slowie
Secretary

Released: December 27, 1951

APPENDIX

PART 12, RULES GOVERNING AMATEUR RADIO SERVICE, IS AMENDED IN THE FOLLOWING PARTICULARS:

1. AMEND PARAGRAPH (a) OF SECTION 12.21 TO READ AS FOLLOWS:

(a) Amateur Extra Class. Any citizen of the United States who either (1) at any time prior to receipt of his application by the Commission has held for a period of two years or more a valid amateur operator license issued by the Federal Communications Commission, excluding licenses of the Novice and Technician Classes, or (2) submits evidence of having held a valid amateur radio station or operator license issued by any agency of the United States Government during or prior to April, 1917.

2. AMEND SECTION 12.46 BY REDESIGNATING THE PRESENT PARAGRAPH (d) AS PARAGRAPH (e) AND INSERTING THE FOLLOWING NEW PARAGRAPH:

(d) An applicant for Amateur Extra Class operator license will be given credit for examination elements 1(C) and 4(B) if he so requests and submits evidence of having held a valid amateur radio station or operator license issued by any agency of the United States Government during or prior to April, 1917, and qualifies for, or currently holds a valid amateur operator license of the General or Advanced Class.

R.T.M.A. AMATEUR COMMITTEE

Last year a group of amateurs in industry, active in organizational affairs of the Radio-Television Manufacturers Association, decided to reestablish the RTMA Amateur Radio Activities Section which had been dormant since 1946. The Section held an organizational meeting in September, adopting as its principles:

The basic objective of this Section shall be to promote the orderly development and expansion of the amateur radio hobby through cooperation of RTMA with other interested parties. This objective will be accomplished by the exchange of information with interested groups, by being available for advice and consultation on matters pertaining to amateur radio, and by reviewing the technical aspects of amateur radio as they pertain to the problems of radio and television manufacturers.

The Chairmanship of the new group went to the man who sparked its revival — Al Kahn, W8DUS. Other officers are Vice-Chairman W. J. Halligan, K9WZE, and Secretary R. W. Mitchell, W9LXQ. The section set up three sub-committees:

1) Technical Committee, headed by Al Pichitino, W6DX, with the objective of reviewing and being available for consultation on the technical aspects of amateur radio as they pertain to the problems of radio and television manufacturers.

2) A Promotion and Education Committee, headed by Larry LeKashmann, W8IOP, with the objective of cooperating with interested groups for the promotion and publicizing of ama-

(Continued on page 32)

Ralph T. Beaudin
1912—1952

There falls to us the sad task of recording the passing, on February 15th, of Ralph T. Beaudin, W1BAW, ARRL's Production Manager and Assistant Circulation Manager.

Mr. Beaudin succumbed to a heart attack while performing supervisory duties connected with the publication of the 1952 Handbook at the Rumford Press, Concord, N. H. He was 40; March 21st would have marked the completion of his twenty-fifth year in the service of the League.

At the tender age of 15, Ralph became associated with ARRL as an office boy. He early demonstrated such ability and perseverance that he was soon established permanently in our Circulation Department. Later, as the League's representative in handling sales of ARRL publications through dealers, extensive travel enabled him to amass a host of friends. As the League's purchasing agent, his considerable experience and exercise of keen business judgment proved invaluable assets.

He became Production Manager in 1945, assuming responsibility for ARRL printing matters, not only with respect to QST, the Handbook and other publications, but also the numerous forms and certificates used daily in League operations. A competent and hard worker always, Ralph's devotion to the League will long stand as an example for the many friends and associates he leaves behind.

The world of amateur radio loses a staunch worker for its advancement; the Headquarters staff of ARRL loses a close friend and respected colleague.

—An informal photo of W1BAW at his desk—

April 1952 31
What Bands Available?

Below is a summary of the U.S. amateur bands on which operation is permitted as of March 1st. Any future changes will, as usual, be announced by W1AW bulletin. Figures are megacycles. A0 means an unmodulated carrier, A1 means c.w. telegraphy, A2 is m.c.w., A3 is s.a.m. 'phone, A4 is facsimile, A5 is television; n.f.m. designates narrow-band frequency- or phase-modulated radiotelephony; and f.m. means frequency-modulation. 'Phone (including n.f.m.) or telegraphy.

<table>
<thead>
<tr>
<th>Band (kc)</th>
<th>Call letters</th>
</tr>
</thead>
<tbody>
<tr>
<td>3000 - 4000</td>
<td>A1, A2, A3, n.f.m., Advanced or Extra Class only</td>
</tr>
<tr>
<td>3800 - 4000</td>
<td>A3 and n.f.m., Advanced or Extra Class only</td>
</tr>
<tr>
<td>7000 - 7300</td>
<td>A1, A2, A3, A4, f.m.</td>
</tr>
<tr>
<td>14000 - 14300</td>
<td>A3, A4, A5, f.m.</td>
</tr>
<tr>
<td>14200 - 14300</td>
<td>A3, A4, A5, f.m.</td>
</tr>
<tr>
<td>29200 - 29700</td>
<td>A1, A2, A3, f.m.</td>
</tr>
<tr>
<td>29500 - 29700</td>
<td>A1, A2, A3, A4, A5, f.m.</td>
</tr>
<tr>
<td>3200 - 2450</td>
<td>A6, A7, A8, A9, A10, A11, A12, A13, A14, A15, f.m.</td>
</tr>
<tr>
<td>3300 - 3500</td>
<td>A6, A7, A8, A9, A10, A11, A12, A13, A14, A15, f.m.</td>
</tr>
<tr>
<td>5500 - 5925</td>
<td>A0, A1, A2, A3, A4, A5, f.m.</td>
</tr>
<tr>
<td>10000 - 10500</td>
<td>Pulse</td>
</tr>
<tr>
<td>21000 - 22000</td>
<td>All above 30 030</td>
</tr>
</tbody>
</table>

1 Peak antenna power must not exceed 50 watts.

In addition, portions of 1800-2000 kc. subject to restrictions as shown; either A1 or A3:

<table>
<thead>
<tr>
<th>Area</th>
<th>Band, Ke</th>
<th>Power (watts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mississippi River to East 1900-1825 kc.</td>
<td>500</td>
<td>300</td>
</tr>
<tr>
<td>Coast U.S. (except Florida and states bordering Gulf of Mexico) 1975-2000 kc.</td>
<td>*500</td>
<td>200</td>
</tr>
<tr>
<td>Mississippi River to West 1900-1925 kc.</td>
<td>500</td>
<td>200</td>
</tr>
<tr>
<td>Coast U.S. (except states bordering Gulf of Mexico) 1975-2000 kc.</td>
<td>500</td>
<td>200</td>
</tr>
<tr>
<td>Florida and states bordering Gulf of Mexico 1900-1925 kc.</td>
<td>200</td>
<td>No operation</td>
</tr>
<tr>
<td>Puerto Rico and Virgin Islands 1900-1925 kc.</td>
<td>500</td>
<td>50</td>
</tr>
<tr>
<td>Hawaiian Islands 1900-1925 kc.</td>
<td>500</td>
<td>200</td>
</tr>
<tr>
<td>* Except in State of Washington where daytime power limited to 200 watts and nighttime power to 50 watts.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Frequency ranges: 3700-3750 kc. | 26,95-27.23 Mc. | A1 c.w. telegraphy; 145-147 Mc. radio telephony using any type of emission except pulse or type B (spark) emission. |

Technician frequencies: All amateur privileges above 220 Mc.

c) Call (your amateur call)
d) File number (not required in the case of amateur applicants)

We point out again this new procedure applies (Continued on page 155)
A Four-Purpose Communication-Receiver Auxiliary

Combining the C.W. Man’s Reception Aids in One Unit

BY GEORGE D. HANCHELT, JR.,* W2YM, AND KENNETH G. BUCKLIN,* W2CDP

Years of DXing, particularly on 20 meters, can finally lead to a burst of ambition to build something which will make a real instrument out of that old receiver. Tempting QST articles on the one hand and QRM on the other sparked the ambitious burst, and a very useful four-purpose receiver auxiliary was built.

This auxiliary, intended primarily for c.w. operation, includes a 50-kc. Q6-er, an audio limiter, a peaked audio amplifier, and a crystal calibrator. A power supply having ample capacity is provided so that future gadgets could easily be added. Plenty of space is available for one particular gadget, a 15-meter crystal-controlled converter, which we plan to add when and if the band is available. A complete schematic diagram of the auxiliary is given in Fig. 1.

Auxiliary Components

Except for the coils, the Q5-er section of the auxiliary is not very different from many that have been described in the past. A 6SA7 is utilized as a converter, two 6SK7s as 30-kc. amplifiers, another 6SA7 as second detector, and a 6SN7-GT as b.f.o. A quick scan of the catalogs for suitable coils left us somewhat cold, since it

* % Tube Dept., Radio Corporation of America, Harrison, N. J.

1 Following are the manufacturer's name and the model numbers for some of the television receivers using this type of coil:

Admiral — 20A1, 20B1, 21A1; Stewart-Warner — 9106B, 9106C, 9106E; Westinghouse — H-251, V-2150-82, V-2150-84; Tele-King — 610; Stromberg-Carlson — TC102, TC122, 317; National — NC-TV-107; Mecad — XM7G1, XT7R8; Starrett — M412 series; Gared — D1002, 1049; Sentinel — 407, 409.

- Here's a spot where TV has proved useful to ham radio — by making available high-Q coils, at low prices, that can be used to make a really selective Q5-er. This article describes how to assemble them into 50-kc. i.f. transformers, how to build the i.f., and in addition describes some further "gimmicks" that help take the headaches out of fighting QRM.

looked as though many dollars might have to be spent to obtain commercial 50-kc. i.f. transformers. Our next thought was to try some of the existing r.f. choke coils but, as suspected, their Qs were much too low. Months went by with an eye toward the surplus market with no results, until, quite by accident, we hit upon the right idea. The coils utilized as the i.f. transformers were constructed from television horizontal-oscillator coils. This type of coil is used by more than 50 per cent of the TV manufacturers in what is known in the TV industry as a modified Potter oscillator circuit.1

The coil is slug-tuned and in modern television sets is resonated with a 3900-μfd. capacitor to produce the 15-kc. horizontal-oscillator frequency. It was discovered that if the coil is resonated with a 300-μfd. capacitor, it tunes nicely through 50 kc. and has a Q of approximately 60. The i.f. transformers were constructed with two such coils mounted in a National HRO shield can as shown in Fig. 2.

In order to provide more tuned circuits for added skirt selectivity, two such i.f. transformers

The receiver auxiliary includes in one box four items for improving operating efficiency — a Q5-er, peaked audio circuit, audio limiter, and a 100–1000-kc. crystal calibrator. Power supply and an audio power output stage also are included.
Fig. 1 — Circuit diagram of the four-purpose receiver auxiliary.
were coupled together by a 5-μfd. mica capacitor for each of the two i.f. stages. A single transformer is used to couple the second 50-ke. i.f. transformer to the second 6SA7. Another TV horizontal-oscillator coil is used in the b.f.o. To make possible the use of this coil, a 6SN7-GT was selected so that a two-terminal oscillator could be employed, thus eliminating the need for a tickler winding or a tap on the coil.

Audio Section

The peaked audio amplifier is similar to the one described by one of the authors several years ago in QST.2 The constants are modified so that the circuit will pass about 500 cycles. The audio limiter is similar to that described in QST by George Grammer, W1DF.3 Both audio limiter and peaked audio amplifier were designed to use 12AU7 miniature type tubes in order to minimize the physical size as well as to reduce the total heater drain. The output tube, a 6AK6, feeds both headphones and 'speaker.'

Crystal-Calibrator Section

The crystal calibrator utilizes the new dual crystals for operation on 100 and 1000 kc. A 6 X 8, a miniature triode-pentode recently announced by RCA, is used as the crystal oscillator and harmonic amplifier, the pentode section being used as the oscillator and the triode section as the harmonic amplifier. The harmonic amplifier is merely an amplifier overdriven to help produce harmonics. As a matter of interest, it is possible to hear the 1-megacycle beats well up through the 144-Mc. band. In one location it even produced TVI on Channel 2.

Connection of the Q5-cir to the communication receiver is accomplished through the use of a 6C4 cathode follower connected to the plate of the last i.f. amplifier of the receiver and fed to the 6SA7 by coax. This arrangement allows the auxiliary to be disconnected from the receiver at any time and does not impair the standard operation of the communication receiver in any way.

Construction

Construction of the auxiliary is not difficult

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The larger knob above and to the left of this row of controls is the b.f.o. tuning control (C3). At the back of the chassis a barrier strip is used for connections to a 'speaker voice coil, the audio input from the communications receiver, and an output of antenna wire for the crystal calibrator. Three a.c. outlets are provided, one for a.c. to the receiver which is controlled at the front panel, and two for a desk lamp and electric clock. The final terminals are a socket for 117-volt a.c. input, and a cox fitting for coupling the receiver i.f. amplifier to the Q5-er. On the chassis alongside the 6X8 are a toggle switch for changing the frequency of the crystal from 100 to 1000 kc, and a shaft for tuning the capacitor which is used to zero beat the oscillator to WWV.

Alignment

Alignment of the receiver auxiliary is a comparatively simple process. After the wiring is carefully checked, voltages should be applied. With the aid of a receiver which covers the standard broadcast band, the local oscillator of the Q5-er should be adjusted to a frequency 50 kc. lower than the receiver intermediate frequency. This adjustment is made by listening on the broadcast band for the second and third harmonics. If these harmonics are separated by the desired frequency, then the oscillator is operating at the right frequency. After the adjustment is completed, the cathode follower of the auxiliary should be connected to the communication receiver by a length of cox cable. The communication receiver b.f.o. can be used for a signal generator. With the auxiliary b.f.o. off and the communication receiver b.f.o. on, the 50-kc. i.f.s should be aligned for maximum hiss output. The 50-kc. b.f.o. of the auxiliary is adjusted to frequency by beating it with the communication receiver b.f.o. The communication receiver b.f.o. should now be turned off and all trimmers

Chassis layout, showing the home-assembled 50-kc. i.f. transformers. The b.f.o. transformer is in the upper right in this picture. The contact socket alongside it was originally intended for a crystal but was later replaced by a dual-crystal unit mounted on a sub-chassis.
touched up for maximum performance on a weak signal. This completes the adjustment of the Q5-er.

**Operation**

The communication receiver used for our present installation is a BC-342J. Room was found for a 6C4 between the power supply and the front panel. One of the jacks marked “2nd audio” was changed to a coax fitting. The receiver is operated in normal manner, but with the b.f.o. turned off and the gain control held nearly at maximum. The auxiliary gain control is adjusted for normal operation at about two-thirds on by juggling it a bit as described in the July 1950 *QST* article on audio clipping. The auxiliary b.f.o. can be changed slightly during operation, but maximum gain occurs close to one correct setting, and for marking this setting a pointer is recommended. The bias control for the 50-kc. amplifier serves as the principal gain control.

**Performance**

Actual measurements made with a BC-221 signal generator after alignment showed that the communication receiver i.f. was 468.6 kc., the Q5-er oscillator frequency 418 kc., and the i.f. amplifier frequency 50.6 kc. The 418 kc. was obtained with a 0.001-mfd. capacitor (C5) and with the 75-mfd. trimmer (C4) halfway in. It is very important to set the oscillator at the right frequency, because signals heard when the oscillator setting is incorrect can be very misleading.

Measurements have not been made on the selectivity, but the auxiliary is very impressive in operation. Only one sideband can be heard even on the strongest signal. It is a real pleasure to find that when a local signal suddenly bursts in, the limiter keeps the headphones from lifting you out of the chair. You can tune the local signal out completely in 4 or 5 kc. (provided the local rig doesn’t have key clicks). Nevertheless, QRM being what it is, there will still be many times when you will want to run the receiver with the crystal filter all the way in and the peaked audio amplifier at maximum. The effective separation is then 100 cycles or so. Even with such extremely sharp tuning, the combination is not a bit hard to handle; all the tuning is done by the vernier on the BC-342J (with backlash removed). With 'phone signals, of course, the speech is practically unintelligible, but being c.w. hounds, except for two meters, this doesn’t worry us a bit.

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25 Years Ago

**April, 1927**

This issue carries a valuable section on the text of the long-sought “New Radio Law” which superseded the antiquated Radio Act of 1912.

Recent developments in dry electrolytic rectifiers are treated by Technical Editor Robert S. Kruse. “The Most Useful Meter” by R. F. Shen discusses the versatility of the vacuum-tube voltmete for amateur applications.

IBFA's article points out the similarities of radio laws and phenomena to the heat, light, mechanisms and wave motion of ordinary physics.

The CX340-UX240 high plate impedance triode is finding favor as a replacement for the 201-A.

An overload relay announced by the Precise Mfg. Corp., of Rochester, N. Y., should save many dollars worth of equipment for the high-power enthusiast.

A loss-reducing low-capacity 50-watt power tube socket has been made available by the Radio Engineering Labs of New York City.

BNAN describes a home-constructed bug key built at a cost of ten cents.

2EB's 5-meter test signals have been logged in Missouri and Kansas, and 2C6M, 2XM and 9EHT are joining in the experiments.

RCA's 15-meter commercial station 2XS, beamed on Argentina, is described and pictured in a feature article.

Cameroons, Salvador, Abyssinia, Fanning Island and British Guiana are rare spots now reported on the amateur bands.

The volume of DXing increasing manifold, C. C. Knight, saJBS, writes a timely piece on the accurate computation of global distances.

4JR of Gastonia, N. C., 60CQ of Phoenix, Ariz., and 9DNG, Lawrence, Kansas, are featured in descriptive write-ups.

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April 1952 37
Evolution of a 75-Meter Tunable Whip

A Novel Method of Loading-Coil Variation

BY WILLIAM H. FISHBACK.* WI1KU

LAST SPRING, our hopes of going mobile on 75 were brought to the boiling point by the acquisition of a 6-volt dynamotor. Having spent several hours getting the one-tuner to convert the car radio and obtain a reasonable facsimile of 75-meter phone signals, we felt ready to install the low-powered transmitter. Letting first things come first, cabling, control-head installation and other time-consuming details were completed. As anyone who has installed a strictly home-brewed control system and mounted a dynamotor in an engine compartment intended to house little more than the 1000-mile tube sticker can testify, time passed!

Up to this point only a vague idea of the antenna installation had been formed, and since the dummy lamp showed everything was working, more or less, some thought was now given to antennas. So far, everything from transmitter to cabling had been scavenged either from the junk box or from sympathetic mobiles who were anxious to have more local QRM for reasons best understood by themselves. So when prices on antennas and loading coils were studied in the various amateur wish-books, it was very evident that somebody would have to start rolling his own and switching to Pepsi-Cola, or else start looking for an out. The best possible prices in the ready-to-wear styles for what we wanted seemed to run between fifteen and twenty dollars, including the insulated mounting. We'd been reading surplus radio sections in the various flyers for so long we knew most of them by heart.

In the end, we invested the grand sum of $6.45 for a GI surplus mount, Type MP-132, at $3.95 and five three-foot mast sections, MS-49, 50, 51, 52 and 53, at 50 cents each.

Constructing the bumber-bracket mount and assembling and mounting it on the car took only a short time. The bracket was purposely tilted back about 5 degrees from the vertical so that under practically all conditions the antenna would never swing forward over center with the resultant bumping noise when the mount spring turns close together. Also, with some rake, the antenna, when striking limbs, would not hit them squarely.

Either the MS-52 or 53 will fit the threaded hole in the MP-132 mast base; however, the MS-53 seemed unnecessarily heavy and was not used. First trials were made with mast sections MS-52, 51 and 50, and a series variometer inside the trunk with a short length of high-voltage wire (unshielded) to the tank coupling coil. This gave us a 9-foot whip with a convenient means of tuning. Initial results were very satisfactory, but

one good second look at the variometer showed that undoubtedly most of the power was probably still inside the trunk.

Although many satisfactory contacts were made, nobody sent us a bill for reshingling his roof except one of the local brethren whom we normally raise for a QSO by throwing open the south bedroom windows and bellowing therefrom. So, after reading and listening to discussions on the relative merits of base, center and top loading, it was decided that center loading would probably provide the best electrical and mechanical answer to the loaded-whip problem. Getting the current loop out into the open where the radiation will be more effective by using a center-loaded whip may not be as good on paper as loading the top with inductance and capacitance, but it represents the happy medium. After all, we were interested in the mobile radio angle and not in pruning tree limbs or mobile whips.

Matching threads on the available loading coils with those on the mast sections called for having adapters made. Have you priced machine-lathe work lately? — we have. We had acquired some 1 ½-inch polystyrene tubing previously, against the day we might want to make our own loading coils. This tubing comes in 12-inch lengths, 1 ½-inch o.d., with approximately ½-inch wall selling surplus for $1.25 and at this writing is still available. End plugs for the tubing were made from 1 ½-inch brass shaft, each being 1 inch long and drilled with a ½-inch and a ½-inch drill, respectively, in a lathe to provide true alignment of the antenna assembly.

The ½-inch drilled plug (actually a 0.010-inch oversize drill was used) was sweat-fitted to one end of the MS-50 section after the bottom fitting had been sawed off. The ¾-inch drilled plug was fitted to the MS-52 section. These mast sections are copper-clad and the ends should be cleaned with steel wool (sandpaper is apt to take off too much copper) to insure a good soldered connection. The plugs were then soldered to their mast sections and then drive-fitted into the tubing. One word of caution, however: If the fit is apparently rather tight, it might be best to remove some of the inside of the tubing with a sharp knife and sandpaper, since polystyrene

* Box 501, Chatham, Mass.

QST for
fractures easily. Although our first attempt at a drive fit was successful, albeit a little brutal, the tubing is still whole but shows discoloration due to the stress. This seems to be normal with polystyrene, but better to play it safe. It might possibly be better to have a loose fit and pin with machine screws rather than attempt a drive fit. However, a good fit precludes any possibility of condensed moisture inside the coil itself. After assembling the tubing and mast sections an 8-32 hole was drilled and tapped in each end for electrical connection.

Estimating the number of turns from general practice (70-100 microhenrys, depending on the installation and frequency) 10 inches (about 130 turns) of No. 14 enamel wire was then close-wound on the coil form and fastened with 8-32 screws.

Pruning the coil was simpler than anticipated. A razor blade was jammed into the end of a 3-foot dowel and one end of a short flexible test lead was fastened to the blade, the other end being fastened to one of the 8-32 screw heads. Firing up the transmitter, no loading showed on the plate meter, but by moving the blade up and down the coil, the resonant point was quickly and accurately found. Allowing two or three turns for error, the excess turns were removed and the last seven or eight turns on each end spaced to give exact resonance. One important point, however—prune the coil for the lowest frequency anticipated. It is far easier to remove than to add turns later.

Even after resonance had been established, we were not certain that we had the coil properly pruned, so the transmitter was moved to a higher frequency and a shorting ring slipped over the coil, held in place with masking tape. It was found that exact resonance could be easily obtained for any given frequency by the position of the shorting ring. This led to the development of a permanently-attached ring which could be moved and fixed in place, as shown in Fig. 1.

The effect of the shorting ring increases rapidly as it is moved toward the center of the coil, the effect being somewhat less near the end. Spacing the turns at the end of the coil will provide an acceptable means of varying the inductance gradually. There are probably several more satisfactory means of adjusting the position of the ring, but the one shown is the result of a deliberation of only a few minutes. With it, a variation of 100 kc. or more in the 75-meter 'phone band is obtained. Ours covers 4000-3900 kc. quite handily.

The ring has one advantage not to be overlooked in that the inside of the coil can be made watertight with no concern for condensation changing the value of the inductance. Wet-weather troubles were reduced to a minimum by liberal application of polystyrene dope to the outside of the coil. Since the tubing has some flexibility, the dope will eventually crack, admitting moisture between turns and more dope must be applied. However, the ring will take care of most any detuning caused by wet weather.

The effect of the ring is, of course, to reduce the inductance as it is moved toward the center of the coil. The Q will be reduced as the ring changes the resonant frequency higher in the band since the resistance of the total coil remains the same but the inductance is reduced. However, signal reports indicate that no noticeable difference exists between the two limits of adjustment. There is no contact resistance problem since the ring is insulated from the coil, and no concern is necessary over any sliding contacts as in the case of shorting taps or contact fingers.

Perhaps the wet-weather problem could be more effectively handled by the liberal application of some compound such as Amphenol Sili-

![Fig. 1 — Sketch showing the essentials of the sliding-ring device for varying the loading-coil inductance of a 75-meter mobile whip.](image)

cone, but unless the compound can be forced between turns it is doubtful this is the answer. What really is needed is a plastic shield with an incorporated ring to slip over the coil and be made movable up and down to change the ring-coil relationship.

A tremendous improvement over the internal loading scheme first tried has been verified many times. We still haven’t worked the West Coast with our 20-watt mobile, nor have we had unpeated 20-db.-over-S9 reports from unpeated generous hams with expanding Si-meters, but we hold our own. No field-strength curves have been plotted nor any roofs reshingled, but our antenna really works. Optimum variation of transmitter frequency without readjusting the ring is about plus or minus 10 kc. which would indicate the Q of the coil to be fairly good.

The total cost for our 9-foot whip? The sum of $8.59 took care of the whole business including 75 cents for drilling the plugs in a lathe, 65 cents for the polystyrene dope, plus the No. 12 wire. This is considerably less than buying a ready-to-go antenna assembly, but, of course, the labor involved amounts to something. However, what ham outweighs his labor when the final result gives him all he wants, plus the satisfaction of doing it himself.
PRACTICALLY all of the fellows we talked to about converting this column into a s.s.b. hints-and-kinks department were in favor of it, so that's what we'll be shooting for from now on. Not that we plan to neglect any of the records or other newsworthy events but, as W3ASW puts it, "... it's tough to turn out new and startling happenings month after month just to get in the column. So please let us hear from you either on your activity or on any technical tips you may have run across. And they don't have to be terrific and monumental developments (although these aren't being discouraged) — any practical hints that will help a guy get on with s.s.b. or make his rig a little better are most welcome.

Here are members of the Chicago s.s.b. gang you should know, W9SQR (left) and W9HKS (center) have been running the stuff on 160, and W9DHY (right) is marketing a phasing-type exciter.

Yoc, W2EB, says that ZS6KD is being needleeed every few days to get his W1JEO rig on the air. The ZS still lacks a few parts, but W2EWL is helping him out on that score.

Nick of W4MXL adds a little more about W4MKT, the 15-year-old single-sidebander we told you about last month. Seems that Paul has the misfortune to have been confined to bed or a wheelchair all of his life, but he is now going to school (via a remote telephone speaker system) and getting excellent grades, thanks to his amateur radio experience. His s.s.b. rig is a phasing job, running 300 watts to a 304TL, which he built himself after gaining experience by building a.m. rigs for all bands from 2 to 75. W4MXL adds to the low-power tales of s.s.b. by telling about the time he fed a 6AK5 Class A into a 75-ohm line to the antenna and developed all of 5.5 volts (400 milliwatts). But it was enough to be heard in Michigan, Pennsylvania, New York, New Jersey and Massachusetts!

One of the requisites of any linear Class AB or Class B amplifier (except those using zero-bias tubes like the 811-A) is a "stiff" bias source. Although batteries are used in many instances, they are really at their best only when the peak grid current is relatively low. Dave Mann, W3MBY, worked out a variation of an earlier regulator circuit that he uses to give a constant 40 volts of bias, over a grid current range of 0 to 80 ma. As shown in Fig. 1, the circuit has another advantage in that a 1000-ohms-per-volt grid voltmeter can be hung across the regulator without affecting its operation.

Ben Grady, W2SNQ, has found the circuit of Fig. 2 to be a reliable and noncritical one for heterodyning an s.s.b. signal from one frequency to another. The values shown have been used with crystals in the 4- to 7-Mc. range.

A lot of the s.s.b. gang have been caught at one time or another by amplified thermal noise in their transmitters "jamming" the signal or

(Continued on page 187)

Fig. 1 — The regulator circuit used at W3MBY for stabilizing the bias voltage on a linear amplifier. The bias voltage can be adjusted by varying R1.

C1 — Power-supply output condenser.

C2 — 50-µfd. electrolytic, 150 volts.

R1 — 10,000-ohm potentiometer.

R2 — 50,000 ohms.

R3 — 35,000 ohms, 5 watts.

R4 — 0.22 megohm.

Fig. 2 — The simple crystal-controlled converter circuit used by W2SNQ.

C1, C2 — Coupling condenser, 0.01 to 0.001 µfd.

C3 = 47 µfd.

C4 = 100 µfd.

C5 = Output tuning condenser.

C6 = 0.001 µfd.

L3 = 0.5 mh.

L4 = Resonates with C4 to desired output frequency.

Xtal = 5 Mc.

With other crystals, L1, C2 and C3 should be selected to give approximately 15,000, 600 and 300 ohms reactance respectively at the crystal frequency.

40 QST for
A Compact Portable 2-Meter Emergency Station

Mass-Production Methods by the Livingston Radio Club Provide Effective Civil Defense Communication

BY ROBERT W. EHRlich,* W2NJR, RICHARD P. WELLS,** W2ORX, AND RALPH H. PRESTON,*** W2BWn

Recently, many groups of radio amateurs throughout the nation have been called upon to set up communication systems for use in civil emergencies. The Livingston Radio Club was no exception. As the first step in the development of a working communications network, the club undertook production of the portable transmitter-receiver units described in this article. It is felt that the features of this equipment may offer worthwhile ideas to groups contemplating similar projects.

Civil defense starts at the community level, and it appeared that two meters was the logical band on which to establish an intratown network. A survey disclosed that there was plenty of twometer equipment among the club members as well as in neighboring towns, but it consisted of assorted individual rigs which were not constantly available and lacked uniformity in construction, servicing methods or operation. Consequently, it was decided to start from scratch and build units designed to meet the following objectives:

1) Similarity in construction and operation, and subassembly design, for maximum availability of complete units in case of failure of any part.

2) Small size and adaptability to installation in a car, at a field site or in a building.

3) The transmitter should be crystal-controlled and have sufficient power for reliable service over several miles.

4) The receiver should be nonradiating with good sensitivity and rather broad selectivity. Receiver output to be adaptable to headphones or speaker.

5) Battery drain to be as low as feasible.

Each member contributed his specialized resources to the whole job. Electrical design problems were turned over to a committee consisting of W2NJR and W2ORX. Mechanical layout was designed by Ralph Preston, W2BWn. Other members handled portions of the production job: one man drilled and bent all the subchassis, another did production testing, and several others handled the purchasing of parts. The one item not handled on a group basis was actual wiring, the thought being that each constructor should have a full knowledge of what went into his own set. While a unit of this type is not normally considered to be the sort of project a beginner should tackle, the pooling of the skills and facilities of the club members made it possible for everyone, including those who only recently obtained their Novice tickets, to complete their equipment successfully.

Front view of one of the Livingston Radio Club's 2-meter emergency stations. Note that the cabinet is made of two standard chas-
sis, bottom to bottom.
General Description

The completed station is a single unit, which needs only the connection of power, antenna, speaker and microphone to go on the air. As shown in the photographs, it consists of three basic subassemblies: receiver r.f. and detector section, transmitter r.f. section, and audio and control section. The last is in continuous operation either as an audio amplifier or modulator. The control circuit performs all switching functions.

The three subassemblies are constructed on strips about 2 by 9 inches in size. These are drilled with templates to insure interchangeability. They are mounted in a standard 7 × 9 × 2-inch chassis which serves as the front panel. A similar chassis forms the rear cover. The audio and control subassembly is more or less permanently attached to the front-panel chassis, but the transmitter and receiver sections can be removed and replaced in a few minutes.

Operating controls include receiver volume, regeneration and tuning controls, and a three-position transmit-receive switch. The center position is for transmit, and the two sides for reception by headphones or by speaker. A switch on the volume control can actuate a relay in the power supply to turn the unit on, and another on the regeneration control drops the plate voltage on the transmitter for tune-up purposes. Adjustments are made by connecting an external meter in the transmitter test jack, which is accessible by removing the front grill.

Plenty of ventilation was found to be necessary, particularly in the front and top. The life of tubes and components can be seriously impaired without it.

Audio and Control Section

The audio and control section includes a two-stage audio system used as a modulator in transmitting and as an audio amplifier in receiving, and a multisection transmit-receive switch which performs the following functions:

1) Switches B-plus between receiver and transmitter.
2) Switches the input of the audio amplifier between receiver and microphone.
3) Connects or disconnects the modulation output winding and the final.
4) Connects the high- or low-impedance audio output winding to the 'phone jack, or opens this winding entirely for transmit.
5) Cuts a dropping resistor in the B-plus lead for receive or shorts it out for transmit.
6) Switches the antenna between receiver and transmitter.

Volume and regeneration controls are also part of the audio and control section.

As an audio amplifier stage is necessary for receiving operation, it was possible to eliminate the usual microphone transformer and utilize this amplifier stage in the transmitting circuit to furnish the necessary voltage step-up from microphone to 6AQ5 grid. Microphone current is derived from the 6AQ5 cathode, suitably by-passed. If Pins 2 and 7 are connected together, the receiver first stage will accommodate almost any of the popular miniature pentodes, as indicated in Fig. 1.

The only critical feature, mechanically, is to locate the ceramic transmit-receive switch so that it will fit properly through the hole in the front panel. Two tapped bushings are used to mount this switch to the chassis, and these must be of just the right height so that the front of the switch will just clear the front panel.

Since most of the leads carry d.c., their location is not critical. Shielded wire should be used on the audio leads from the receiver output to the volume control, thence to the transmit-receive switch and to the grid of the first audio tube. Reserve one of the sections of the switch nearest the front panel and close to the coaxial antenna connector for antenna switching. There appears to be no necessity for using coaxial antenna leads to and from the switch; ordinary hook-up wire with ground return through the chassis seems perfectly satisfactory.

Interior of the 2-meter portable transmitter-receiver described by W2NJR, W2DRX and W2BWN. The three portions of the station are constructed as subassemblies, and are screwed to the bottom of the chassis that comprises the front portion of the cabinet. The audio and control unit is the center strip, with the receiver above and the transmitter below.
The audio and control unit of the 2-meter portable station. Wiring is complete except for two connections that are made after the assembly is mounted in place.

With two exceptions, all plugs, jacks and controls can be wired on the subchassis before it is inserted in the main front chassis. The two parts that are most easily wired after the unit is in place are the test resistor, which mounts inside the top of the front chassis; and the antenna output connector, which requires one short lead over to the transmit-receive switch.

Checks can be made on the audio and control system without having the transmitter or receiver available. For audio tests, the load can be simulated by a 10-watt 10,000-ohm resistor between the blue lead on the output transformer and ground. Connect an a.c. voltmeter, through a condenser, across the resistor. With the control switch at "transmit" it should be possible to talk up to about 150 volts a.c. with a supply voltage of about 200 volts. Then with the control switch on "receive" (and no 'speaker or 'phones) observe the voltmeter for signs of oscillation as the volume control is adjusted. If any oscillation occurs, it can usually be cured by a 0.001-mfd. condenser between the first audio grid and ground.

In stubborn cases, a second condenser may be tried from the 6AQ5 grid to ground. It is desirable to make continuity checks of the control portions of the circuit to make sure that the test resistor and regeneration control are wired properly.

**Receiver**

Several receiver prototypes were tried before the final design was established. The receiver is of the superhet-supercollapsible type for good performance with few tubes. The standard superheterodyne "front end" uses an r.f. pentode amplifier and a dual triode mixer oscilator. The tube types indicated are the ones used in the production models but various types of high-frequency pentodes and twin triodes with individual cathodes may be used.

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**Fig. 1** — Schematic diagram of the audio and control unit. Pins 2 and 7 should be connected together for tube selection given for first stage.

C1, C2 = 0.005 mfd.
C3, C4 = 5-mfd. 50-volt electrolytic. C5 = 0.05 mfd.
C6 = 8-mfd. 50-volt electrolytic.
R1, R2, R3 = 0.47 megohm, 1/2 watt.
R4 = 10,000 ohms, 1/2 watt.
R5 = 22 megohm, 1/2 watt.
R6 = 230 ohms, 1 watt.
R7 = 470 ohms, 1 watt.
R8 = 5000 ohms, 10 watts.
R9 = 50,000-ohm potentiometer with switch.
R10 = 0.5-megohm potentiometer with switch.
J1 = Microphone jack, non-shorting, to fit PL-68 plug.
J2 = Phone jack, non-shorting, to fit PL-55 plug.
J3 = Transmitter power socket, 6-pin (Amphenol 78-565).
J4 = Receiver power socket, 4-pin (Amphenol 78-518).
J5 = Coaxial socket (Amphenol 83-1R).
P1 = Power plug, 4-pin (Jones P-3014).
P2, P3 = Plugs for antenna connection (RCA phone fitting).
S1A, S1B, S1C, S1D, S1E = 2-section ceramic switch, 5 circuits, 3 positions.
Each section shown in transmit position.
S2 = Switch on R8.
S3 = Switch on R9.
T1 = Combination modulation and output transformer (Farno No. 9D1003).
if the sockets are wired accordingly. The 6AK5, 6BA6, 6AU6 and 6AG5 are suitable for use in the r.f. circuit while the 12AU7, 12AT7, 12AX7, 6BQ7, 6BK7 and 2C51 (W.E. 396A) work well in the mixer-oscillator position. Coupling between the mixer plate and detector grid is a one-turn link loosely coupled to the cold end of each coil. The two coils are separated by several inches, to limit the coupling to that through the link path only. Oscillator injection is obtained through a one-turn link between the oscillator and mixed grid coils.

The detector is a conventional superregenerative type using a pentode tube, with regeneration controlled by varying the screen voltage. The tubes recommended for use in the r.f. amplifier are applicable in the detector as well. The detector grid circuit is tuned to the same frequency as the mixer plate circuit, about 18 Mc.

The receiver is built on a 21/4 x 9-inch sub-chassis. To avoid congestion around the tube sockets, use of the smallest available components is recommended. Of the tube socket shields, shown in the photograph, the one across the r.f. amplifier is essential for proper performance. This should pass between Pins 1 and 7 and Pins 3 and 4. The shield on the mixer-oscillator is not necessary for electrical reasons, but it provides a convenient mounting and grounding point for the oscillator and mixer circuit elements.

Note that the r.f. plate and mixer grid coils should be mounted with the B-plus and ground ends toward each other. The mixer plate coil form is mounted directly to the chassis, but the detector grid coil form is glued in the circular recess in its trimmer condenser and the latter is mounted on the chassis with two stand-off bushings. In some later models this coil and condenser were mounted on an angle bracket to enable adjustments to be made from the top of the set without removing the receiver subchassis.

It is suggested that the builder beg, borrow or steal a grid-dip meter for aligning the receiver. Although adjustments may be made on a received signal there are variables which make initial adjustment in this manner rather difficult.

The tuning of the r.f. plate and mixer grid circuits is not varied with the local oscillator, so the bandwidth of this coupling circuit must include the whole two-meter band. Each coil is preadjusted by a grid-dip meter to resonate at 146 Mc. by itself, with the other coil detuned. When the two coils are placed close together and in line, the bandwidth will be about right.

The two i.f. coils are adjusted according to the same principle. First, with the link pulled away from one coil so that coupling is negligible, the detector grid coil is tuned to match the resonant frequency of the mixer plate coil. Then the coupling is increased just to the point where some broadening of the combined response (measured at either coil) is apparent.

Continuing with the grid dipper, the oscillator is made to resonate in the 120–130-Mc. range by means of its trimmer. The oscillator injection coupling link cannot be set by the grid-dip oscillator, so at first it may simply be placed so that the one turn at each end is closely linked to the grounded end of the mixer grid and oscillator coils.

When voltage is first applied, check to determine whether or not the r.f. amplifier is oscillating. An absorption-type wavemeter will provide sufficient indication for this test, or the plate current to the stage may be checked for any sign of variation. Be sure that the grid circuit of the amplifier is loaded. A dummy antenna consisting of a resistor equal to the antenna line impedance will do. Should the circuit show a tendency to oscillate try removing the by-pass condenser from Pin 7 of the 6AK5. (The circuit should be wired with a by-pass and 150-ohm resistor on Pin 2 and a by-pass on Pin 7.)

Tests have indicated that little or no quench-frequency filter is required in the detector plate circuit. However, should the builder desire to install such a device, a 2.5-mh. r.f. choke bypassed at both ends with 0.002-mfd. works very well.

The receiver is now ready to tune for signals. It should perform well enough for general purposes with no adjustments other than those outlined above. If the builder desires, however, improved performance may be obtained in some cases by listening to weak signals and making careful adjustments of the oscillator injection link, the i.f. coupling link and the detector grid tuning. Best sensitivity occurs when the detector is loaded so that it requires about 30 volts on the screen to begin regeneration, the required loading being obtained by increasing the i.f. coupling gradually and retuning the detector grid coil carefully.

\[\text{Receiver subassembly of the Livingston portable. The r.f. end is at the left.}\]
Tests with many receivers of this type have indicated an ultimate sensitivity equal to, and sometimes better than, an SCR-522 with a rebuilt front end.

**Transmitter**

The transmitter circuit has been adequately described in previous QST articles. The first half of the first 6J6 operates as a 24-Mc. overtone oscillator, and the second half doubles to 48 Mc. The second 6J6 is a push-pull tripler to 144 Mc., and the third operates as a neutralized push-pull amplifier at the output frequency.

Most 8-Mc. crystals will operate successfully at the third overtone, but it should be kept in mind that the resultant frequency may not be exactly three times the frequency marked on the crystal. If a 24-Mc. crystal is available, it can be expected to produce somewhat greater output and at its doubled frequency.

Final neutralization is done with two pieces of 75-ohm Twin-Lead, cut as required for proper capacity. This arrangement has the drawback of requiring some selection of tubes for the final, because different 6J6s vary considerably in capacitance. Fixed neutralization was selected, however, because it is much easier to install the Twin-Lead than any variable condensers, and because it was found that by selection procedures outlined later it is usually possible to find several tubes that will function properly in the same socket without reneutralization.

The three split-stator variable condensers are made by modifying ordinary single-section "APC" trimmers obtainable on the surplus market. With a fine coping saw or jeweler's saw cut half the stator plates free from one of the stator support rods. Cut the small portion of the stator plates where they attach to the supports. Then cut the remaining stator plates free from the other support rod. The plates should be cut from each side in sequence, so that if there are six plates, for example, plates 1, 2 and 3 will be cut from one rod and plates 4, 5 and 6 from the other. If there is an odd number of stator plates, remove the center one entirely. Clean out all burrs and excess metal, and sight through to make sure no plates touch as the rotor is turned. Make sure that the manufacturer has not stripped the support rods together, as these rods are now separate terminals. Finally, make a ground connection from the rotor contact spring to one of the two metal mounting blocks.

The modified condenser requires some care to

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Fig. 3 — Schematic diagram of the transmitter portion of the portable station.
C₁ — 30-µfd. paddler, APC type.
C₂ — Similar to C₁, but modified for split stator — see text.
C₃, C₄ — 25-µfd. APC-type paddler, modified for split stator, as above.
C₅ — 17-µfd. ceramic.
C₆, C₇ — 27-µfd. ceramic.
C₈, C₉ — 0.06-pf. disk ceramic.
C₊ — Neutralizing capacitors of 75-ohm Twin-Lead — see text.
R₁ — 47,000 ohms, ½ watt.
R₂, R₃ — 33,000 ohms, ½ watt.
R₄ — 1500 ohms, ½ watt.
R₅ — 5000 ohms, ± 5 per cent, ½ watt.
R₆ — 100 ohms, ± 5 per cent, ½ watt.
R₇ — 3500 ohms, ½ watt.
R₈ — 5600 ohms, 1 watt.
R₉ — 4700 ohms, 1 watt.
L₁ — 19 turns No. 20, ⅛-inch diam., 1⅛ inch long, tapped 4 turns from crystal end (B & W Miniductor No. 3003).
L₂ — 13 turns No. 20, ⅛-inch diam., ⅞ inch long, center-tapped (B & W Miniductor No. 3003).
L₃, L₄ — 6 turns No. 14, ¾-inch diam., 1 inch long, ⅛-inch space in center, center-tapped.
L₅ — 4 turns No. 20 push-back, ⅜-inch diam., close-wound, center-tapped.
L₆ — 3 turns No. 20 push-back, ⅜-inch diam., close-wound.
J₁ — Test-point pin jack.
J₂ — Output fitting (RCA phono jack).
P₁ — 4-pin miniature plug (Amphenol 71-43).
RFC₁, RFC₂ — Single-layer r.f. choke (Ohmite Z-114).

Avoid overheating when soldering the coil to the support rods, else the stator plates will come loose. They stand up well under use, however, and are considerably less expensive than the commercial split-stator condensers. If the latter are desired, E. F. Johnson types 11MB11 and 9MB11 may be used in place of the split APC-50 and APC-25, respectively.

Sockets should mount under the chassis to insure clearance for the tips of the tubes. A solder lug is fastened under each socket nut to facilitate grounding the heaters and cathodes, and a small insulated terminal post is mounted on the center collar of each tube socket for terminating the B-plus leads and the ends of the dropping resistors and chokes for each stage. Coupling condensers are of the tubular ceramic "dog-bone" type, and by-pass condensers are disk ceramics.

The line-up job falls into two parts: the production alignment when the unit is first completed, and the final tuning that is done whenever the frequency is changed or a new antenna is used.

When a number of units are being constructed, it is desirable to set one man up to do the production alignment on all units as they are finished. He should, if possible, be equipped with a good grid-dip oscillator, not only to set the coils on frequency in the first place but also to use as a detector for observing progress of the signal. A 0-100 microammeter is also helpful, as well as the 0-1 milliammeter which will be used later on for final adjustments. Lacking this equipment, it is possible, with some care, to do the job with an ordinary multimeter by measuring plate currents of the individual stages.

The first alignment step is to adjust the first three stages for maximum grid current in the final. This is done with the final plate lead disconnected and with not over 150 volts on the remaining plates. The final grid current is measured with a sensitive meter connected to the test jack and chassis, and a reading of about 25 microamperes should be obtained with about 120 volts on the exciter stages. The following points should be kept in mind:

1) There may be quite a difference in feedback requirements of various 8-Mc. crystals, so try several others if the first doesn't work.

2) The oscillator condenser must be set on the low-capacity side of resonance for stable operation. Tune from high to low capacity until oscillation starts, then go a little farther. Check for proper adjustment by applying plate voltage intermittently to see if oscillations start readily. Adjust the position of the tap only if necessary to insure easy starting but no self-oscillation. Recheck the oscillator tuning after the doubler has been tuned.

3) No final grid-current reading will be obtained until all circuits are pretty well in line. Meanwhile, a sensitive wavemeter can be used to detect the desired signals, or the stages can be
tuned by watching for slight dips in plate current. The usual pilot bulb and loop is not sensitive enough when the unit is working at low voltages.

4) When some final grid-current reading is obtained, reseal all stages and adjust the coupling to the final grid (retune the tripler plate each time coupling is changed) to get the greatest reading. The final plate should be completely out of resonance when taking this reading.

The next step is neutralization and selection of suitable tubes for the final. Start with about 13/4 inches of Twin-Lead on each side, exclusive of the length that is separated for connection to the tube pins. Tune the final condenser and note the dip in grid current as the final goes through resonance. At first the dip may be 90 per cent of the original total grid current. Snap off about 1/2 inch from each capacitor and reresonate the final plate condenser, continuing until the dip in grid current is only about 10 per cent of the total grid current.

At this point it is desirable to select tubes for the final. Try all the 6J6 tubes available in the final socket, noting how much the grid current dips for each one. If there are two or more that show almost identical performance, reserve these for use as regular and spare in the final. If no two act alike, select one in about the middle of the range observed, remembering that it may be necessary to rereutralize if the tube is changed.

Continue neutralization with the selected tube, until there is no dip in grid current. Cut less than 1/4 inch at a time off the two in the latter stages of the process. After neutralization is completed, replace the B-plus connection to the final, and the rig is ready for final checks.

Final checks are made with the entire rig assembled, and with the antenna or dummy load connected. Insert an 0-1 milliammeter between the test jack and ground, and start with the regeneration control off, which cuts in the test resistor to protect the final tube. Oscillator and multiplier stages are tuned for maximum meter reading, and the final plate for minimum. Then, turn up the regeneration control to cut out the test resistor, and touch up the tripler and final tuning. The meter reading should be in the vicinity of 0.6 or 0.7 ma. with a supply voltage of about 200 volts. The first time these tests are made it may be necessary to move the output coupling link to get the proper operating current, but after it is once set it need not be changed for most antennas. In computing power input, consider a full-scale reading of 1 ma. to represent 50 ma. of final cathode current, and subtract about 7 ma. from the cathode current to obtain plate current.

Adjustments of final tuning should be made whenever the transmitter frequency is changed or whenever a new antenna is to be used, to insure against loss of tubes by running them off resonance. Much about the performance of the rig can be learned by loading it into a 6-volt 250- year, pilot bulb (blue bead) according to the procedures described above. It should light this bulb almost to full brilliance. When modulation is applied, the bulb should get brighter; if it goes dim instead, the final neutralization or the tripler tuning are incorrect, or the coupling to the amplifier is too great.

### Power Supply

The power supply required for this unit is somewhat smaller than that commonly used for mobile rigs. The basic drains with the average small vibrator supply are as follows:

- **Receive Position**: 40 ma. at 300 volts
- **Transmit Position**: 120 ma. at 220 volts
- **Heaters**: 2.6 amp. at 6.3 volts

The voltages given above are to be considered maximum voltages; a power supply that delivers 220 volts at 120 ma. should have sufficient regulation to stay below about 300 volts when the load is reduced to 40 ma. Furthermore, it is essential that no more than 220 volts be applied to the transmitter. The rig will function satisfactorily on as low as 150 volts.

Surplus PE-101-C dynamos were used quite successfully for these units. Designed for 400-volt output with a 12-volt system, it gives the required 200 volts when the two primary windings are connected in parallel and used on 6 volts. With this arrangement, the total battery drain is about 8 amperes.

It will be noted that Pin 4 of the power plug becomes connected to the ground when the volume control switch is turned on. This is intended for the operation of a relay which can be associated with the power unit to turn it on and at the same time to connect 6 volts to the filament lead which enters Pin 2. It is not recommended that this switch be used in place of the relay, because it will not carry the required primary currents.

### Conclusion

These units have been used quite successfully for service coverage over a radius of 5 to 10 miles with a fixed control station at the central head-
How a C.W. Traffic Net Operates

Handling Traffic Is Easy . . . and Real Fun!

BY WILLIAM G. WALKER,* W3NUG

No doubt many of you who work 80 and 40 meters have often wished you could handle traffic but after listening to a net have said to yourself, "I don't understand what they are doing and besides they are going too fast for me."
Well, relax and read farther; you'll see how simple their procedure is and how their use of directive signals gives the false impression of high speed.

An amateur traffic net is just a group of amateur radio stations whose operators mutually agree to operate on a single frequency, called the net frequency, under the direction of one station, the Net Control Station (NCS). When in operation such a net is a directed net.

During a directed net session the NCS is in supreme command and no station transmits unless directed to do so by him. Net stations communicate with each other only to transact business authorized by the NCS. This temporary surrender of freedom of action by all net stations is necessary in the interest of expediting the procedure of the net.

The NCS calls the net into session at its scheduled operating time by a short CQ (with an identification such as WPA for Western Pennsylvania Net). Barring unavoidable delays, net members are expected to be on hand at the scheduled time so that a complete listing of the traffic to be handled can be made immediately.

Under today's operating conditions you should either have exact-frequency crystals for the net in which you desire to operate, or a stable VFO. Any power over 30 watts is satisfactory. (In an emergency, use whatever you have.) If you use a VFO, the best method of setting it zero beat with the NCS is to tune him in, turn off the beat oscillator in your receiver, hold the key down (with only the VFO in operation) and set the zero beat between the NCS and your VFO to zero. Then turn on the b.f.o. and the rest of the transmitter, and assuming that the amplifier stages of the rig have already been tuned close to the desired frequency, you are ready to go. (Every station should have posted a list of dial settings vs. frequencies to permit tuning up before going on the air.) If your VFO blocks the receiver beyond the possibility of getting a beat with the signal from the NCS, you can tune him in (with b.f.o. on) to zero beat, and then zero beat your VFO; this is not quite so accurate as the first system, but will be entirely suitable.

Break-in is a "must" these days. Simply use a separate receiving antenna and key the crystal or VFO with protective bias on the following stages. Leave your receiver on all the time and don't worry about it. Remember, the first-stage tuned circuit will accept the same amount of energy from the antenna, whether the voltages are applied or not. You may want to bypass some of the energy from the receiving antenna to ground through a small neon bulb, or you may want a noise limiter on the receiver output, but let your operating experience dictate what you need. A monitor is not absolutely necessary for net operation since you always send and receive on the same frequency.

Before attempting to check into a traffic net you should become familiar with the most commonly used International Q signals, the QN net signals, and the frequently used abbreviations. The Q signals are contained in every Handbook. The QN signals are used principally by amateur traffic nets. The distinguishing letter of each QN signal usually is the initial letter of a word closely connected with the meaning of the signal, some of which follow:

QND Net is directed.
QNF Net is free.
QNH Your frequency is high.
QNI Report (or this station reports) into the net.
QNI: Transmit your message(s) for ________ to ________.
QNL Your frequency is low.
QNR Answer ________ and receiver traffic.
QNX Station is excused.
QNY Shift to another frequency.
QNZ Zero beat with NCS.

The most frequently used abbreviations are: AA — all after, AB — all before, WA — word after, WB — word before, B — more to follow, BN — between, C — yes, N — no or no more, TU — thank you, SU — see you, BK — break in.

At net time, while the NCS is transmitting the net call-up, each station sets its frequency to that of the NCS. As the preliminary call ends, a member in the net checks in simply by sending only the call of the NCS; when he receives a "BK,"

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* 124 Serrano Ave., Pittsburgh 16, Penna.
1 See ARRL's Operating an Amateur Radio Station. This booklet is available to League members gratis upon request and to nonmembers at 15 cents per copy.
be signs and then indicates what business, if any, he has for the net. A station with no traffic would simply say QRU. A station with traffic would state the number of messages (QTC) and the destination of each. The NCS notes this information in each case, acknowledges it, tells the station to wait and then listens for additional reporting stations. When all stations have checked in, the NCS directs the orderly distribution of traffic. Often he will tell two stations with traffic for each other to "down ten" or "up five," indicating they are to shift frequency by that amount, handle their traffic, and return to the net. Meanwhile the NCS continues to do business on the net frequency, either soliciting calls from late-arriving member stations or directing the exchange of additional traffic on the net frequency itself. A station with no traffic is usually kept on a stand-by basis until it becomes apparent to the NCS that there will be no traffic from others for his city or immediate area, at which point he is usually released from the net. It is a good idea to have a regular policy as to how long a station remains in the net if there is no traffic for him.

Let us now assume that we are monitoring a session of an actual net, in this case the Western Pennsylvania Net or WPA. Starting with the call-up the session will proceed approximately as follows with W3NUG acting as NCS.

(NCS) CQ WPA CQ WPA DE W3NUG QNZ CQ WPA CQ W3NUG QNZ CQ WPA CQ WPA DE W3NUG QNZ BT QND QNI QTC? R

(Stn. 1) W3NUG

(NCS) BK

(Stn. 1) DE W3MIZ QRU AR

(NCS) W3MIZ R AS

(Stn. 2) W3NUG

(NCS) BK

(Stn. 2) DE W3GEG QTC THREE 1 PGH 1 CALIF 1 LLL AR

(NCS) W3GEG R AS

(Stn. 3) W3NUG

(NCS) BK

(Stn. 3) DE W3NRE QRU AR

(NCS) W3NRE DE W3NUG R CAN U QNI 3RN7 K

(W3NRE) C

(NCS) R TU DWN TEN QNR W3GEG CALIF ES

(W3NRE) R

(W3GEG) R

This means that W3NRE has signified that he will be able to check into the Third Regional Net, 3RN, at a later hour and will handle any traffic going from the WPA net to the Third Regional Net. Also W3NRE and W3GEG have been ordered to move to a frequency 10 kilocycles below the net frequency to clear part of W3GEG's traffic.

To indicate that he is now ready to receive more stations into the net the NCS may call CQ WPA again or he may just stand by. Let's assume that no other stations check in and that W3MIZ who checked in without any traffic is still standing by. The NCS may then say, W3MIZ QRU QNX SK DE W3NUG. W3MIZ acknowledges by saying SU SK W3NUG DE W3MIZ.

Immediately after W3NRE and W3GEG have completed their assignment they will again report to the NCS in the following manner:

(W3NRE) W3NUG

(NCS) BK

(W3NRE) DE W3NRE

(NCS) R AS

(W3GEG) W3NUG

(NCS) BK

(W3GEG) DE W3GEG

(NCS) R QNK PGH QRV K

W3GEG then proceeds to send his Pittsburgh message to W3NUG.

After a final CQ to determine if there are any other stations waiting and finding none, the net will probably be freed something like this: WPA DE W3NUG QRU QNF 1929 SK DE W3NUG.

It is a good idea to copy the calls of all stations checking into the net and the traffic they report to the NCS. This gives you an idea of what you may be expected to do and avoids the delay that results when it is necessary for a station to ask questions.

If the NCS does not appear on the frequency at net time, either a previously-designated station or any other station in position to do so will assume the duties and begin the call-up, usually not later than three minutes after scheduled time. In the event that the regular NCS is able to enter the net later the alternate generally retains control to avoid the loss of time and confusion which would result from a transfer of control in midstream.

Obviously not all nets will use exactly the same procedure but in most cases you will find that when they deviate it is because they have worked together for some time and have simply dropped out some of the signals used above. A few minutes listening should indicate to you their procedure if you must put your traffic into their net. Generally section nets use the complete procedure and it is recommended that you put your traffic into your own section net.

(Continued on page 125)
Civil Defense Keynotes 1951 SET
AREC Members Put On Another Impressive Performance of Emergency Communications in Fifth Annual Test

BY GEORGE HART,* WINIM

Surveys and analyses of reports by Emergency Coordinators on the 1951 Simulated Emergency Test held October 13th-14th, indicate that there was some improvement over last year’s performance. Although the number of reports received in 1951 (214) was almost exactly the same as the number received for the 1950 SET, statistics show an increase in all other particulars.

Perhaps the outstanding feature of the 1951 SET was the amount of public interest in this activity. Practically every report included a newspaper clipping of one kind or another, and before the week end was over the press was after us for vital statistics on national participation. Even two weeks after the SET, we could only guess at this, since some ECs did not make their reports for months after the event.

This article is not intended as a boost or a glorification of the Amateur Radio Emergency Corps. It is rather a factual report of the 1951 SET, intended to show us exactly where we stand in the emergency and civil defense picture. It is the report to the fraternity by your National Coordinator, indicating the status of the AREC, without embellishment or padding.

Facts and Figures

There are things about a national survey of the SET that can be added up, averaged, and expressed numerically. These things can go in the record book as something to shoot at in future years. But there are other less tangible factors, such as esprit de corps, EC leadership ability, equipment performance and cooperation of community officials which are not always reflected in the dry analytical expression of how many participated, how many mobiles, total points, etc.

The intangible factors in a local AREC or-

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The Oak Ridge gang used an emergency-powered BC-655 and PE-103 on 75 meters (left) and a BC-348 with an Oak Ridge converter (see p. 48, July 1951 QST) to monitor 6-meter mobiles until a simulated power failure. The operators, W4CXY at left, W4RO on the right.

QST for
Traffic

In previous years, every AREC member participating in the SET was asked to originate a message to ARRL Headquarters. This always gave rise to a tremendous flood of traffic headed toward Connecticut, giving many Connecticut amateurs a golden opportunity to make BPL in the month of October, to say nothing of enhancing the traffic totals of other traffic-handling amateurs who undertook to relay some of these messages. All in all, it helped to give the SET the aspect of a start-of-the-season awakening in both emergency and traffic circles.

W6ZZK operates the key of a small rig set up in the field, a part of the field message center in the Eureka, Calif., SET. The gent looking on is Col. Munroe, Eureka's civil defense head.

In 1951, in view of several comments that this mass handling of traffic was not realistic of a situation which would obtain in an actual emergency, the traffic-handling phase of the SET was done a little differently. Instead of sending messages to Headquarters, AREC members were requested to originate messages in standard form to transmit to their ECs on the local emergency net. At the end of the activity, each EC would then summarize the list of participants and any other pertinent facts in a message addressed to this Headquarters. EC reports on the SET have indicated that 172 such messages were originated by ECs for Headquarters. 152 EC "radio reports" were received here, many from ECs who did not submit subsequent written reports, which indicates that there were more participants in the SET than are actually reflected in the above figures.

No preannounced schedules were published for the 1951 affair, in order more closely to simulate conditions as they would exist in an actual emergency. Nevertheless, Red Cross stations W3PZA, W9DU4 and W6CWO were active as usual on the National Emergency and Calling Frequencies (3550, 3875, 7100, 14,050, and 14,225 kc.). Some 450 messages were handled by these stations and the several other amateur stations in their vicinity who were assisting. This is a slight decrease from the previous year, not indicating necessarily that activity was down, but rather that more emphasis was placed in 1951 on local drills and handling messages at that level, in closer cognizance of what the actual emergency situation might be. Several networks of the ARRL National Traffic System maintained special sessions during the SET week end, clearing most of the traffic at that time and cleaning up the remnants during the regular sessions on Monday and Tuesday. Some traffic routed by other means was quite late in arriving.

Civil Defense Aspects

In those areas where civil defense is well organized, local ECs contacted c.d. officials to put on impressive demonstrations of the versatility and potential of amateur radio in a civil defense emergency. In Cincinnati, the Queen City Emergency Net took advantage of a simulated bombing attack on Anderson Township on September 30th. CAP planes dropped sacks of flour to make a very realistic test, and the QCEN mobiles went into action to show what amateur radio could do. In the Chicago area, 128 amateurs turned out 61 mobile units for a civil defense demonstration which brought high praise, but EC W9SXXJ says they can do better. In Orange County, Texas, another simulated atom bomb attack was put on by the CAP on September 23rd, with EC W5NMV in charge of all communications. In Oklahoma City a civil defense emergency was conducted with full cooperation of state and local civil defense, state highway patrol and other agencies concerned; this one lasted two days. In New York and New Jersey, statewide demonstrations of amateur radio civil defense communications were conducted.

These are but a few of the many civil defense exercises conducted over the SET week end or at other times in connection with the SET. On the other side of the ledger, some ECs reported no interest in civil defense and simulated natural disasters such as tornadoes, wind and rain storms, earthquakes and industrial explosions.

In both civil defense and natural disaster exercises the Red Cross was conspicuous by its high degree of cooperation, as usual.

Publicity

Almost every report contained at least one clipping, and most of them contained several, indicating not only that ECs paid close attention to this phase of the test, but also that there is a high degree of public interest in your annual SET. Although our suggested wording was used in a good many cases, modified to suit the local situation, many ECs found it desirable to use a complete new spread, with pictures and by-lines. The SET, like the Field Day, is fast becoming (Continued on page 150)
Keeping Up with the Girls

A picture of W09GME operating her rig was published in a Chicago newspaper in conjunction with mention of one of Grace's contacts with the now famous Captain Kurt Carlsen, W2ZXM. The picture prompted a barrage of telephone calls from girls interested in learning more about amateur radio. And in Gloucester, Mass., on February 8th, W1RQZ, acting as representative of the Deep Sea Drag Net of New England, presented Captain “Stay-Put” with a DSMN certificate and made him an honorary member of that net. Earlier, who recently merited the MM certificate, had previously contacted the Captain on the air several times. . . . If W6NZ can glean time in between producing and “enconing” TV shows, she hopes to publish an amended version of the YLRL Callbook. The original book, written in 1949 by Lenore and W6YRL, gives the name, call, address, and a brief account of each YLRL member’s amateur activities, hobbies, and other interests. . . . W9PQH’s first QSO was with KZ3GO. Both YLs are just thirteen years old! Other junior YLs are W6IPJ, 12, and Susan, W4TAV, 13. Susan is NCG of the KYN and the Ky. C.G. Net. . . . WIZR handles traffic for MARS — Edith has been licensed since 1917.

. . . QSL Bureau duties leave W9FWR with limited time to operate ten and eighty, but Mary Ann finds considerable satisfaction in dispatching eagerly-awaited QSLs. . . . On January 31st, the YL’s Chicago Club was organized. The initial meeting was held at W6PZO’s QTH. Interested YLs please write to W9GME. . . . W3NWX is corresponding secretary of the Western Pennsylvania Emergency Net. . . . VE0MP operates between waiting on customers in her “little cracker barrel store” in Chandler, Alta., population forty. On mail days the whole community gathers at her store, and with colorful human interest supplied by the townspeople and the “thrills” she encounters with her rig, Maude claims no dull moments. . . . W1FVJ

(Continued on page 154)

The YLRL New York City Club held its annual luncheon and installation of officers in January at the Red Coach Inn, New York City. L. to r., seated: W2OVY; W2GOK; WN2IGA (vice president); Helen Zaparni (treasurer); W2BEO (president); W2QWL (ex-president); W2RAQ (secretary); Middle row: W2UXM; Jean Merten (of L. I. Group); W2IZX; Mae Gallup; W2PUY; Eva Hudson; W2MGC; W2OWL. Back row: Hazel DuBarton; W2QP; W2PZA; Ruth Schmitt.

April 1952
Determining the proper values for a pi-network tank circuit involves a good deal of computation, as compared with a simple tuned tank. However, for the special case where the network is to couple a tube to a flat coax line, much of the information can be presented in a few curves. To use them it is necessary to know the value of resistance that the power tube must see in order to work properly under the chosen operating conditions, or else to make a reasonably close estimate of it. Also, it is more convenient to work with reactance than with inductance and capacitance, since the former is independent of frequency. The reactance values can easily be converted by the usual formulas:

\[ C_{\text{mu}} = \frac{159,000}{X_c f_{Mz}} \]
\[ L_{\text{mu}} = \frac{0.159 X_L}{f_{Mz}} \]

An approximate formula for the tube load resistance is:

\[ \text{Load resistance} = 500 \frac{E_B}{I_B} \]

where \( E_B \) is the plate voltage and \( I_B \) is the plate current in milliamperes. An exact formula cannot be given because the actual load resistance required under given operating conditions must be determined from the tube characteristic curves, but the formula given is close enough for ordinary amplifier operation.

Fig. 1 gives the values of input and output reactance needed when the \( Q \) (ratio of tube load resistance to the reactance of the input condenser of the network) is held at 10. The curves are carried only as far as 140 ohms for the output reactance, since higher values can easily be obtained with a 300-\( \mu \)fd. variable condenser even at 3.5 Mc. When the \( Q \) is 10 (or more) the reactance of the coil averages 25 or 30 ohms higher than the reactance of the input condenser. It should be noted that the output reactance becomes infinite — that is, the output capacitance required is zero — when the ratio of actual load resistance to tube load resistance is equal to the square of the \( Q \). Since the square in this case is 100, the output capacitance is zero for a 50-ohm line when the tube load is 5000 ohms. A higher tube load resistance cannot be "matched" unless the \( Q \) is increased above 10. Corresponding conditions obtain with the 75-ohm line when the tube load is 7500 ohms.

Fig. 2 shows the values required when the reactance of the output condenser is fixed at 60 ohms, a median value for both 50- and 75-ohm lines, and one that is useful over at least the range 35 to 100 ohms when the inductance is continuously adjustable. The approximate \( Q \) variation for various tube load resistances also is shown. If a larger \( Q \) is wanted for low tube load resistances (low ratios of plate voltage to plate current) it can be obtained by reducing the reactance of the output condenser. This in turn requires reducing both the input reactance and the coil reactance, as comparison of Figs. 1 and 2 for values of tube load resistance below 3000 ohms will show.

The same considerations hold when a larger \( Q \)
than that shown in Fig. 2 is unavoidable, because of excessive minimum capacitance on the input side of the network. With a tube like the 813, for example, it is difficult to keep the minimum capacitance below 40 μfd, including the plate-to-screen capacitance, minimum capacitance of the tank condenser, and strays, which at 23 Mc. is a reactance of only about 140 ohms. Since the tube requires a load between 4000 and 6000 ohms, depending on the operating conditions used, the minimum possible Q may be well over 30. This means that the r.f. current circulating in the tank is much larger than is desirable—a state of affairs that is not unique with the pi network, since exactly the same thing applies with the conventional tank. With either type of circuit the tank losses in such a case reduce the over-all efficiency very materially, although the tube itself may be operating with just as good plate efficiency as on lower frequencies.—G. G.

"New Theories" on V.H.F. Wave Propagation

Less than two weeks apart, technical reports have been received from the National Bureau of Standards disclosing two "new" concepts of wave propagation in the v.h.f. range. The first concerns that worst-kept of all secrets, the "big signal" on 49.8 Mc. that 50-Mc. hams the country over have been monitoring for some months. Permission to publish the details of this project has not yet been given, but it is certainly no secret to hundreds of 50-Mc. enthusiasts. Round-the-clock reception of this high-powered transmitter at distances of 1000 miles and more has demonstrated that such consistent DX is not many decibels removed from the limits imposed by the 1-kw. limitation on amateur work.

Because power output in kilowatts and an antenna of rather large proportions were required to demonstrate this capability of the 50-Mc. region to provide uninterrupted communication over 1000-mile distances, it is not surprising that this characteristic eluded hams who have operated on 56 and 50 Mc. over the years. The other NBS report, however, concerns something that v.h.f. men have known for a dozen years or more; namely, that the "line-of-sight" characteristics assigned by many propagation authorities to the frequencies above 100 Mc. represent a very considerable underestimate of the facts of life. This lack of understanding of the true nature of v.h.f. wave propagation was the principal basis for the too-close reassignment of television channels that resulted in the present mix-up in TV allocations.

For years it was assumed that propagation above about 100 Mc. was "optical" in nature; that waves traveled in essentially straight lines, with the reliable range being just slightly beyond the optical horizon. A figure was set for this that made the earth's radius, for propagation purposes, four-thirds the actual radius. Propagation beyond this limit was ascribed to "anomalies," "inhomogeneities" and other terms that seem to delight propagation people everywhere.

As long as low-powered transmitters, relatively insensitive receivers, and dipole antennas were used, observable weather effects could, in fact, account for just about every example of communication beyond the confines of the "four-thirds radius" area. But when more efficient gear began to be employed it became fairly obvious that something more than unusual or accidental atmospheric effects were involved in the day-to-day coverage that began to be demonstrated. It has been well established by leading 144-Mc. amateurs, for example, that consistent communication is possible, even over fairly high mountains, from low-lying locations on either side as much as 100 miles apart. Daily operation in all kinds of weather over 200-mile paths is not uncommon. It takes something more than weather effects to explain this sort of thing.

The "blobs of air" of the Booker-Gordon hypothesis represent the most reasonable explanation we've had to date, but much experimental work is being done by NBS and others to develop a more exact theory. Experiments are being conducted with the new NBS transmitters on Cheyenne Mountain in Colorado and highly sensitive receiving equipment placed on the sloping plains east of the site. The implications are many, perhaps the foremost commercial importance being attached to the proper interpretation of this theory in connection with TV allocations, and to a lesser extent in all allocations covering the v.h.f. portion of the spectrum.

To the amateur it is important to note this ever-increasing scientific and commercial attention being paid to territory that was not so many years ago the almost exclusive stamping ground of a few hundred amateur experimenters. At least one of our number, the late Ross Hull, was able to make important contributions to scientific knowledge. Many of the rest of us, merely by making large-scale use of frequencies once thought to be commercially valueless, have demonstrated that there are many things as yet not wholly understood by the better scientific minds in the business. By careful observation and reporting of propagation peculiarities we can still aid in these investigations.—E. P. T.

Strays

A combination of disturbed radio propagation conditions and other circumstances resulted in the performance of a ham "scoop" by W8SYN/KG6. By amateur radio he provided Australia's public with its first news of the passing of the late King George VI hours before the BBC's report arrived.—Guam Daily News via W38GK
Stretching the Junk Box

How To Make Use of Leftovers

BY ROBERT G. SEYMOUR,* W9WJS

A recent article\(^1\) in QST described in some detail the things to be taken into consideration when building a transmitter. While the information given was very useful, it did not treat what is often more of a problem to many of us; that is, how to stretch what we find in the junk box to cut the cost to a minimum.

Any transmitter I build is a modification of some original circuit taken from a handbook or magazine article. Let us consider the procedure after deciding to build the same transmitter which was described by Goodman in the original article. We have decided that this rig is the one that will most closely fit our needs and the one whose parts we most likely have on hand. We like the idea of including a crystal switch so a look through our stock of switches reveals that we have one that will do, but it has only three contacts. So, holding our breath we look in the tin can where we keep our dimes and quarters which we laughingly call "radio money." Having already looked in the catalogs we find that the money on hand is enough to cover the cost of a switch, providing no other new parts are required.

Laying aside the question of the switch for the moment, we go on to the other parts requirements. Small parts, such as resistors, are already on hand. Of course, they have been used in numerous other pieces of equipment and the pigtailed are a little short, but that problem can be taken care of by soldering on extensions. The values may not be just what the circuit calls for, but with a little luck we can get by with a few substitutions if they are fairly close. For instance, if we do not have a 47,000-ohm resistor a 56,000-ohmer might do. The only way to find out is to try it in the circuit. If the circuit calls for a 0.005-μfd. capacitor and one cannot be found in our stock of parts, a 0.004 will do — we hope. At any rate we can forget about the small parts until the rig is built and tested, then, if it does not perform the way the article says it should, we can start to suspect our substitutions.

Now we compare the larger parts listed for the circuit with what we have in the junk box. This rig requires two variable capacitors, both 300 μfd. After a little searching one is found, but it is only 150 μfd. However, by winding the coils properly, this can be used on 80 and 40 meters, which are the two bands to be used, anyway. But we still need another one. Shall we use the money to get a variable capacitor and forget about switching crystals? Well, let’s wait a while before deciding and go on to the other parts required.

What other parts do we need? Well, the circuit shows a 150-ma. meter. Now the only meter that does not already do constant duty is the one in the grid-dipper. Of course, that one has only a 1-ma. scale, but we could use it by winding a shunt for it. But now comes another problem. We do not have the coils specified in the diagram and will have to wind our own, and it will be much easier to wind them if the grid-dipper is in operation, especially since the capacitor on hand is not of the value specified. So we will dispense with the meter and use a pilot lamp instead. We know we are not going to exceed the FCC power limitation with a 6L6 and a pilot lamp will tell us when the circuit is tuned to resonance and tell us if the antenna is loading the circuit.

Now the only thing left is a couple of r.f. chokes, and, to and behold, here is a brand-new one. Wonder where that came from — must have swapped somebody something for it. That leaves only one choke that we need. Now let’s see — there were a couple of chokes in that portable rig that was built to take on vacation last summer. Won’t be needing it again until next year and, anyway, if this rig works OK, we can take it on the trip. So now we get out the destruction tools, a pair of cutters and screwdriver, and go to work on the portable. What’s this? Here is another variable capacitor, and just what we need. We do not know what the capacitance is but it tuned 80 in this rig so guess it will work OK in the new one.

We can now go back to the problem of the crystal switch. Everything else has been taken care of and the money is still in the tin can. Just

\(^*\) 567 Elm Grove Drive, Elgin, III.

\(^1\) Goodman, "How To Lay Out a Transmitter," QST, July, 1951.
how advantageous would it be to have that switch in the circuit? Well, with the switch we can QSY in a second or two unless we make a big change in frequency. If we do that we would have to retune the final and antenna tuner which would take — oh, maybe ten seconds. We could probably change crystals by hand in eight or ten seconds, and another ten seconds to retune if necessary. Of course, this is assuming that we can find the crystals, so we would have to make a point of keeping them handy. So, by using the crystal switch, we can save a maximum of ten seconds or so. Is it worth it? I don't think so. Besides, we will need a couple of beers while sweeping out the actual construction, and the "radio money" would come in very handy for that purpose.

The Layout

The next problem is how to fit the parts in and around the holes already on the chassis we found in the junk box. It would be nice to start out with a clean chassis, but we are already using parts that have been used and reused, so why change now?

The thing to do is to choose the chassis with the fewest holes, or the one with the holes most nearly in the proper places. Having done this, we begin. But wait — how about a panel? Let's look back at the article and see what has to be mounted on the panel. Just two tuning knobs, a meter and a key jack. Remember, we have decided not to use a crystal switch, so that will not have to be mounted. We are not using a meter, so the only things left are the two knobs and the jack. The jack and the pilot lamp can be mounted on the lip of the chassis, and the knobs can be mounted directly on the capacitor shafts. So we don't need a panel, and besides, we would have to do without a couple of beers if we wanted to buy one. No panel.

Now, using the available holes in the chassis, we start laying out the rig in the way it is to be constructed. Following the accepted practice of making all leads as short as possible, we can use most of the holes. If a hole does not line up where we want it, we can punch another one — one more won't make any difference in the appearance. But we try to use as many of the existing holes as possible because it saves a lot of work. We want to keep away from making any more large holes because we would have to borrow a socket punch, which, of course, we do not have.

Because we have used this system of utilizing existing holes, we do not have to worry much about the placement of the small parts. They will just have to go in the space available. One thing we must try to do, however, and that is to avoid placing the parts in more than one layer. The reason for this is that, if when testing the rig a change has to be made, the parts are much easier to get at if they are in only one or two layers.

Testing

Before turning on the power we check our wiring against the diagram to be sure we have made no mistakes. Remember that we have made some substitutions and that what may appear to be a mistake in wiring may not actually be so. Now we plug in the oscillator tube and crystal and turn on the power. Listen to the receiver on the frequency of the crystal. If we hear the signal from the oscillator, we plug in the 6L6 and the final tank coil. After a suitable warm-up we should get an indication on the pilot lamp. But the lamp does not glow. Well, let's try another 6L6 first. Oh, oh. We don't have another. Well, temporarily we can wipe the 6F6 out of the receiver. Now everything is fine, except the pilot lamp will not show a dip in plate current. So now we get out the grid-dipper and find that the frequency of the tank circuit is too low, so we remove a few turns from the coil and try it again. Now we get a dip in current and are ready to connect the antenna. The antenna seems to be loading up properly, so the only thing left is to check the quality of the signal in the receiver.

But now the receiver is inoperative because the output tube is being used in the transmitter. Let's see, the b.c. receiver upstairs has a pair of 6V6s in the audio, and we could probably borrow one without anyone knowing about it. So we get one of the 6V6s and put it in the transmitter, return the 6F6 to the receiver and check the signal. Everything seems to be working fine.

So now we have a new rig ready to try on the air and the beers that we bought with our "radio money" helped us get through the construction and testing without too much trouble.

SWITCH TO SAFETY!
Ten-Meter WAS Contest Results

Getting off to a slow start, the 1951 Ten-Meter WAS Contest moved into quick action on the second week end and saw some unusually high scores rolled up. The reason for the fast moving second week end was the short- and long-skip conditions that prevailed. Although the magic number 18 wasn’t reached there were many reports that all states were heard. Several entrants worked over 40 states and, as in the previous contests, location was not an important factor in ability to work out.

Out of 128 logs submitted, representing 53 sections, W7PUM, Warner Thompson of Arizona, bitted his last year’s high score, racking up 35,164 points, 806 contacts and 44 states. Highest total was worked by W6IYY, having 46 tallied. Other high scorers by call area were:

- W1AOQ 12,298
- W2TJY 36,410
- W3PQH 37,776
- W4PJU 63,600
- W5SFW 7,981
- W6BTE 7,370
- W8RXY 4872
- W9DRQ 4914
- W9HOM 5480
- W2YR 7206
- K1HBI 20,748
- KX4P 10,340

Scores

(Scores are grouped by Divisions and Sections. The operator of the station first-listed in each section is winner for that Section. Listings show score, number of contacts, number of states worked.)

ATLANTIC DIVISION

- Eastern Pennsylvania W3QFJ 3776 118-32
- W3QXY 2041 92-42
- W3QOR 805 29-17
- Maryland W3NOL 2926 101-25
- W3PKC 2125 88-25
- W3SQ 1026 87-18
- W3EG 4 2
- New York W2TJR 3416 104-38
- W3QWQ 2223 99-24
- W3FZ 1329 72-21
- W2FZQ 1056 39-24
- W2HXY 279 42-10
- W3QZ 209 35-17
- W3FXA 16 6-3
- Pennsylvania W3LX 2038 138-26
- W3NCF 1050 50-10
- W3QN 293 50-20
- W3DL 769 48-16
- W3KNQ 254 30-16
- W3QYJ 250 25-10

CENTRAL DIVISION

- Illinois W9NJE 630 42-15
- W9LME 392 26-15
- Indiana W8KLR 3072 128-24
- W8SR 117 37-12
- W8KXY 190 21-19
- Wisconsin W8QHI 3069 118-25
- W8VIA 149 35-4
- W8RXY 3472
- W9DRQ 4914
- W9HOM 5480
- W2YR 7206
- K1HBI 20,748
- KX4P 10,340

DAKOTA DIVISION

- North Dakota W8BPO 732 17-16
- W8BH 11 1-4
- South Dakota W8BLZ 1406 72-23
- Minnesota W9ANC 608 16-16

DELTA DIVISION

- Arkansas W5YV 714 12-17
- Louisiana W5KC 4000 160-25
- W5FXW 2025 121-25
- Tennessee W4NJE 1241 101-24

GREAT LAKES DIVISION

- Kentucky W4SMM 136 17-8
- Michigan W8RXY 1872 174-28
- W8NOH 1788 85-21
- W8CGL 1729 87-27
- W8STL 86 6-8
- Ohio W8QNR 4060 140-28
- W8VZ 2736 56-31
- W8QOD 1251 105-17
- W8PNJ 415 41-15
- W8PM 512 32-10
- W8AL 305 25-15
- W8RHR 98 12-8

HUDSON DIVISION

- Eastern New York W2DR 153 17-9
- New York City & Long Island W2KX 2210 90-28
- W2CLL 150 100-19
- W2HN 150 100-19
- W2NH 150 90-19
- W2TN 75 10-7
- W2BUJ 2050 18-25
- W2RQS 636 55-18

MIDWEST DIVISION

- Iowa W8SN 26 12-6
- Kansas W8HJ 948 137-40
- Missouri W8CNW 2328 104-22
- W8CVD 672 12-16
- Nebraska W8NR 2860 110-23
- W8NOV 91 15-7

NEW ENGLAND DIVISION

- Connecticut W1EIO 2852 102-26
- W1DQ 180 10-10
- W1DQ 155 11-5
- W1IC 90 10-5
- Maine W1FQ 1519 100-22
- W1XC 480 10-10
- Eastern Massachusetts W1NGD 7231 122-24
- W1RXK 1118 181-34
- W1TRN 1406 74-19
- W1PPL 994 71-14
- W1RIG 448 26-11
- W1LUM 900 10-10
- W1AQ 1228 28-39
- W1LJ 658 47-14
- Rhode Island W1BQ 2300 30-25
- W1AO 250 12-25
- W1A 10,070 205-38
- W1BP 301 35-18

NORTHERN WEST VIRGINIA

- Alaska KL7MF 100 12-8
- Idaho WTTN 8411 177-33
- W8QY 4770 196-35
- W8PQZ 3245 455-46
- Oregon WOUT 4155 305-41
- Washington W8Y 125 314-40
- W8PG 2720 105-40
- W8PHG 8850 180-29
- W8JTR 1474 67-22
- W8PQ 166 31-16

PACIFIC DIVISION

- Hawaii K1HBI 39,748 401-42
- K1HIU 1920 61-30
- Nevada W7KHO 15,380 356-43
- Santa Clara Valley W0BTE 19,260 429-45
- W0IYY 18,300 350-46
- East Bay W8YHI 1700 160-35
- W8DJO 5285 126-29
- W8JN 3210 104-30
- W8RRH 295 29-13
- W8ZJ 86 6-7
- San Francisco W6TVY 7932 232-35
- W6KHE 4725 135-35
- W6YQG 1625 75-31
- Sun Joaquin Valley W6VPS 14,212 325-44
- W6NCQ 5384 167-32
- W6KUK 3774 11-24
- W6KAN 2186 95-28

ROANOKE DIVISION

- North Carolina W4JP 1614 26-14
- Virginia W4KQ 874 52-17
- W4KFC 312 22-11

SOUTHERN DIVISION

- Eastern Florida W4PFI 6900 212-30
- W4TP 3795 118-33
- W4NYL 660 45-14
- W4YAT 502 31-16
- West Indies KPIFP 15,840 390-43
- KPKCF 15,525 145-15
- KPJE 756 36-21
- KP4KD 946 38-17
- Georgia KZ5CW 25 5-8

SOUTHWESTERN DIVISION

- Los Angeles W6XR 1050 45-24
- W6M 35,064 380-44
- W6PKU 2846 98-30
- Sun Diego W6ZY 11,631 277-12
- W6N 3435 145-50

WEST GULF DIVISION

- Texas W8SWE 7881 214-37
- Oklahoma W8TJ 3888 133-26
- New Mexico W8PF 7844 196-39
- W8NFX 7848 204-37
- W8ETO 4498 135-38
- W8QZ 4352 198-34
- W8STV 1050 50-31
- W8CA 750 50-15

CANADA

- Maritime VE1MK 336 21-14
- British Columbia VE7YR 7292 192-38
- VE7AAH 3712 126-99
- VE7XX 2600 100-25
- Saskatchewan VE8KRM 1586 72-19
- VE8OZ 1006 58-17
What is a Novice?

Ask this question of a low-frequency c.w. man and he'll tell you that a Novice is a high-school lad with a 6V6 or a modified ARC-5, struggling to salvage some QSOs from the mass of QRM between 3700 and 3750. Look at the occupancy of the 2-meter band and you find quite a different picture. There will be quite a few fellows between 145 and 147 signing WN calls, and many of them will be v.h.f. counterparts of the low-frequency version. They'll be running 522s, mostly, but they won't be having much trouble with QRM. Their problem will be to get enough contacts, and to develop their code speed and know-how so as to qualify for General Class permanence within a year.

There will be another sort of ham in both Novice categories, the experimenter; but the chances are that he is more numerous in the v.h.f. group. Like as not he knows his way around technically. He has a 2-meter converter that he built himself, and it may put the receiving gear of some of the more long-standing 2-meter hams to shame when it comes to either appearance or performance. His transmitter may be made of surplus components, but it is home-built, and it will be rebuilt and improved frequently as time goes on. He has a 16-element beam, or maybe even a 32-element.

His interest in 2-meter work is not a sideline or a temporary expedient. He's working the band for all it's worth, and he has some solid plans for increased power when he is over the hump on the code and can go up for the higher grade of license.

What is a Technician?

In many instances he is undoubtedly a fellow who tried for the General Class ticket and slipped on the code. He probably has a Novice license, too, and the Technician ticket may mean little to him except a renewable license and a callbook listing with a conventional call. But not always!

He may be an old-time ham, who tired of the somewhat repetitious nature of operation on the communication frequencies. He's willing to concede that working DX on 20 or 40 may be fun, but feels that the end doesn't quite justify the means. He likes to fuss around with equipment, and to do this to the best advantage it's necessary to work somebody once in a while, but talking is secondary to experimenting, as far as he is concerned. He may have a fairly well-equipped laboratory, and it's quite possible that the more active hams of the area come to him for ideas, and listen to his suggestions with respect.

Or he may be a newcomer, enticed into getting a ticket by the fact that none of us knows very much about hamming on the frequencies from 220 Mc. up. We have made only occasional passes at the amateur assignments higher than the 2-meter band; will it not be possible for a fellow who spends all his time there to do an outstanding job, even though he is just breaking into the game?

When you come right down to it, the new hams in our midst are not very much different from a cross-section of new hams of any year or decade. They may have gotten started a little sooner than they would have without the new classes of license, and there are undoubtedly quite a number who might never have taken the plunge, but the important point is that they represent growth, both actual and potential, in a field that has not seen as much growth as we would have liked in recent years. There are more hams using 144, 220 and 420 Mc. today, and that's good, any way you look at it!

New England 50-Mc men welcome G6DH at Lexington, Mass., March 1st. L to r:; Cal Hadlock, W1CTW; Arthur Jones, W1NWL; Ernie Grant, W1GJZ; Bill Coburn, W1ELZ; Ted Valpey, WA1TP; Denis Heightsman, G6DH; Ed Tilton, W1HDQ; Doc Farrar, W1CLS.

April 1952
February Doings

Fear of TVI may be a deterrent to v.h.f. activity, and certainly TV looking has cut heavily into evening operating, but the results of the increasing use of the one-eyed monsters have not been entirely on the negative side. Authors, tropospheric-refraction openings and scattered DX on Channel 4 may show on the TV screens sufficiently to send v.h.f. ops scurrying to their ham shacks.

So it was with aurora in February. Several of the reports received here from.grass-roots DXers on Channel 4 showed openings on Aurora Project stations. Some of the latter were so brief as to almost escape notice. The aurora was bright and exciting the night of 7 Feb. 4th, W2FIF, Glen Falls, N. Y., saw bright bands appear on Channel 4 which lasted an hour and a half. Seeing was not good, but the aurora was bright and exciting the north. No signals on 2, so he called your conductor on the landline. "Let's get started — the sky's lighting up!" As soon as the receiver warmed up at W1HDO we heard W2FIF buzzing in on line style, calling QO. We answered and back came, but much weaker, and dropping out rapidly. Soon the 'bunch range again, and the familiar voice said, "You've just used up the shortest aurora on record!" Five minutes later there was not a peep to be heard on either 50 or 144 Mc., other than local signals. Things were better on the 28th, when openings were noted over a wide area. Two-minute openings on W1ZT, W2WF, W2U7H and W3PMG show that DX was audible on that band from 6:25 to 9:27. An interesting angle on this one is that, though most observers reported clear skies and good visibility, nobody could see the aurora. There was moonlight at the time, but a bright auroral display would have been plainly visible, even so. W6ALU's reception of W6QIN on 50 Mc. is the farthest west reported on this opening.

The following night there was another dash opening around 6:40 P.M. EST. Apparently only W2FIF and W6ALU were quick enough on the draw to catch this one. Probably the best aurora opening of 1932 so far came on the night of the 23rd — and this was the time that practically every regular operator of 50 and 144 Mc. in Western Massachusetts and Connecticut was attending a v.h.f. dinner in Hartford! But the rest of the gang did right well, and while there are no details as to how things shaped up, the dash so far received is impressive. W6FKS was hearing a W4 on 144 Mc. as early as 3:15 to 3:30, but the main session started around 7:30, lasting almost to midnight.

Reports already received from W1BCN, W2ORL, W2FIF, W2U7H, W3PK, W3PAC, W6EP, W6FKS, W6ARN, W6BV, W9GCA, W6PK, W6VZP and W6HYV (Massachusetts to Missouri) give some idea of the extent of this one. Though 2-meter aurora signals are usually weak, this session brought in some 89 reports. Operators all across the territory affected were unanimous in reporting W4AO, Forsyth Church, Va., "the loudest sound I have heard this aurora." No phenomenal distances have yet been reported, but the considerable lists of calls heard indicate that we are gradually picking up new converts to this exciting game.

There was widespread 2-meter activity on this one, too, most of the year-round operators on both bands getting in some licks. For W6HYV, Pleasant Hill, Mo., it meant the opportunity to work two near-by states that he'd never been able to snag on ground waves.

So far as is known, no home-station QSOs have been made on 144 Mc. between Arizona and California, and this is not surprising in view of the terrain that lies between the active 2-meter centers in these two states. An interesting list of police station DX reported by v.h.f. operators in Arizona indicates that 2-meter contacts with Southern California stations should be possible at times, however.

On February 11th at around 11:30 A.M., Don heard a station signing KJMA 781, Stockton, through the maintenance station monitor of KOA 255, the Tucson Police, on 155.01 Mc. A brief exchange of calls between the two stations took place at 12:09 P.M. KJMA 781 is located in Brawley, Calif., 276 miles away. Their signal was strong enough to be heard plainly by the Tucson mobile units. Surely, the 144-Mc. band must have been open over a similar path at the time.

The v.h.f. get-togethers held intermittently at Oakville Lodge, near Toronto, are known far and wide for the interest and enthusiasm that is always in evidence. Your conductor attended one last fall, and can vouch for their excellence. At the suggestion of VESANY, the informal organization in back of these gatherings this year is named "The Southern Ontario and Western New York V.H.F. Group." Next meeting is May 10th at Oakville, with the v.h.f. men of Brantford, Guelph and Kitchener hanging out rapidly. Details of interest to all active v.h.f. men (and women) within traveling range. Each meeting features a technical talk, gab session, and the awarding of "The Order of the Bathurst Plug" to the perpetrator of the worst boomer observed on the v.h.f. bands since the last meeting. W3BSQN is the most recent "winner," having taken a trip to Buffalo during the week end of the V.H.F. Sweepstakes, after promising a high score in that activity!

Another group that is doing excellent work in promoting
Overtone Oscillator Tips

The economies effected through the use of overtone crystal oscillator circuits have caused what amounts to a major revolution in amateur v.h.f. transmitter design. Most users are well pleased with their results, but some run into difficulties now and then. W5FKE, Houston, Texas, says that he has used several versions with no trouble of any kind, but a number of his acquaintances have not been so fortunate. Examination of several oscillators that refuse to be crystal-controlled has convinced him that long by-passing leads are on the bottom of this list.

The same principle applies in case a separate feed-back winding is used. (See Fig. 17-1 in recent editions of the ARRL Handbook for examples.) The by-pass (Cs in Fig. 17-1) must maintain the tap on the coil, and the by-passing the coil when a separate feed-back winding is used, at ground potential, if feed-back is to be controlled by the feed-back winding. For third-overtone operation the adjustment of feed-back should be particularly critical, and any crystal that will oscillate on its fundamental should work on its third overtone. For fifth or higher overtones, however, adjustment of regeneration may be quite tricky with any crystal, unless the crystal is particularly suited to overtone operation. It should be possible to get at least the fifth overtone out of practically any crystal, by careful adjustment and proper layout, but not all of them will provide enough output for transmitter applications.

OES Notes

Perhaps it's the result of publicity we've given to the program in recent months, or maybe it is a reflection of the increased v.h.f. interest in many quarters, but it is interesting to see our Official Experimental Station reports this month make the biggest file we've had since the OES appointment was announced more than five years ago. In case you've not noticed all the details of the ARRL appointment, drop a note to your Section Communications Manager (see page 56 of each issue of QST) or to ARRL for full particulars. If you are active on the v.h.f. bands, and interested in promoting v.h.f. activity and progress, we invite you to join the ranks. If you are just thinking of doing something about getting on someday, or are just curious, please don't bother. There have been a few in this category, and they just waste everyone's time.

On the other hand, don't feel that operation of the host station in your section is a requisite. Regular activity and interest in helping others are the most important attributes for a successful OES. Here are a few examples, picked at random from reports received this month.

W2UTH, Rochester, N.Y., keeps a nightly sked with W2UIH, North Tonawanda, 65 miles to the west. Though this is a solid circuit, there is a wide range of signal strength, tiring in with observable weather effects. During the coldest winter the signals were almost uniformly poor, usually requiring c.w. for complete readability. Fair weather and average winter temperatures resulted in good voice communication. Variable and stormy periods have brought variable signals.

W2ZHB, also of Rochester, has also noted large signal variations during the winter. One passing warm front, with receding barometric pressure, brought signals from W23KZ/2, nearly 200 miles to the east, almost up to summer levels. Activity in the Rochester area has improved markedly this winter, and about 30 stations are now heard more or less regularly. There is more interest in mobile work on 2, and both W2ZHB and W2UTH are building mobile gear. W2ZHB is also experimenting with speech equipment to restrict the passband and maintain a high average level of modulation. These inexpensive and simple ways to increase one's effective power should receive more attention from the v.h.f. fraternity.

W3NVR, Columbus, Ohio, and WS3BQKC, Hudson, Ohio, report that things are looking up on 220 Mc. They say that W8JLG is working hard to sell more of the gang on 220 around Cleveland. W8WS WM, WCJ and RHJ are already on, and DQH, VO2 and W8NKM are working on 220-Mc. gear. W8NVR has 8 halfwaves in phase on 220, and is monitoring Channel 13 in both Dayton and Toledo for indications of good propagation. Ken wasted a lot of time getting his rig going on 220 because of two S22As that worked OK on 144 but not on 220. He now has up to 25 watts output from an s29B that will shortly be replaced by an PX-9000.

W8UZ, Columbus, reports reactivation of the 140.34-Mc. emergency net, with sessions each Monday at 8 p.m. He and W8MQY are now working on 430 with modulated (Continued on page 165)

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The Southeastern Signal School recently held special ceremonies at the Camp Gordon, Ga., MARS station to honor the 1000th member of the Camp Gordon Radio Club — Private Suekichi Higa, K96QA, of Hawaii, a member of Student Company 16, Signal Training Regiment. Private Higa was also the last new member to be signed in 1951.

The Camp Gordon Radio Club was founded in December, 1948, and is the brainchild of Colonel H. P. Lyman, then deputy commander, Signal Corps Training Center (subsequently signal officer for Third Army and now serving as deputy commander, Signal Corps Training Center and Fort Monmouth).

Operating with call signs K4WAR and AA4WAR, the club station has been active in amateur and MARS activities, serving as MARS Net Control Station for the State of Georgia.

The club was organized with a four-fold purpose:
1) to stimulate the interest of radio operator and maintenance students of the Southeastern Signal School;
2) to provide additional training for those qualified radio operators of the Southeastern Signal School who are awaiting shipment;
3) to create an additional off-duty diversion for the command as a whole; and
4) to establish another link in a reserve communications system in event of civil disaster or national emergency.

The club station is equipped to operate on most amateur bands. In addition, facilities available to club members include a radio theory class for beginners, code practice equipment for both sending and receiving, and listening stations for those not licensed.

Pvt. Higa, K96QA, receives Camp Gordon Radio Club membership card No. 1000 from SFC Oliver G. Skipper, AR6WZ/W41RZ, club president. Witnessing the presentation are (l. to r.) Sgt. Ralph Witskepe, 44150/W4150; Lt. Col. Fred J. Elser, A4G6VU/W4G6VU (ex-pi3AA-TA33G-VU), council member and assistant commandant of the Southeastern Signal School; Lt. Freeman J. Fruge, club custodian and company commandant of Student Company 31, Signal Training Regiment.

Ohio Flood

During the recent flood in the Ohio area, the Naval Reserve Training Center (KSNAM) at Streitville, Ohio, and the Fort Steuben Radio Club provided valuable assistance in setting up and providing emergency communication facilities. Radio stations were set up at Emboro, Stratton, Brilliant, Mingus Junction, and the Jefferson County Red Cross Headquarters. These stations comprised a network with the training center acting as control station. WR0TV at Wheeling, W. Va., gave valuable assistance in handling traffic.

Amateur operation and frequencies were used exclusively. Frequencies of 1890, 37250 and 37720 kc. were used for traffic handling. Between 1000 EST on 27 January and 0200 EST on 29 January a total of 32 messages was handled.

In addition to the permanently installed equipment available at the training center for such emergencies, two portable TCB-13s from the training center, plus equipment owned by members of the radio club, were used in equipping the net stations. Amateurs taking part in this emergency were: D. L. Battey, W5SFP; G. Smith, W5CIE; F. Bishop, W5ZER; R. Harris, W5SAM; H. Smith, W5E2C (ARRL emergency coordinator); F. Gordon, RMC; W5F2Z (stationkeeper); and M. Horne, E51, WN8EU (stationkeeper).

It is a Navy Department policy that all Naval Reserve radio stations shall have emergency communication plans. These plans are designed to provide cooperation with local authorities on any occasion which requires emergency communications.

Personnel Items

Cmdr. R. E. Coleman, USNR, W1KNE, has recently reported to the Office of the Chief of Naval Operations for duty in the Reserve Liaison Unit, Naval Communications Division, as the relief of Cmdr. E. L. Battey, USNR (W4TA). Cmdr. Coleman has previously served as Assistant District Reserve Electronics Program Officer in both the 6th and 1st Naval Districts.

Lieut. Merrill Callum, USNR, W1LAE, has for the past been serving as the Electronics member of the Sub-Board of Inspection and Survey at Brooklyn, N. Y.

Lieut. Cmdr. F. K. Knight, USNR, W4BHI, has recently been assigned as Assistant District Reserve Electronics Program Officer (Operational Communications) on the staff of the Commandant 6th Naval District.

Lieut. E. T. Maguire, USNR, W1MNE, is now on duty in the Electronics division of the Bureau of Ships at Washington, D. C.

Lieut. Cmdr. C. C. Jones, USNR, W4GKA, is attached to the Office of the Chief of Naval Operations (Naval Communications), Washington, D. C.

Cmdr. A. O. DeRuyter, USNR, W2BBII, is serving on the staff of the Commandant, Pacific River Naval Command, Washington, D. C., as District Reserve Electronics Program Officer.

Cmdr. J. C. Picken, USNR, W4ECP, recently reported to the Commandant 11th Naval District as District Reserve Electronics Program Officer.

Cmdr. G. L. Tucker, USNR, W9HFP, is now serving on the staff of Commander Naval Forces Philippines as Communications Officer and also as Commanding Officer of Naval Communication Facilities Philippines.

Cmdr. J. J. Zummitt, USNR, W5KHP, is at present assigned to the staff of the Commander-in-Chief, U. S. Naval Forces, Eastern Atlantic and Mediterranean.
CONDUCTED BY ROD NEWKIRK, W3BRD/1

Wow: [. . . So she can cook, sew, play cabbage and has W3VES for a brother. . . . what's she got that I haven't? . . . Wait'll he next tries to stay on the air all night! . . . I'm fed up . . . quite, you know. . . . Has any reader with a kilowatt and rotary beam the need for a ripping-good gentleman's gentleman? —Jeeves]

What: As the Gs so aptly put it, conditions have been grim, grim indeed. A de‹uent opening serves only as a prelude to an inescapable storm nowadays. While bearing the brunt of those onslaughts, twenty was used by W8ASG to assemble ZS2MF (105), KE6IC (45), 4BY (92), UP1PA (95), VU2NB (95), VQ5CB (102), EZ2P (110), FR7Z/A (020) and LB6XO (020) contacts. — The Fives really have it. W5MPP shows up with FPBBB (080), FD8AF (025), FO8AG (050), CRs 4AF (025) SAD (015), VPs JVN (058), 3AO, VK8KS (084), 4AE (008), VU2Z (015), HZ1R (027), K56Z (052), MP4BB (084), 0V1GO (070) and 3AJA (018). Another Fives, YV5AK, is happy over Q90S (002) CN (060), EZAB (080), FOYTV (070), ZB9S 020 (005), ZB9C (070), 3AB (060), 3AC (010) AG (036) AJ (040), HZ1Z (095), VQ2G (060) and VQXK (120). Manuel embarked on construction of a 304TL ‰nal rig but found no goal to go beyond the 60-watt exciter. [That appeals is worth about 10 db., anyway. —Jeeves] Anybody needing a c.w. Venezuelan may Þnd YV5AK around 7:00 a.m. P.M. EST, VFO on the low end. — ZD5CD (065), CPHX (065), YV4HP (022), FO8SL (060), ZB9K (032) and KS9L (090) were raised by WC2TO. Bob met LUCY personally in the Big Town when the later's duties as a DC-6 air ‰cer carried him thither. WC2TO uses 250 watts, a half-wave and crystals for his DX. — K9GEO was a new one for W6KCG and W8YR added EL7A (045) — W5KUC's West Gulf Division DX Club DX Bulletin reports these c.w. stations active: (morning) AG2AG (017), AP4A (075), CRS 5AC (105) 9AF (045), DGDG (075), ISIFIC (056), H4ZL (075), K2WJX (052), K2MDL (052), M13OBG (075), MP4MA (050), L5JX (090), L2LZ (048), FB8Z (095), FOQ/HK (023), FO8AB (010), FS8A (065), FO8AL (065), FO8AI (078), FK8Z (078), FS8AG (065), FO8CS (085), TF8A AB (023), NK6 (058), CE11A (040), VPs 3F1G (005), 3AB (060), Z6IA (060), ZC4DT (055), ZD4AA (012), ZSMK (030), YS10 (038), YS9 3RD (025) 4CR (012), VQ4 AD (060) 4CM (025) 4BB (024) 4CB (012), WZ2G (111), YS9A 060 (096) 9AC (065) VU3C (022) 2FH (030) 2FJ (096) 4UA (081), 4XX BA (038) CW (060) KE (090); (evening) CRS 7AN (100) 7CD (024), CT9 2AB (045) 2CC (043) 3AA (120), EAS 6AM 969 HR (012) 9AP (025) 9BD (075) 9AC (070) 9AD (090), EL2A P (110) R (020), FO8AC (100), FO8AK (025) AN (040) AF (040), FM7W (040), HCO2S (040), H11AT (041), KB6Q (085), KG4AJ (090), KTI0 (020), K56Z (048), OQ9S CP (086) RA (012) VN (048), OE13SC (001), MGC1G (055), M125B (028), DI AHS (080) CR0 (075), JARAB (072), PZ1W (067), ST2a GL (091) HL (060) VL (078), YG1S (075), TF3NA (050), TOC (078), VP3 1AA (100) 3V (080) 5B (037) 8AE (100), 8AO (065) 8AU (050), VQs 4FCA (085) CJK (085) 8C1 (075) SW (015), YV5AK (030), ZBI (020), Z347X (074), Z5D 1SS (012) 2HAI (067) 2JAB (019) DJ (090) 6DV (030), 8ZZ 8 (030) P 066 (012), Z85s C 005 (D 080), 4X48 (062), 5AZ 011 (062) 9B3A (094) insulargate. — XE1AC returned from his US, junket and hit twenty- phone for EAs RAY (351) HAB (140), S27H (345), CR5AC (150) and VP8AE (098) for South Orkneys. The CR5 is a new one for AI and VP8AB came through with a next 'phone QSL that W1LCP finds that W1WGO has been using people like UA9KB (355), MP3KAF (355) of Kuwait, VP5BF (150) for Turks and ZS2MA (349). He would like to see cards from 3F6BC, 3P2F, 7UYX, LZ1AA and E9A1 JD (349). Additions at W8ASG are KB8AO (250), CR6AV (320), ZPI2A (270) and several already expected. Bill notes that 5A2TH is ex-MD2AM — W4YN was glad to receive 'phone postcards from 3V5BB, SP2AB, PX1A and XG3AA. Jack nailed down Z6DHJ (151) and a CR3; he wonders why no XZ8AC, E98AC or W5CIE/KW6 QSLs hit his mailbox. — Here's what W5KUC's w3 05-thirteenth has been stalking: (morning) CN8BB (205), G3DQB (085), ISIFIC (374), M72AA (350), M13RX (070), HZ1S TA (385) TD (350), SP25 AB (127) AG (127), TALAF (330), TS57Z (360), VQ3OB (390), VU2S AK (165) CN (250) CP (198) CQ (300) PE (140), YI3ZB (125), ZB1AJY (148); (evening) CR1A JS (385) AM (148), C7A 3AE (118) 3AA (076), E96Z A8 (385) AW (301) BP (738), KT1BB (340), LX1ID (250), MRI2B (331), OQ5RA (350), OX3MW (355), TA3A (370), VK1BS (255), VP3s AB (370) DP (335) LE (200), VOs ZDT (390) ZET (376) HJ (305) 4AC (381) 4RR (342) 4RF (342), ZD4s 04K (125), RF3 (025), Z5R7X (011), ZPS1 (157) 48R (081) 3NB (280), Z5s JD (352) 8A (318) and 3VB8B (390). — There appears to be a scarcity of modulators in these French possessions so active on c.w.

Forty is as wobbly as ever. Jeeves' deserved verse of last month notwithstanding. W5KPL came away with F86AS (7030), Y6GAO (070), HPILA (070), CE11W (090), VP5BF (040), HR3AD, T2s AP CR, OABED, HKDXD, VP7NM and EK5AD/EK6W (020). If anybody knows of his 100th 7-Mc. country, finds it irksome to hear Central and South Americans on 'phone in countries he needs badly — ZS0OS (055) tells W3JYS he needs but a few more stations for his 40-meter WASH; W4DJY reports a hefty signal from VP9AL (085) —. If you Þnd crossing the points too rugged a job you might fish for a rare Cuban district in CMIAR as worked by W9CCK. Then look for CM8HF, the only Isle of Pine's licensee — WC2TO tried 40 and found YQ9CB, ZSS8A and W268IS working to his W5KUC's hects of ZK1AB (035), SI1AHK (024), VP7s NG (018) NZ (010), YUs 1A9 (022) 2ADE (040)
A Massachusetts DXCC get-together brought top 'phone men (l. to r.) WJ1CX, W1NO and W1FIH into camera range. Of course, the latter lasts out a little o.w. now and then! (Photo courtesy W1MB)

2AKL (021), ZD4AB (020) and 4X4CJ (020).

Eighty is getting scarce to the last drop, to coin a phrase. Via W1ZL we hear of W4BRB’s contacts with P51LZ, ZD4AB and KH6QY/KC6 (3510); W3BKP and W6ZAT also noted the K6S and the latter added DU6CO and VS8CG. Mind you, this is 3.5-Mc. stuff! . . . . . Between 3504 and 3520 kc. VE5EJ has been working LU3EL, CT2AB, V56AR, KV4UA, DL1AO BLK, Gs 3FGT 5BJ and 5IRV. LzA is planning an 80-meter ground-plane. . . . AAIIC (3505) answered W2EKO and W7PQF ran across ZLZ 1CI and 4BO . . . . . . W1AW (Chas) says the early a.m. is good for ZLZ 1AGE (3558) and 3J7 (3557) . . . . . W2BKP has a 71/2-foot wire some 125 feet in the air at one end and 65 feet at the other. Among George’s QSOs we find items like V4QCM, OX3EL, YO12RF, YU3AFR, ZK1AX, FKSAL, OK1s MB MQ, K5AQU, VKE3A, SM7YO, HP1AW, FA3DA, LAAU, CX1BB, OZ5AA, GH3FD, CT2 BO, ON4MF, 984AZ, 15 A1, 20 ZLAs and over a dozen other assorted Europeans and North Africans. This was routine non-contest DXing, too.

The inspiring state of ten is decisively indicated by W4RN’s comments on European openings — “they may stay for all of five minutes on good days.” Don captured VQ6GW (26,300), CR4AE (400), HX1ES (300), CR68X (400), HP9TQ (300) and YL1ED (300). W4RN’s shack is within an all-metal house overlooking Roanoke. TVI is negligible . . . . . . CR6AT, OQ5S RU VD, EL18A, TG6AD and ZP7AW chatted with W2ZVS . . . . . . A 4-element whiz has got OQ5S CC CJ BQ VP, YQ9s IFR 4RF 481 4AC 2IN 2C, EAKAX, CN8FP, CR7TV and a host of ZS/ZLAs for W5RDA.

The one-earthy DX Tests had rough going during February. An abnormally high static level plus lorum splatter harassed all concerned. W1BB QSOd GSUJ while hearing Gs 3DIY 6CM and GW3FSP; VE18A’s contacts included GSUJ and G5DTY. . . . . . KV4AA gave many consolation QSOs to those who found the Atlantic too tough a barrier. Ws EBF LVY TCR TTV, W2s COR EQS LUD MX, K2USA, Ws 6L KQR ORU PRC KWA RQG, Ws 8B KBT JLI, Ws TVQ NH and VE2UJJ were among participants on our side . . . . . . VECWV was in three pitching with a balloon-supported dipole, results unknown here.

Where:

The Ceylon QSL Bureau is now under the wing of VSTNG. Address: Noel Gunasekara, 158 Queen Marys Road, Gampaha, Ceylon . . . . . . The block 5A2C has been assigned to Cyrennes and 5A2T to Tripoliates. The former may be QSL’d via R308 and cards for 5A2T stations go via M/Sch. E. R. Haverstock, 5A2TR, 34th Radio Sqdn., APO 231, % Postmaster, New York, N.Y. These are not separate countries; both represent Libya on the Countries List.

CR9BFZ QSL via WB6DIL
CR6BX Box 1345, Launfa, Angola
EA9BD (QSL via URE)
FF8AI J. Maillet, Inspection Academique, B.P, 211, St.-Louis, Senegal, F.W.A.
FK3AH R. Garbe, 26 QL., Nounes, New Caledonia
FK3AL J. Garbe, 26 QL., Nounes, New Caledonia
FK3AM F. Concin, Ausz VM, New Caledonia
FK3AN G. Costot, Electron Radio, New Caledonia
F0SAD I. Rapp, Grande Australiies, via Tahiti
F0SAF P. O. Box 218, Brassaville, F.E.A.
F0SHA A. Welby, Box 180, Libreville, F.E.A.
F0SAL G. Vidal, Service Navigation, Fort Anchamacht, Tahad, F.E.A.

oe-KG6GC K. K. Wilkinson, Box 428, Hillsboro, Ill.
OE13RL L. R. Lister, 12th Radio Squad Mobile, APO 61, % Postmaster, New York, N.Y.
OQ6VN Box 631, Elizabethville, Belgian Congo
PAX1YR Yves Ramous, Andorre-a-la-Vieille, Andorra
TA13A Lpt. E. Berfeld, TRAP, JAMMAT, APO 206A, % Postmaster, New York, N.Y.
TA3QZ Lt. H. C. Harris, Jr., TUSAEG, American Embassy, Ankara, Turkey
VP7NZ QSL to W4RN
VQ21W Mangweahi, P. O. Seebach, Barotseland, via Livingston, Northern Rhodesia
V57ES E. Suvundranayagan, 30 Horton Place, Coombe T., Ceylon
ZD2GAIJ Bureau of Commerce and Industry, Lagos, Nigeria

Full-sized rotary beams on 7 Mc. are about as plentiful as three-dollar bills. This 3-element yagi beam at W1HIQN (ex-W1JO) has a measured forward gain in the vicinity of 8 db. with a front-to-back ratio of some 30 db. Relays permit its use on 14 Mc, as a 6-element phased array with gain figures roughly the same.

The 65-foot three-legged tower is built of timber felled locally and a war-surplus SO-4 radar rotor does the spinning. RG-8/U feeds the driven element; the 64-element section, which taper from 11/2- to 11/4-inch outside diameters, are swayed by copper-cored wire guys to minimize droop. The 34-foot boom of 2 x 4 provides 17-foot element spacing.

Operator-builder Ambrose Kramer first constructed the beam to supersede W10JM’s 600-foot-per-leg Yacea at Waltham, Mass. It gave such a superb account of itself that he transported the boom and elements to his new "farm" location at Bumpass, Va., where over 100 countries were contacted in a month’s operation as W1HQN. The antenna is especially an asset in 40-meter contest work as even competitor W1KFC will admit!
FR8ZZ is the reason for many a scramble on 20 meters these days. This station will continue active on Amsterdam Island for quite some time. (Photo courtesy W1FIF)

9S4BE R. Mayer, Am Guldenberg 29a, Elvenberg, Sweden.

W1s IKE MCW NWO RWS TSZ, W2s OTQ FOQ, W3DLI, W4CGY, W5ASG, W5YGR, W9TRD, W8A1H, N. Duxbury, West Gulf Division DX Club’s DX Bulletin, Northern California DX Club’s DXer, Southern California DX Club’s Bulletin and OSM’s OSM all had their shoulders to the wheel on this run.

Tidbits:

According to W5ASG, ZSTB intends to visit St. Helena for two or three months and roll up some two or three thousand QSOs. Not counting dupes, this should give us all a good show at ZD7. From OK1MB via G1SUR: LB3 6ZD and 8HC represent Jan Mayen and LB5Z is good for Spitsbergen. There is a 6K6AA operating 20 meters as a QRP isophone-sounding rig in Budapest, says W9TRD. When he raises power will be he signing 6L6AA? W6FXN learns there will be a native TA on the air soon which will be the first, we believe... EAAAW’s Ifal and Rico de Oro jaunt as well as the XE4PS Revillagigodos expedition were delayed beyond their original departure dates. They’re still cooking, though... FR3AC has left for a year in France and will sport an F call for a long Bolivian log and along will be good to replace lost, stayed or stolen QSLs. Writer Felix Franchette, Villa “L’Oustalet,” Tamaris-sur-Mer, Var, France... For the unfortunate whom it may concern, ZK2AB has worked 6.6 Mc. and that for just a week or so in December of 1950. Pirating of his call resulted in a stack of 14-Mc. QSLs which he cannot acknowledge. ZK2AB does intend to put a pair of 807a on 20 meters shortly and will then QSL thoroughly... The Marion Island outpost, ZS9MI, collects meteorological data for a proposed airline from Natal to Australia. The rig runs 100 watts, the receiver is an HRO and a diamond is beamed on South Africa... If you need cards for your contacts with W0ATB/K10E/KC9 or K0GID/K60/GZ3AM drop the details to Pete Peters in care of W6JSK. W6ATB will be back in the swim directly... WX3BI (ex-OX3GO) is making tracks back to WA4KAR in Va. Before leaving Greenland, Frank unloaded over a thousand QSLs W7VE-based all via bureau. His relief at the NBS outburst will also be a ham, call unknown... W3JHF was bitten by the DX bug during a ZL QSO and currently is the DXinget YL on 80 c.w. (AC1H) tells W1BDI that AGS0 is the only other active Sildel station... W5MFV heard more St. Helens talk from Z3KF — the more the merrier!... — OX3EL relates to W4CGY that three OYs work 3.5 Mc. regularly. Two hit twenty now and then and that we know... The Jubilee Royal Adelaide Exposition will have a VE5 station on the air from March through May. Forty and twenty will be used and specially prepared QSLs will be forthcoming... The director of Radio Vatican returns to HRBF that the Vatican State does not tolerate amateur radio. All stations who have used, are using or will use the HV prefix — pirates... We regret to see Ed Miller, W2ZJ, among Silent Keys. Old timers will remember Ed best as W8CJ. Among his accomplishments under that call was a proven DXCC... Information on present whereabouts wanted: W2WVM/C9 by W2K, K6SRR by W8SWG and K6ABS by W2ZV8... The K2T label is now official for U.S. citizen Tangier stations. Novices there will be W7Ts... Ex-5M6XH, former voep of SBA (Sweden), writes interesting lines from his new Philadelphia residence. He points out the possibility of new country material in the Baltic Sea island group of Aland. Jan says the folks there maintain their own parliamentary self-government as guaranteed by the Finnish constitution. The question: Are there any OHs active in Aland?... Anyone needing confirmations of contact with DL4PA, F4AT, PX1AR or 5Z4AZ would do well to submit details to Warren’s home QTH at W7HZA. While in Monaco, he found the ‘phones of W7HIA, W1FIF, W2APU and W1JXG to be standouts on 20. Add Firsts: 3Z2AO worked ZB2AN for the first reported 3Z2 two-way... Ex-W7MJC tells W1BDI that several Novice licensees are active on Guam. They’d like the W/VE gang to watch for them on 11 meters... Karl of MS1LQ, formerly W5NLS, advises us to be on the lookout for ZT2US, a projected radio safari into the Sudan. Some spot for Field Day!... Z6BEV, quite active on 20 c.w., is bedfast in a Johannesburg hospital. A 20-watt rig at his bedside helps pass the time and he likes to work Ve. This from W581C... W5YGR ran into old friend KP4TU who was operating from Tennessee, all classes. My guess is probably thinking up another choice spot from which to roll up one more DXCC... VP1NW will be on with a VP5 call in Jamaica very soon, according to W5YGR’s notes... W8UPN reports from OX3EL who may return to the Faeroes long as OY5EL... Writing from Kabul, K6E1M states that he couldn’t wangle a YA license mowah. "Amateur radio is absolutely unauthorized in Afghanistan... any station using the prefix YA is not legitimate." Period!... 11CC0 tells W1UJX of M.I.T. that his local gang is very short on radio literature of any date. Rather than throw 'em away you might ship some to: Como Radio Amateur Club, 11CC0 Secretary, Piazza Peretta 4b, Como, Italy. W1UJX finds that amateur radio licenses in Italy are issued on a "30-day permit" basis; lots of renewing necessary... 9B3AA is perfectly okay for Bulgaria; W2WZ and others have his QSLs. The fellow especially likes to work South Americans on 20 c.w. with his S-watter. W2ZW adds that VRS3A now signs W8RCG. Al and this column would appreciate knowing the present whereabouts of ex-J3ABJ... In April ZD6DU expects to return to the U.K. and G2HIDU. "It's surprising how many stations, W and others, say ‘first ZD6 QSO'... I'm very pleased to give these boys a new country. They'll all get cards in due course," ZD6DU runs (Continued on page 156)

Spanish Guinea is not as rare as it once was, thanks in part to Jose Civit of EA3AD. Operation is mostly on 14-Mc. c.w.
BASE-FED VERTICAL HALF-WAVE ANTENNA

It is usually much easier, from a mechanical viewpoint, to base feed a vertical antenna than to feed it at the center. The electrical problems involved are usually tougher to handle with base feeding, especially when the antenna is to be fed at a high-impedance point, as is the case with a half-wave whip.

The system shown in Fig. 1 was worked out as a very satisfactory solution to the problem. In addition to giving the desired impedance match, it permits the use of coaxial cable at the output of the transmitter so that a low-pass filter can be inserted to eliminate TVI, and requires no antenna tuner. A quarter-wave section of 600-ohm line is used as a matching transformer to give a step-up ratio. This is simply an inverse use of the system frequently used to feed the radiator of a beam antenna where center feed must be used with open-wire feeders. In our case the transformer is used to secure a step-up to about 5000 ohms. The system is, of course, applicable to either vertical or horizontal antennas when end feed is required.

![Fig. 1 — W4FPK solves several problems at once with this base-fed vertical half-wave antenna. Either RG-9/U or RG-11/U coaxial cable may be used.](image)

The installation of a low-pass filter in the coaxial line resulted in subsequent elimination of TVI, and the vertical antenna seems to be very effective for DX work in the 14-Mc. band. — R. J. Miller, W4FPK

HOME-BUILT SHIELDED PLUG-IN COIL FORM

Shown in Fig. 2 is an inexpensive way to build efficient shielded slug-tuned plug-in coils. The base is a male cable connector with shield (Amphenol), and the form is a cut-down slug-tuned unit from surplus radar gear. Almost any small-diameter form will do as well.

![Fig. 2 — An ingenious coil form devised by ZS5KU. It uses an ordinary cable connector to make a shielded plug-in coil form with provision for slug adjustment through the top of the shield.](image)

A piece of wire is soldered to the shield and connected to one of the pins for grounding. The slug is adjustable through the cable entry bushing at the top of the shield.

While the commercially-available units probably have lower losses, they are much more expensive. These forms do a fine job for me in a home-built "R9-er," and are scheduled for use in a new converter that is now under construction.

— Jack Whitle, ZS5KU

TVI TREATMENT FOR "COMMAND" TRANSMITTERS

In fringe areas, TVI is a distinct possibility with the low-frequency "Command" transmitters. We encountered it in a BC-457A unit that had been modified "as per QST."! for use by WN6FVK, but found that it was curable by the following means.

First, provisions were made for use of an antenna coupler with the unit. This entailed removal of the existing loading coil, and substitution of a coaxial output connector for the binding post. Next, the entire unit was shielded. The "window" was covered with a sheet of aluminum, and the side louvers in the cover as well as the rear opening of the cover were shielded with fine-meshed copper screening. The keying jack and all supply leads were by-passed with 0.01-µfd. disk ceramic condensers installed right at the power socket.²

After these modifications, no traces of interference were noted on the nearest TV set, which is only 25 feet away from the transmitting antenna. An incidental benefit obtained was the elimination of a case of BCI in a garden-variety a.e.-d.c. set that was installed in the same room with the transmitter. — James F. Quigley, W4FPQ

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² Grantner, "By-passing for Harmonic Reduction," QST, April, 1951.
HERMETICALLY SEALED, TOO

750 Francis Dr.
Wantonah, N. Y.

Editor, QST:

There are some members of the radio amateur world who will be interested to learn of a resistor now on the market which has proven to be of great value when it comes to test and adjust transmitters. These resistors can be inserted in series with the primary of the high-voltage transformer to drop the voltage to such an extent that the, once resonance life of vacuum tubes is extended considerably. These resistors can also be used instead of an antenna in the output of the final being adjusted. They come in various resistance values and various wattages. On a dollar-per-watt basis these resistors are extremely cheap. They are easily mounted and replaced. A mounting assembly can be purchased at most any hardware or dime store.

In addition to the above, these resistors have many other uses and advantages. For one thing, they give visual indication of their operation and give an idea of the power being dissipated. They are quite non-linear and can be arranged so that a slight increase in load will cause their resistance to drop to a value where no damage will be done to circuits they protect. Some of those designed for lower voltages make excellent fuses and do not introduce much of a voltage drop.

This modern refinement of some research done by T. A. Edison is now so widely used in home and industry that it can be purchased almost anywhere.

— Charles J. Hertz, W2OEP

NOVICE QRM

R. R. I
Frederiction, N. B.

Editor, QST:

This is a recommendation that the Novice class amateurs should have their frequency range moved to the c.w. portion of the 80-meter band and off the Canadian phone band. Since American amateurs have been given an extra 30 kc., it is only fair that we Canadians should have full use of the extra 25 kc, allotted to us without having to share it with these c.w. stations. As it is now, only the higher-power stations can make use of the range 3725 to 3750 kc.

— E. A. Urquhart, VBIOL

PI-NETWORK TANKS

700 East Broad St.
Falls Church, Va.

Editor, QST:

The article by George Grammer, W1DF, "Practical Applications of Pi-Network Tank Circuits for TVI Reduction," in the January, 1952, issue of QST, is an outstanding example of the contribution of ARRL to progress in amateur radio. Here is a basically new concept in tank circuits, so far as general amateur construction practice is concerned. It promises to be a boon in reducing TVI and offers greater convenience in bandswitching and control of loading. Needless to say, I am building up a small rig to try this out for myself.

I would like to venture a prediction that you have started a major trend which will gradually extend even to the kw. power level. The first indication of this is in the advertising of a continuously variable inductor; no doubt other component manufacturers will also increase their emphasis in this direction. In a few years, the plug-in coil and swing-in-link tank circuit may be as obsolescent as the push-pull triode final is today.

My congratulations to you for this latest evidence of your competent leadership.

— Emmett P. Bonner, W4MXP

BAND-EDGE VIOLATORS

3425 5th Ave., S.
Minneapolis, Minn.

Editor, QST:

Whether the situation is becoming worse or whether I have just started noticing it, an alarming disregard for the band limits has appeared, especially on the 20-meter 'phone band.

Listen any week-end afternoon near 14,200 and 14,300 kc. and you will see what I mean. Violators range from fellows who zero-beat everyone they call from force of habit to hard-shelled old-timers who will risk a pink ticket to get through the QRM.

It is not the misreading of a dial or the sudden change in otherwise stable oscillator characteristics (perhaps good excuses) but carelessness, ignorance of equipment limitations, and an apparent contempt for the regulations that causes most of these violations. Certain such operation does not interfere with commercial services, but where is the new with which we have traditionally regarded our regulations? ...

— R. W. Schoening, W7FKX

7 MC.

9463 Knodell
Detroit, Mich.

Editor, QST:

When the a.m. and c.w. boys start to fight each other about the 7-Mc. band proposal, why not open up 7 Mc. to those who pass the new Extra Class exam?

That would only put the fellows who work hard in ham radio up there and also would encourage more to apply for a new ticket. I think that would stop a lot of fighting and would also get a lot of bum signals off.

— Marion B. Orchard
735 Broadway
Venice, Calif.

Editor, QST:

I am very strongly in favor of a proposal being made to the FCC to create a Novice band in the high-frequency end of 7-7.5 Mc. amateur band.

— Edward F. Munseil, W7PCP
4554 Marmion Way
Riverside, Calif.

Editor, QST:

If the 40-meter band is to be cut up into 'phone and c.w., why not cut a chunk out for the Novices? His band is crowded and it would help amateur radio to put him up there. Let's try and keep the whole band c.w. There are enough 'phone stations on the 40-meter band now to cause lots of trouble for c.w.

— Raymond E. Hanson, W6KXE
1575 Seminole Blvd.
Ocala, Fla.

Editor, QST:

No U. S. 'phones, please. Down here in Florida, we are very close to some of the foreign 'phones often referred to, and many kilowatts are in the air. Thankfully, they are mostly in the higher end, but the advent of U. S. 'phone would send them to the lower portion of the band faster than the ear could follow.

(Continued on page 186)

April 1952

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Rag Chewers Club. "Operating an Amateur Radio Station" (page 7) tells all about the Rag Chewers Club.Fraternial QSOs of at least a solid half hour held with a member of the club are required to qualify one for nomination by that member. When the Old Sock (chief rag-chewer) has both the member's nomination and one's own request for RCC certification, membership certificates are sent. The precepts for this fraternal group: (1) Be a conversationalist . . . talk and get to know the fellow you QSO. (2) Operate in strict accordance with FCC rules and ARRL practice. (3) Observe rules of courtesy on the air. (4) Sign RCC so others may know you.

All classes of amateur licenses may belong to the RCC. ARRL certifies some two thousand new RCC members per year. You will find them, if you mention RCC, in any or all bands. As a help to newcomers there follows a list of WNs certified as RCC members to the time of writing these lines.

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11 Meters a Good Novice Band. Novice Round-up reports are still coming in as we write. Many worked . . . states notes on QSLs will show an increased total as a result of the Round-up. Eleven meters was used to the advantage of certain participants to get the distant ARRL sections. Note just a few desirable ones.

Ala., WN4TJO; Ga., WN4TVY; Hawaii, W06A; Los Angeles, WN6ORB; Ohio, WNS15; San Diego, WN6NLO; Southern Texas, WN5TWB; Virginia, WN4TVI. Try 11 for some WN DX.

How To Get Emergency Messages Through. The majority of amateurs are quick to accede to the principle of curtailing casual activity if it would cause interference to any emergency communications in progress. The degree to which an emergency is "generally recognized" as pertaining to communications service is important. Much depends on the duration of the primary load of emergency communications; also on the conditions in the later hours or secondary phase, and the judgment and operating savvy of the operators engaged.

There is a case for the low-powered emergency rigs in situations not backed up with wire and where those participating are subjected to interference from high-powered stations in casual QSO who cannot hear the work in an emergency zone. If the communications are of small scope, however, or the communication is plainly supplementary to wire and press facilities, many amateurs may rightly feel that those engaged should use good judgment to "button up" their contact, particularly if emergency traffic is not actually forthcoming. A circuit should not be held open unreasonably just because someone hopes he can get a place in the sun by getting unnecessarily into a situation already under control.

In such cases, and also in the emergency of larger scope, it is generally advisable for those primarily concerned in net operations to line up some stations to stand-by off the traffic frequency to watch for and QRN new casual operators who come on the channel being protected without being first aware what is going on. The conduct of the emergency-net operators themselves, in keeping their channel busy with traffic, all handled in businesslike fashion, and necessarily of a type self-identifying as to its emergency nature is a necessary prerequisite to securing the widest amateur understanding and automatic cooperation of all amateurs. To be understood quickly the emergency thus must speaks for itself. If this condition is truly satisfied there is generally no complaint about getting general amateur cooperation.

We do heartily recommend to radio amateurs stock-piling some rigs for low-powered circuits, to utilize v.h.f. and c.w., for frequencies less subject to congestion and interference. All amateurs are supposed to know the code anyway, so that instead of complaining to the world in general (FCC
and ARRL included) it becomes more the intelligent operating thing to do to side-step the QRM difficulty. To secure the greatest freedom in operation, plan and test in advance if possible with your group stations, so you have the ability to put your record communications over to less crowded c.w. or v.h.f. frequencies. This is sometimes the thing to do; it makes possible quiet efficient operations, and avoids contending with any large degree of misunderstanding and congestion. 'Tis the real communicator's way of exercising versatility to side-step interference and see the message through. Strangely enough there are almost always alternate circuits and ways for the skilled man to do his communications job.

— F. E. H.

JANUARY CD QSO PARTIES

The January CD QSO Parties provided League appointees and officials with lively contest workouts. In the c.w. fray top score honors were earned by W7BSU of Montana, who apparently went all-out to bring the West into the CD Party limelight. Virginians W4KFC and W4AIA old and capable hands at this party business, took second and third places respectively. The nuke boys were really in the pinching this time and came up with some good scores. North Carolina OPS W4NYN finished up with the highest 'phone score and a substantial lead on his competition. Second-highest 'phone total was tallied by Mississippi W6DEJ, followed closely by W3HA of Eastern Pa. Listed below are other high claimed scores for the parties. The figures following each call indicate the claimed scores, number of contacts and number of ARRL sections worked. Final and complete results will appear in the April CD Bulletin.

C.W.

W7BSU 133,792-298-58 W4CMN 65,350-145-50
W4KFC 129,450-203-63 W6HTS 64,312-148-46
W4AIA 113,450-365-61 W3KUN 62,520-266-47
W6DEJ 106,005-211-55 W5AQF 63,000-219-56
W4MRQ 55,290-257-58 W3JSH 60,580-235-26
W10WD 77,000-230-55 W4BMW 59,850-267-49
W6WOO 76,380-181-52 W2COD 57,750-224-50
W6QLO 72,280-232-52 W5YMJ 55,540-209-52
W5EK 71,455-200-51 W9RM 53,590-309-54
W6DEJ 71,750-230-55 W7RPM 54,380-118-50
W4QF 71,250-270-50 W6OEG 54,200-133-44
W3HIE 69,660-289-64 W2ATE 54,060-204-53
W5NOH 68,550-233-55 W2YFW 52,300-223-50

PHONE

W5DEJ 6890-46-26 W5KUN 4980-40-21
W3HA 6885-45-27 W5EMT 4160-31-25
W2ATE 6750-50-27 W9RMQ 3900-33-20
W2MIE 6500-56-24 W5IP 3800-33-20
W4FY 5985-41-28 W4KMS 3455-33-21
W5ZM 5520-43-32 W2EO 3330-30-19
W1CRW 5000-44-27 W2YFW 3100-27-20

W1AW OPERATING SCHEDULE (All Times Given are Eastern Standard Time)

Operating-Visiting hours: Monday through Friday: 1500-0300 (following day) Saturday: 1900-0230 (Sunday) Sunday: 1500-2300 W1AW will be closed from 0900 April 11th to 1000 April 12th in observance of the Good Friday holiday, and from 0300 May 30th to 1900 May 31st in observance of the Memorial Day holiday.

General Operating: See page 76, October, 1951, QST for a chart showing W1AW general operation. This schedule is still in effect and is not reproduced here for space considerations. Mimeographed complete master schedules of all W1AW operation in EST, CST, or PST are available upon request.

On Saturdays and Sundays during which official ARRL activities are being conducted, W1AW will forego general-contact schedules in favor of participation in the activity concerned.

Official ARRL Bulletin Schedules: Bulletins containing latest information on matters of general amateur interest are transmitted on regular schedules:

Frequencies:
C.W. — 1886, 3555, 7120, 14,100, 28,768, 52,000, 146,000 kc.
'Phone — 1885, 3560, 14,280, 28,768, 52,000, 146,000 kc.

Times:
Sunday through Friday, 2003 by 'phone, 2100 by 'phone. Monday through Saturday, 2330 by 'phone, 2400 by c.w.

Code-Proficiency Program: Practice transmissions are made on the above-listed c.w. frequencies, starting at 2130 daily. Speeds are 15, 20, 25, 30 and 35 w.p.m. on Monday, Wednesday and Friday, and 5, 7, 9, 10 and 12 w.p.m. on Sunday, Tuesday, Thursday and Saturday. Approximately ten minutes of practice is given at each speed. Each certificate qualifying run from W1AW and W8TTQD is scheduled for April 16th from W9OWP, April 8th.

MEET THE SCM's

Clifford C. McGuyer, W9DGA, SCM Indiana, received his first ham ticket in August, 1939, and since that time has been active in many phases of amateur radio.

He is an active appointee and has held an Official Relay Station and Official Experimental Station appointments; also is past-secretary and present vice-president of the Tri-State Amateur Radio Society. An ardent contest participant, he has taken part in ARRL Sweepstakes, DX Contests, and CD Parties. In addition, he possesses W3A, DXCC, Code Proficiency (35 w.p.m.), Rag Chewers Club, A-1 Operator Club, and Brass Pounders' League certificates.

The big rigs at W9DGA are a Signal Shifter driving p.p. 814s and 6F6-6F6-807 p.p.-S10 for DX work. Also available are 6F6-6F6-2826 for Field Day use and 6AG7-822 for v.h.f. Receivers are Howard 440 and 430, a homemade converter, and a 652. Antennas are a 90-foot center fed job, an 80-meter folded dipole, and a 10-meter vertical. For emergency use McGuyer has a mobile 28.6-Mc. Link police transmitter and receiver. While he operates on other ham bands, he is most active on 80-meter c.w.

Cliff's favorite sports are baseball and football. Previously employed as a radio engineer at WEOA, he now is a radio operator for the Evansville Police Department.

A.R.R.L. ACTIVITIES CALENDAR

Apr. 5th: CP Qualifying Run — W6GPW
Apr. 12th-13th: CD QSO Party (e.w.)
Apr. 14th: CP Qualifying Run — W1AW, W8TTQD
Apr. 19th-20th: CD QSO Party ('phone)
May 4th: CP Qualifying Run — W6GPW
May 14th: CP Qualifying Run — W1AW, W8TTQD
June 6th: CP Qualifying Run — W6GPW
June 7th: 8th V.H.F. Contest
June 19th: CP Qualifying Run — W1AW, W8TTQD
June 21-22nd: ARRL Field Day
July 12th: CP Qualifying Run — W6GPW
July 13th: CP Qualifying Run — W1AW, W8TTQD
July 19th-20th: CD QSO Party (e.w.)
July 26th-27th: CD QSO Party (e.w.)
Aug. 3rd: CP Qualifying Run — W6GPW
Aug. 18th: CP Qualifying Run — W1AW, W8TTQD
TRAFFIC TOPICS

National Traffic System. Now under consideration to make your NTS a more efficient organization is a Transcontinental Corps (TCC) of crack operators interested in the long-haul aspects of traffic handling to assume full responsibility for relay of traffic between Area Nets. This will supersede the present system of inter-area liaison which has not worked as well as we hoped due primarily to difficulty in negotiating the long hop from Eastern to Pacific Area, and inability to find sufficient operators to maintain the late hours necessary to report into PAN from the East Coast. At this writing no manager has been selected for TCC, but negotiations are under way. Whoever gets the job will be interested in hearing from amateurs with top-notch traffic-operating ability, husky signals and ability or willingness to keep a late-evening or early-morning schedule. Several operators have already indicated their interest in the new high-level NTS group. If anyone else is interested just let us know and we'll refer you to the TCC Manager who will probably exist by the time this is printed.

One new Regional Net Manager who has never been properly introduced is Len, W6DSX. Len replaced W6SWC when the latter resigned to become Manager of EAN. This was mentioned in February QST, but faulty proofreading on the part of your reporter caused the call to come out wrong. Len usually operates from W6SG, the powerful station of Denison University.

January reports:

**Most Sessions Traffic High Low Average Consistent**

<table>
<thead>
<tr>
<th>Net</th>
<th>Sessions</th>
<th>Traffic</th>
<th>High</th>
<th>Low</th>
<th>Average</th>
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<tbody>
<tr>
<td>1RN</td>
<td>34*</td>
<td>35</td>
<td>7.5</td>
<td>E.M.</td>
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<td>2RN</td>
<td>46</td>
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<td>6</td>
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<tr>
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<td>177</td>
<td>0</td>
<td>0</td>
<td>E. Pa.</td>
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<tr>
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<td>417</td>
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<td>4</td>
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<tr>
<td>5RN</td>
<td>46</td>
<td>308</td>
<td>1</td>
<td>1</td>
<td>Ahs.</td>
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<tr>
<td>8RN</td>
<td>61</td>
<td>637</td>
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<td>1</td>
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<tr>
<td>9RN</td>
<td>45</td>
<td>340</td>
<td>0</td>
<td>0</td>
<td>Wneh.</td>
</tr>
<tr>
<td>9RN</td>
<td>52</td>
<td>221</td>
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<td>1</td>
<td>Mich.</td>
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<tr>
<td>9RN</td>
<td>27</td>
<td>486</td>
<td>2</td>
<td>2</td>
<td>All 100%</td>
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<tr>
<td>TEN</td>
<td>46</td>
<td>702</td>
<td>0</td>
<td>0</td>
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</table>

Out of 46 sessions held.

Section nets who wish to report each month for tabulation in the above may do so by submitting the listed data before the fifteenth of the month. Convenient report forms will be sent on request to any net manager who wants to report the month’s activity. This is for NTS section nets only.

Second Regional Net: The late evening session of 2RN has been discontinued because no section nets in that region are now holding a 2200 session. The 1830 session, previously experimental, is being continued.

Third Regional Net: During January, 11 different stations reported for Md.-Del.-D.C., 10 for W. Pa. and five for E. Pa. The consistency of section representatives was in just the opposite order.

Fourth Regional Net: Net Manager W4-AKX requests volunteers for net control and liaison to EAN. The following have earned 4RN certificates: W4s AYK FPC TLJ IMH and OTL.

Fifth Regional Net: Several comparatively “new hands” are having a crack at the NCS job while some of the old-timers bolster CAN both as NCS and liaison.

Seventh Regional Net: Contact with Alaska is being maintained through separate schedules in 80 and 40 meters. Still no representation from Alberta or Saskatchewan. Eight RN7 members have been issued BRAT (Brotherhood of Radio Amateur Traffic Buffers) cards by W7FIX.

Ninth Regional Net: No new certificates have been issued to W4SHJ, W6SLI, W6SLX and W6C0Z.

Tenth Regional Net: W6SCA, in his last report as Manager, says “It has been a swell two years, and am almost weary I resigned.” TEN certificates have been issued to W6s CBF, CTQ, HFB, TQG, GB3, KHK, RON, VKB and ZLN.

Thirteenth Regional Net: TRN traffic hit a new high during January, with VE3ATR the star performer.

Eastern Area Net: During January EAN was in session 22 hours and 21 minutes, moving traffic at an average of one message every 1.7 minutes. 2RN was 100 per cent in attend-

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BRASS POUNDERS LEAGUE

Winners of BTL Certificates for January traffic:

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<tr>
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<td>W3GUD</td>
<td>231</td>
<td>2061</td>
<td>2366</td>
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<td>138</td>
<td>949</td>
<td>479</td>
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<td>22</td>
<td>904</td>
<td>347</td>
<td>35</td>
<td>1981</td>
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<td>36</td>
<td>705</td>
<td>641</td>
<td>36</td>
<td>1430</td>
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<tr>
<td>J32RAK</td>
<td>513</td>
<td>322</td>
<td>167</td>
<td>576</td>
<td>175</td>
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<td>W38UJ</td>
<td>10</td>
<td>498</td>
<td>343</td>
<td>128</td>
<td>976</td>
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<td>W3IQJ</td>
<td>49</td>
<td>367</td>
<td>562</td>
<td>41</td>
<td>959</td>
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<td>W3KAR</td>
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<td>706</td>
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<td>9</td>
<td>700</td>
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<td>W3LJH</td>
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<td>542</td>
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<td>521</td>
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<td>263</td>
<td>193</td>
<td>15</td>
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<tr>
<td>W6GEB</td>
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<td>245</td>
<td>158</td>
<td>9</td>
<td>503</td>
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<tr>
<td>W6EJS</td>
<td>21</td>
<td>191</td>
<td>241</td>
<td>15</td>
<td>505</td>
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The following made the BPL for 100 or more operations-plus-deliteries:

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<tr>
<td>W2OBU</td>
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<td>W5KF</td>
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<td>W6WWT</td>
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<td>W6WHP</td>
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<td>W5PY</td>
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<td>W7BA</td>
<td>111</td>
<td>W7TCC</td>
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<tr>
<td>W9NZE</td>
<td>226</td>
<td>W6CM</td>
<td>104</td>
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<td></td>
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</tbody>
</table>

A message total of 500 or more or 100 or more operations- plus-deliteries will put you in line for a place in the BPL. The Brass Pounders League is open to all operators who qualify for this monthly listing.

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ELECTION NOTICE

(No all ARRL 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 Sections. This notice supersedes previous notices.

Nominating petitions are solicited. The signatures of five or more ARRL full members of the Section concerned, in good standing, are required on each petition. No member shall sign more than one petition.

Each candidate for Section Communications Manager must have been a licensed amateur 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 ahead to the dates given herewith. The complete name, address, and station call of the candidate should be included with the petition. It is advisable that eight or ten full member signatures be obtained, since on checking names against Headquarters files,
with no time to return invalid petitions for additions, a petition may be found invalid by reason of expired memberships, individual signatures uncertain or ignorant of their membership status, etc. The following nomination form is suggested: (Signers will please add city and street address to facilitate checking membership.)

Communications Manager, ARRL, 38 La Salle Road, West Hartford, Conn.

We, the undersigned full members of the ARRL Section of the

Division, hereby nominate ____________________________ as candidate for Section Communications Manager for this Section for the next two-year term of office.

Elections will take place immediately after the closing dates specified for receipt of nominating petitions. 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. H. Handy, Communications Manager

<table>
<thead>
<tr>
<th>Section</th>
<th>Closing Date</th>
<th>SCM</th>
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<tr>
<td>Mississippi</td>
<td>Apr. 1, 1952</td>
<td>A. W. Morley</td>
<td>June 15, 1952</td>
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<td>Nevada</td>
<td>Apr. 1, 1952</td>
<td>Carroll W. Short, Jr.</td>
<td>June 15, 1952</td>
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<td>Virginia</td>
<td>Apr. 1, 1952</td>
<td>H. Edgar Lasdau</td>
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<td>Ontario*</td>
<td>Apr. 1, 1952</td>
<td>G. Eric Farquhar</td>
<td>June 15, 1952</td>
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<td>Idaho*</td>
<td>Apr. 1, 1952</td>
<td>Alan R. Rose</td>
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<td>Yukon*</td>
<td>Apr. 15, 1952</td>
<td>W. R. Williamson</td>
<td>Mar. 17, 1949</td>
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<td>Tennessee</td>
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<td>D. G. Stewart</td>
<td>Mar. 31, 1952</td>
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<td>Arizona</td>
<td>Apr. 15, 1952</td>
<td>Jim Kennedy</td>
<td>Apr. 1, 1952</td>
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<td>Walter L. Glover</td>
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<td>R. F. Steinkinis</td>
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<td>San Joaquin</td>
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<td>E. Howard Hale</td>
<td>Apr. 15, 1952</td>
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<td>West Indies</td>
<td>June 2, 1952</td>
<td>William Werner</td>
<td>Aug. 16, 1952</td>
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<td>Arkansas</td>
<td>June 2, 1952</td>
<td>Dr. John L. Stockton</td>
<td>Aug. 16, 1952</td>
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</tbody>
</table>

* In Canadian Sections nominating petitions for Section Managers must be addressed to Canadian Director Alex Hed, 109 Logan Ave., St. Lambert, Quebec. To be valid such petitions must be filed with him on or before the closing dates named.

**ELECTION RESULTS**

Valid petitions nominating a single candidate as Section Manager were filed in a number of Sections, as provided in our Constitution and By-Laws, electing the following officials, the term of office starting on the date given:

- **Alabama**: Dr. Arthur W. Woods, W6GW — Dec. 14, 1951
- **Alaska**: Glenn Jefferies, KL3NT — Jan. 15, 1952
- **Utah**: Floyd L. Hinshaw, W7UTM — Feb. 16, 1952
- **Washington**: Leonard Schering, W7CYF — Mar. 10, 1952

In the West Virginia Section of the Roanoke Division, Mr. John T. Steele, W8MCR, Mr. Donald B. Morris, W8JM, and Mr. Alfred E. Dimnaak, W3BE, were nominated. Mr. Steele received 57 votes, Mr. Morris received 40 votes, and Mr. Dimnaak received 28 votes. Mr. Steele's term of office began Feb. 15, 1952.

**CODE-PROFICIENCY PROGRAM**

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from W1AW/W7TQD will be made on April 15th at 2130 EST. Identical texts will be sent simultaneously by automatic transmitters. Frequencies of transmission from W1AW will be 1885, 3555, 7130, 14,100, 28,060, 52,000 and 164,000 kc. W7TQD will transmit on 3544 kc. The next qualifying run from W5OWP only will be transmitted on April 5th at 2100 PST on 3540 and 7248 kc.

Any person may apply; nor is ARRL membership nor an amateur license 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 five 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 are made from W1AW each evening at 2130 EST. References to texts used on several of the transmissions are given below.

**April 2nd**: Pointless Shielding for the Plug-in Code Transmitter—Exciter, p. 10

**April 4th**: A Radio-Control System for Mobiles, p. 17

**April 8th**: TVY West That's for You, . . . p. 20

**April 10th**: A Battery-Operated d-Meter Pointable, p. 25

**April 14th**: How To Wire a Transmitter, p. 30

**April 16th**: The Wavelength Factor, p. 40

**April 22nd**: Fundamental Teletypewriter Operation, p. 45

**April 24th**: The World Above 80 M.C., p. 48

**April 28th**: A Mobile Installation, . . . p. 54

_NATIONAL CALLING AND EMERGENCY FREQUENCIES_

<table>
<thead>
<tr>
<th>C.W.</th>
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<tbody>
<tr>
<td>7100 kc. (day)</td>
<td>3875 kc.</td>
</tr>
<tr>
<td>3550 kc. (night)</td>
<td>14,225 kc.</td>
</tr>
<tr>
<td>14,050 kc.</td>
<td>29,640 kc.</td>
</tr>
<tr>
<td>28,100 kc.</td>
<td>28,350 kc.</td>
</tr>
</tbody>
</table>

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

The following are the National Calling and Emergency Frequencies for Canada: c.e. — 3985, 7050, 14,090; phone — 3815, 14,160 kc., 28,350 kc.
In sorting through the somewhat considerable amount of material submitted for "With the AREC" this month, it occurs to us that there are a few ways in which you fellows who send in this material (bless your hearts) can help us to present it in 027 in a more thorough and concise fashion. Mind you, we are not complaining, but only assuming that you want to do the job right in setting down these points on how to do it right: (1) Include all the clippings which contain mention of the amateurs' part in the emergency. (2) Be specific as to dates and times. A reference to an emergency "right before last" can be very confusing. (3) If you yourself participated, give a résumé of your version of the activity in addition to any clippings you send in. We don't like to reconstruct a story of amateur participation from newspaper clippings alone, since they are often inaccurate and always written from a different point of view from ours. (4) Photographs are important, and unooped action photographs are the best. We are not much interested in bigwig officials standing around watching—we are most interested in the amateurs doing the operating and the equipment they are doing it with.

Your consideration for some of these factors in reporting amateur participation in emergency communication will be much appreciated by your very busy Headquarters staff.

The freak storm of January 15th-16th hit Milwaukee with heavy rains, an unseasonable thaw, pea-soup fog, lightning, and gusty winds up to 51 m.p.h. to bring action by the mobile wing of the Milwaukee Radio Amateurs Club. On the disconnection of telephone service in parts of northern suburbs, WOSNK rounded up net members and the amateurs soon established an effective net of mobiles and fixed stations at various police and fire stations under the direction of KOPO.

Police officials expressed delight at the speed with which the amateurs set up the net. The Milwaukee Journal gave the hemos front-page notice in their write-up of the storm's fury. We're mighty glad to have the following mobiles who participated: W6OJF, W6EYJ, W6SFX, W6KQG and W7D. W6KQG stood by with his transmitter. — W6BPA

At 0902 December 4th, W7HLC was called by W7EJF and advised that power was off in Coos Bay. With the assistance of W7WJ and W7DAF a circuit was set up immediately for handling traffic as there was no communication out of Coos Bay and adjacent areas. W7EJF was able to pass on an eye-witness account of the damage, which proved the situation to be serious, before he lost his power. Several other stations checked in and at 1000 W7HMX/M advised that power and "phone lines were out in Reedsport. At 1128 W7KYU advised that he was using emergency power. W7HNR/M reported no apparent damage in Tillamook Bay. At 1215 W7EJF advised his power was on but he had a generator available if he lost it again. W7HUX came on with emergency power.

This was the sequence of events on the evening of December 4th in the general vicinity of Coos Bay, Ore. By midnight traffic was picking up at a rapid rate and Western Union and the Telephone Company referred much of it to the bureau. Broadcast station KOW requested an on-the-spot report for their newscast. Arrangements were made from W7APF at Empire through W7II and its 'phone patch. This was broadcast on "News of the World" on NBC. Operations continued for three days, by which time some of the lines were re-established.

Some of the additional services performed by amateurs during this period, and some of the notable events, were the following: (1) A Southern Pacific train became lost because of lack of communication. W7LVM/N located it about four miles from Austa, unable to proceed. He established communication between the train and Eugene. Along with W7HUX and W7MZY, SP train orders were handled with W7KL at Eugene. (2) Considerable business was handled for West Coast Telephone Company from Coos Bay to their headquarters in Everett, Wash. KLTTM/R, W7JFJ, W7VEV and W7IOQ were on the northern end of the link. (3) W6CXX was not available to take over MOS during skip conditions, so W6WCO moved in and did a notable job under very adverse conditions. (4) W7EJF and W7APF shared the MOS job, with W7LXX as relief. (5) W7AWI assisted in getting communication into Crescent City, Calif. (6) Several calls were handled for the Oregon State Police.

Among the agencies served were three press associations, three newspapers, four broadcast stations, Western Union, Pacific Telephone & Telegraph Company, West Coast Telephone Company, U.S. Weather Bureau, U.S. Engineers, Southern Pacific Railroad, Oregon State Police, General Adjustment Bureau and other insurance agencies, Greyhound State Lines, West Coast Airlines, Coos Bay Lumber Co. and the American Red Cross. Traffic included requests for food, drugs, and auto parts, and death messages, health and welfare messages, State Police advisory traffic and calls for police assistance.

Stations principally involved were W6EJF, W7WJ, W7D, W6KQG, W6EYJ, A1Z, W6VYJ, A0F, FL LYN POM BLY HTF LXL WAEF, and MHY. Other stations assisting included W6S WGQ JDN, W6S KTG FBJ WJ BA HHH OJN 111 PKK IIJ HIJ AWI FL E5K RCJ OIS and KLTTM/R. This list is probably incomplete. — W7HDN, SEC Oregon

SEC W6RRX of the Los Angeles Section reports activity by two nets in the recent flood and snowstorm emergency in the Los Angeles Area. In the Owens Valley Area of California a telephone line failure gave the newly-formed Owens Valley Emergency Net a chance to demonstrate its ability. W6WWT, manager of the net, handled 260 messages in six days and there was communication out of Bishop within one hour after the lines were reported down. The net was on 24 hours a day until lines were available again. The Mission Trail Net helped in relaying traffic including weather reports, Western Union telegrams, orders for equipment for the telephone company and traffic concerning a near-by Marine encampment which was snowed in. A good impression was made on the local populace and civil defense officials.

On January 17th, after continued heavy rainfall in the Los Angeles Area, civil defense officials notified W6KEI that 30 families were in danger of isolation in the Tujunga

On January 31st, the Omaha (Neb.) AREC gang assisted in the March of Dimes "Lights On" drive. This control station, on the third floor of the City Hall, kept in touch with 10 mobiles which were deployed about the city collecting contributions from citizens who left their porch lights on, or to pick up an "area captain" with money which he had already collected. That's W6KEI at the mike, with a city official watching with interest.

QST for
An ice storm in the first few days of January left the little town of Crosbryn, Texas, entirely without communication for two days. W5FQ, with the assistance of W5PWS, handled all communication to and from Crosbryn for two days. Assisting on the "outside" was W5s SQQ JQD PTK FKJ FNI and CC. The telephone company got a wire open the night of the 5th and normal communication was restored.

Four amateurs set up a circuit which may have prevented serious fires on the Santa Fe Railroad between Williams and Flagstaff, Ariz., when high winds, sleet and ice disrupted signal communications, leaving six passenger trains without contact with the division dispatchers in Winslow. W7OJQ who, with W7LTO and W7KQG, soon established contact with W7RU at Williams, W7LYS started on 1200 'phone and W7RU on 75-meter 'phone; but QRM was so bad that W7LYS opened up on 80-meter c.w. and all messages got through in good shape. Leaders and instructions had to the points continued for several hours before a regular telegraph line was patched together. Naturally, railroad officials were very pleased with the work of the amateurs.

Late in the evening of January 2nd, ice started forming on the trees in the southeast part of Missouri and southern Illinois. By the morning of January 3rd, approximately 20 towns in this section were without power or communications. W8PTG was in full swing with a battery-powered rig early Wednesday morning and had established contact with Memphis, Tennessee, St. Louis, Perryville and Columbus, Mo., W4BAQ at Memphis and W6HVQ in St. Louis were active. By Wednesday night most of the Missouri Emergency Net could be heard handling traffic and clearing the frequency for the lower-powered transmitters. On January 6th, W8MBT offered the loan of a 2000-watt s.s.e. generator furnishing power to the Bluff Amateur Radio Society. This plant was put in service Sunday afternoon at Wyatt, Mo. Power and telephones were out for a total of 11 days.

Amateur radio played a big part in obtaining power plants from scattered points in Missouri. The R.F.A. Red Cross, newspapers and State Police were aided by numerous amateur stations in the isolated towns. It is impossible to identify all the stations taking part, but some of the known calls were W6A, NE6RAQ and J73L. "Station Activities," and SEC reports usually come along with the SCMs' reports, so we'll report January again next month, and continue a month behind to make sure all reports are included.

How about it fellows? Do something at your local level so your EC will have something to report to your SCC, so the SEC will have something to report to his SCM and Hq. Let's show some progress climbing toward 100%!

**DX CENTURY CLUB AWARDS**

**HONOR ROLL**

- W1FHI...
- W5ENV...
- W2BXX...
- W8heure...
- W5BEB...
- W5CVP...
- W5YYO...

**RADIO TELEPHONE**

- W1FHI...
- W5ENV...
- W2BXX...
- W8heure...
- W5BEB...
- W5CVP...
- W5YYO...

**NEW MEMBERS**

- Z5BRJ...
- Y7BZ...
- F6KQ...
- G6FG...
- F6FT...
- H1R...
- W3HTO...

**ENDORSEMENTS**

- W6VG...
- W5BR...
- C6BA...
- W6DZ...
- W5Q...
- W5BU...
- W4N...

**RADIO TELEPHONE**

- W6VG...
- W5BR...
- C6BA...
- W6DZ...
- W5Q...
- W5BU...
- W4N...

"It is noted from a paper by R. L. Smith-Rose, Fellow,IRE, in Proc. IRE., p. 18, January, 1950, that speed of transmission of radio waves varies with practical conditions so that at 100 kc. with high loss at heights of fractional wavelengths the speed is 290,550 kilometers per second while centimeter waves propagated at heights of several wavelengths are observed to travel at approximately 290,900 kilometers per second.

"This suggests that a remedy for the three- and four-day delays frequently encountered in semi-local traffic handling might well be found in higher antennas and transmission frequencies. Thus traffic nets might give consideration for operation to higher frequencies with less use being made of bands used. Priority traffic could of course be handled by mobile aircraft where, at altitudes of 9800 meters, velocities at centimeter wavelengths on the order of 290,750 kilometers per second may be anticipated." — W5CP
Atlantic Division

Eastern Pennsylvania - SCM, John H. Dusho, 2 WOE, Net: 3610 kc. The following clubs held elections during January: Northeast (Phila.), IND, pres.; KYX, vice-pres.; BLE, sec.; RNF, treas.;ות, TQK, cor. sec.; NIK, fem. sec.; JWC, membership; Phil-Mont (W. Phila.), QGH, pres.; KBL, vice-pres.; NIP, sec.; TQQ, fem. sec.; LGG, fem. sec.; JWC, membership. The Abington Town Club has opened new rooms in the new Abington Township Club Hall, under the direction of the President, WVQ, 1st Sec.; and the Vice-President, WNP, 2nd Sec. Also, the Abington Town Club has opened new rooms in the new Abington Township Club Hall, under the direction of the President, WVQ, 1st Sec.; and the Vice-President, WNP, 2nd Sec.

Mansfield-Delaware-District of Colmar - SCM, F. E. Hare, 2 WQK, 1st Sec.; and 2 WQK, 2nd Sec. The Mansfield-Delaware-District of Colmar has opened new rooms in the new Mansfield-Delaware-District of Colmar Club Hall, under the direction of the President, WVQ, 1st Sec.; and the Vice-President, WNP, 2nd Sec. Also, the Mansfield-Delaware-District of Colmar has opened new rooms in the new Mansfield-Delaware-District of Colmar Club Hall, under the direction of the President, WVQ, 1st Sec.; and the Vice-President, WNP, 2nd Sec.

Pennsylvania - SCM, John H. Dusho, 2 WOE. The following clubs held elections during January: Northeast (Phila.), IND, pres.; KYX, vice-pres.; BLE, sec.; RNF, treas.;ות, TQK, cor. sec.; NIK, fem. sec.; JWC, membership; Phil-Mont (W. Phila.), QGH, pres.; KBL, vice-pres.; NIP, sec.; TQQ, fem. sec.; LGG, fem. sec.; JWC, membership.

Station Activities

- All operators are invited to report to the SCM on the first of each month, covering what station activities for the preceding month. Radio Club news is also desired by SCM's for inclusion in these columns. The addresses of all SCM's will be found on page 6.
Here is good news for the thousands who own HRO-50 and HRO-50-1 receivers. Now you can extend the range of your receiver to six meters without any changes. Merely purchase the new 6-meter "AD" coil, plug it in, and you’re in business on six!

With the advent of civilian defense, many communities have established networks on six meters and interest in the band is increasing daily. Now that the HRO-50 can be used for C-D work on six meters as well as on the lower frequencies in normal C-D use, we hope the new 6-meter coil will enable many HRO owners to take part in their local civil defense nets. We also hope that it will be the means to enable thorough utilization of the possibilities of this relatively unpopulated 4 megacycles.

Engineering foresight in the planning of the HRO-50 and 50-1, together with the use of high quality ceramic parts in the front end of the receiver makes such a coil possible, with a high degree of performance to be expected. The sensitivity is in the order of 2 microvolts for a 10db S/N ratio and the image ratio is approximately 25 db (5 “S” units). For optimum results, a good six meter antenna (preferably a beam) should be used.

Here is an example of how the demands of hams over a period of time do register with the manufacturer, since he wants to make available those things that are in demand. Here, also, is the main reason for not changing the basic design of the HRO, since it is the only receiver in our line, and in any line we know of, for that matter, to which a new coil can be added at any time there is sufficient interest — and the receiver can be made direct reading on the new frequencies covered. This is quite an accomplishment when you recall that there are now 13 coils that can be purchased with the HRO-50-1, taking its range from 50 kc. to 35 mc. and from 48 mc. to 54 mc. This means that changing frequency assignments at any time could not obsolete an HRO.

Forgive us for our boyish enthusiasm, but the HRO is one subject we get wound up on. Oh yes, the cost of the new coil is $24.50. Order it thru your National distributor. (No extra charge for the lucite scale that makes your HRO-50 or 50-1 direct reading on six meters.)

W. W. Bartell, W1PIJ
WITH ELDICO THE BLIND "SEE" A WAY TO HAM RADIO

ELDICO has long ago established its policy for the Hams... more active Hams... for the good of amateur radio... now and in the future. In keeping with this policy ELDICO designed a line of amateur equipment, in kit form, equal to or better than existing high cost equipment, and made these economical kits available to all by keeping the price down and quality up.

When TVI raised its ugly head, ELDICO's Engineering Staff dug in and came up with the information, tools and needed test equipment, low enough in cost for all to have but equal to high priced units in performance. Because of ELDICO, Hams who would have been QRT are now on the air.

The Private Tutor Course was designed to further advance interest in amateur radio. The FCC provided the opportunity and ELDICO provided the means to become a novice. The ELDICO Private Tutor Course, code in long playing Columbia records and theory in Braille, was presented to the famous Bob Gunderson, W2JIO for use at the New York Institute for the education of the Blind. This has been so successful that the ELDICO program is being extended so that any blind person desiring to become an amateur can do so without cost. Full details can be obtained directly from ELDICO, from any ELDICO distributor or in the April issue of the "Braille Technical Press."

The Private Tutor Course is on sale at all ELDICO distributors: Five long playing Columbia records for code training (a full five hours of playing time), six complete lessons covering Novice theory with examination for each. Copy of the ARRL License Manual. Construction courses for test equipment, transmitter, resistor and Impedance calculators, etc. See the Private Tutor Novice Course at your dealer's now.

Complete course, code and theory ............... $25.00
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Novice Hams is an ELDICO TR-75. It is a simple test to run—get on
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inside this package on your Jobber's shelf... is the world's toughest transformer

made with QZE, OIE, NXK, and PIX during the demonstration. OIE is pleased with its mobile rig. KJM, formerly of WGR, made his debut on W-5 at 7:30 a.m. and joined K6NU at 9 A.M. QTH. ODE and NXK were responsible for obtaining through ham radio for the Erie Dispatch news of the fatal plane crash in New York recently. OSL, a former member of the RAE of Erie, reported his eyewitness account of the conditions and rescue operations via PTK. Other amateurs who participated in the plane hunt were HEC, BQ, KNC, PTK, CQ, MS, and mobiles 2GSL, 2ABC, and 3YUH. The Warren Radio Club has such active members as PAV, acting secretary, SQI, J3O, JG1, J8Q, LNL, NQ, PHC, KYW, BOZ, OMK, MWR, RJJ, LEE, TOJ, RNM, and NQ1. Down Pittsburgh way, the Steel City Amateur Radio Club was operating YXVQ, Please note that the PARCC is being revamped and is known as the Western Pennsylvania AM Radio Club Council. JQV under the operating ability of WCKW is working the club station to good advantage. NRQ is now on 1410 m at 3:55 p.m. on 3900 kc. TAP is now receiving from Korea. APR, we understand, is the only active station on 75-meter phone from down in Jeannette way. In Johnstown, KVO has been newly trained for EC work on the 75-meter band. Another new nozzle in Pittsburgh is KWSB, who reports he has worked 14 states on 3.5-Mc. QSO reports he has made up to now are 33 reports. JG7P is also new on the 3.5-Mc. band. QSO to radio ham is WSN5X. OEZ is now Class A. Heard in the recent WJF Contest were LCL, LCL, and KLR. The Mercer County Radio Assn. in Windber is proud to announce that George Heim, treasurer, now is WNS5Y. In spite of the local plus of total blindness he is working very diligently for his General Class Ticket. WNS6J is about to try it out from Goveille, will have a 32-flanged 2-meter of new stock. The Pennsylvania/Ohio 2-Meter Net now operates each Monday at 6:30 p.m. on 146.8-Mc. Frequency. WTVQ, on 948-FM, is operated by UNH 32, KUN 30, GJY 12, KWL 10, VNI 8, MIZ 2. (See) W8GEG 259.

CENTRAL DIVISION

ILLINOIS — SCM, H. F. Lund, W9EQL — Section Neta: TEN, 3400 kc.; LBN 3615 kc.; SEC: QZL. Asst. SEC: HPG, PAM, VQ, TM, EUK, ILN. Licensed earliest starting time to 3:00 CST Mon. through Fri. He spends most of his time as NCS on TXN. OUC is doing well, with 30 watts to a 4600 kc. and a 3-lb. regenerative receiver. ICQ got confirmation from country No. 1 phone, PEC skeds PED/9, who is at the University of Colorado. MNB06 worked on 75-meter phone and 3.5-Mc. crystal-controlled converter. YYX has returned to the air and is now on 3.5-Mc. c.w. and 4-Mc. phone. UAT, vacating in Miami, advises that the beach bugs interfere with his operation. RPL has returned under the same call. STZ maintains daily with his son, PTZ, at Ripon College. UJZ has taken delivery on a 75A-2. Mr. W. F. McDonald, ICCS Regional Manager, spoke on National Defense before the Wheaton Area, York, and Rock River Radio Clubs. He got back in Dixon and spent the week with KFO. The Dixon Radio Club now meets twice a month. LQI and JSF also vacated in Florida. CRK is back on c.w. after a bit of phone. VJN operated on 75-meter phone and had an excellent job in 1951 with its code class. As a result of its efforts New General licensees are OGC, ORE, FIPN, QHY, QC, and QYK, and KNC, PNM, and KQF. PPD, LCG received Advanced Class license and completed work on an 814 final. BTV couldn't load his transmitter until he put on a new meter — the old one was only reading half-scale. OTM dropped the "N" from her call with a General Class ticket. JTV doesn't like Korea since having declared itself. HFA has 2956 final and a liquid beem on 144 Mc. CARC officers are JT2, chairman, JH2, vice-chairman, AII, secretary, KC2, treasurer, RQX is now OFR. QXR is a new rig. In Elgin, K9AAL is operating mobile in the Dixon Area. DXT worked with OGL to make him a new Novato at WAC. CMG is going mobile to get in operating time. 4CV0/4Q0 will be in the Virginia 'phone net; his old home state gang. DOR has joined the 1.8-Mc. gang. KNC again is going. KXXX gave up 28 Mc. In favor of 144 Mc. KTV is stationed at Great Lakes and is on 4-Mc. phone. QAB and QCO are new rigs in Waukegan. The Weather District is not represented in the All-50 states Novice on 80-Mc. work. It is with regret we report VOA as a Silent Key. Traffic: Jan. W9BUR 200, CSW 175, YXX 106, SRL 101, ERI 79, KJ 84 Free copy of NRT 48 today, or get it from your distributor.

CHICAGO TRANSFORMER

DIVISION OF ESSER WIRE CORPORATION

871 ADDISON STREET • CHICAGO 18, ILLINOIS

(Continued on page 80)
Higher Power at Higher Frequencies...

with EIMAC 4X150A!

COMPACT and rugged, the 4X150A is the most powerful tetrode for its size in the VHF and UHF spectrum. Capable of a power output of more than 140 watts through the 420 Mc. band this mighty bantam is the class of the field in higher frequency operation. Excellent power gain and stability plus high power output with plate voltages less than 1000 volts are among the many features establishing the 4X150A as the tube for the amateur who wants a big wallop in VHF and UHF service.

The 4X150A's small, compact design and ability to operate in a simplified transmitter with low driving power make it ideal for a low or high frequency mobile rig. Requiring simple forced-air cooling, this general purpose beam tetrode has an oxide coated cathode and external anode. Wide application of the 4X150A in ground and airborne communications, video amplifiers, TV sound amplifiers, FM and TV r-f amplifiers, and STL and dielectric heating service is firm evidence of its outstanding dependability and performance.

For proper and efficient operation it is suggested that the 4X150A be used in its new, specially designed air-system socket.

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<td><strong>Power Input</strong></td>
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<tr>
<td><strong>Power Output</strong></td>
</tr>
<tr>
<td><strong>Heater Voltage</strong></td>
</tr>
<tr>
<td><strong>At 165 Mc.</strong></td>
</tr>
<tr>
<td>(Power output at 500 Mc. 120 watts)</td>
</tr>
</tbody>
</table>

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RF CABLES made by Amphenol are the product of continuous research and development by Amphenol’s expert staff of engineers. These low-loss cables are designed to give top performance under all conditions. By production control and inspection assure that they will perform as specified.

“MIP” TUBE SOCKETS are the strongest in the world! The sturdy steel mounting plate is molded directly into the socket body. This makes it possible to mount the tube without loosening or vibrating.

POWER PLUGS made by Amphenol meet the need for a water-proof connector for use in close quarters. These plugs are separated or drawn together by a single screw for quick connection or disconnection.

RF CONNECTORS provide a convenient connecting link between coaxial cables. Amphenol RF Connectors provide never-failing continuity, low RF loss and a long life of sustained performance.

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The Anderson Radio Club has a Novice school with 43 enrolled. KAS is new OBS. The Kokoome Radio Club now has 35 members, UNK, new OBS, rebuilt its SCL, 252, at WQH has 151 members on 7 MC. New OBS and KDN, ZGQ, receive 151, MDL. New officers of the Tippecanoe Amateur Radio Assn. are LJI, prec.; JBG, vice-pres.; LKV, KY, TIC. New calls are included PEO, QNZ, KUK, PPC, PFF, QBD, QNI, QM, PIU, PSE, PFD, QVU, PAQ, YPO, and PLQ. In the Pacific NW got its first automatic morse decoder, a new antenna mast is being built. New members are the Microwave Club. The Microwave Club is outfitting a trailer to be used as a mobile emergency communications center. GMA is editor of the Lake City Echo Club paper. MTY now owns a W4X, KUN has a code and theory class. PBS has run on his receiver again. JRY has 5 puts on 440-Mc. *phone. New officers of the Ihepatoplis Club are ATS, prec.; KCP, vice-pres.; D. Miller, secy.; and C. Pence, treas. The Indianapolis Club was organized August 28, 1974, and is under the direction of W2WY. GMG has a 160-meter *phone. GAC is recovering from a broken collar bone. W2Z and TRM have new transmitters. GAR is the new state archery champion. I2P has a new voice recorder. QCT is now at Elkhart with 6V6 oscillator. IF is having a traffic total of 150 for January, and covered 35 cities. JI has a new NC-410. BK has made W6G and plans new TVI-proof rig. Total QTH traffic for January was 780. The Martinsville Club has a grid-dip meter and a new TVI committee. FYW has installed a code and theory class with IYK as instructor; also a TVI committee under LJJ. BRW is on 75-meter *phone. The TARS TVI committee is headed by OJS and OBS. Melvin Osborne, CJO, former treasurer of the Indianapolis Radio Club, moved away Jan. 1st at his home in Indianapolis. Traffic: (Jan.) W2KJ, KJQ, 1402, TT 320, NOG, 202, KJX 115, IJH 109, LBI 85, QLX 85, BKJ 74, JFTX 85, DGA 85, KDV 48, PMT 30, DOM 24, FZM 30, RZS 17, BDP 15, CLOX 9, BCR 2, etc. WJIPZ.

WISCONSIN — SCM, Rene W. Goetsch, W2RQM — SEEC, OVO, PAM; ESJ, RMs; GBE, IQW; *Phone Net (BEU) 3950 ktt. 6 P.M. daily. CWM, 3511, 7 P.M. daily; slow speed at 1:30 P.M. Net certificates (BEU) are issued to GPL, EAN, HEL, DOR, H1D, and AOW ANN. NIK is a commercial 144-Mc. nets. GBE comments, and questions relative to Emergency Corps e.d. activities should be directed to him. IQW is mobile on 12-Mc. e.d. and 3.7-Mc. work. GBE, MAC, GBE, JTV are all selected OME, prec.; LNM, prec.; GFW, secy.; LS; JS; LSV; JTV; AVM, W2FVPV, FKB, directors. TRG paired, a 320-kw. lab is a.m.b. to both the Maxwell and Pinckney Club, PMH is operating a local 28-Mc. mobile net. The Manawah Novice program was gotten underway by KRT, ZKB, and ARV9. KRT is working for a Viking transmitter kit. APY is new to the Beaver Dam Area. The Dells Region and Kenosha Clubs now are AARR affiliated clubs. ERW is working on 14-kw. rig. WNOQCH and W2PQF are qualified for RCO and recently concluded a QSO of 3 hours and 11 minutes. SEL received a new appointment. ION is in the Air Corps, JBP is interested in BTY. The Blackhawk Club elected FCY, prec.; OOD, secy.; JBY, vice-pres. The Club station, 25/news, is being operated on the Milwaukee police mobile units provided emergency communications when about 500 telephones were out. FAN completed v.b.f. and h.f. regenerative grid-dipper. GME worked DME with new 144-Mc. mobile rig. UF 60’s car looks like an octopus with all of the antennas—ham, broadcast, and both high- and low-frequency police. H-M will call QST Sept. 30 at the Wausau Hamfest April 26th. Section and local meetings of the Council of Radio Clubs are scheduled for the afternoon. Transmitters on 3.8 and 28 Mc. will be on the lookout for mobiles. JIO informs us that the Motor Vehicle Department will now issue call letter license plates to all licensed amateurs with proper endorsement. K5JWQ qualified the MVD had interpreted the call letter plate license law to allow such issuance only to s.o.r. with mobile installations. Traffic: W2SFR, 500, IKA 100, 320, FZM 30, BVR 7, SPL 75, GP 70, DR 25, ANM 25, FXA 14, FJS 19, LS 15, TPA 14, RMM 10, ZGL 8, OOD 4, HZ 2, OVO 2, WNOQCH.

DAKOTA DIVISION

NORTH DAKOTA — SCM, Everett E. Hill, W9WVKP — MVD is in State Police Department. W9WVKP wishes ideas from clubs and individuals on a plan to tie in police and ham mobiles, CUF and MLD are busy installing the new equipment. MVD is in charge of the project which meets each Sunday at 000 on 160 meters. ZCM is NCS of the Nodak Net, which meets Mon., Wed., and Fri. at 000 on 100-200 kHz. The net is open to anyone with a call on 160 meters. Notify K5JWQ if you wish to check in. New officers of the Jamestown Club are HJK, prec.; EBN, v.p.; and EMT, secy.-treas. K5JWQ regrets moving to Minneapolis. The Fargo Club is holding a civil defense drill each Thursday at 1830 on 20,000 kc. Your SCM is interested in qualified individuals applying for BEC appointment.

(Continued on page 88)
• Space and appearance a problem? Try standard open-frame relay racks recessed behind sliding doors in a completely-screened enclosure for TVI prevention. The view-covered operating table slides into space left between two panels and is supported by simple brackets. Install the equipment in front of a window, also screened, to take advantage of antenna access and adequate ventilation...otherwise use an exhaust fan. And right at home in this space-saver station is an E-V Microphone...the E-V Model 630, for instance. The 630 is a communications microphone proved in thousands of stations with stand-out signals. It features the exclusive E-V Acoustalloy diaphragm, extra rugged to withstand hard use. Response and output are engineered for signals that cut through QRM! "On-Off" switch; choice of high or low impedance models. List? Only $42.00. At authorized distributors everywhere or write W5HCW.
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Whether you're a constant tinkerer or just looking for some tips to help you improve your gear, you'll find some mighty valuable data in this popular QST column. In the past 12 months for example, there have been

49 “articles,” containing
19 diagrams, using
14 pages

of Hints and Kinks for you! More are coming. Don’t miss any!!!

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$5 elsewhere

continued from page 81
With good old summertime just around the corner, our favorite crystal ball tells us that at this very moment there are precisely 99,999 amateurs who are dreaming of building that super-duper, never-to-be-equalled, portable-mobile rig.

By this time next month the glove compartments and the luggage trunks of 99,999 family jalopies will have been filled with a miscellaneous collection of radio parts connected together in 99,999 different ways to produce the most efficient, the most versatile rigs the world has ever seen.

This is great dreaming! And we’re all for it! Because we know that a high percentage of those 99,999 rigs will be powered with an efficient Mallory Vibrapack* vibrator power supply.

The power supply is the most important single unit of the portable-mobile rig. It must be rugged, it must be dependable, and above all, it must be tailored to fit your needs.

Why don’t you let Mallory help you with your portable power problem? We have prepared an Engineering Bulletin describing the Vibrapack vibrator power supplies... it contains a wealth of practical information about connecting them to your equipment, voltage vs. current output curves, and filtering specifications. This Bulletin may be had simply by addressing a QSL card (or postal) to P. R. Mallory & Co., Inc., Box 1558, Indianapolis 6, Indiana, and asking for vibrator power supply information.

And don’t forget, your Mallory distributor can supply you with the most dependable line of: ham band switches, push button switches, controls—rheostats—potentiometers—pads, tubular capacitors, dry electrolytics, transmitting capacitors and dry disc rectifiers—practically every component you need to keep your rig in A-1 condition.


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HUDSON DIVISION

EASTERN NEW YORK — SCM, Stephen J. Neason, L2WTH — RMs: TYC, KBT, PAM; LG, NIV, JQ1. On Feb. 9th NYS celebrated its fifth anniversary. NYS Net meets on 3055 kc. at 7 P.M.; NYSB on 3655 kc. at 6 A.M. daily. Our full support should be given to these nets. New outlets are needed. A new call in Cairo is JYO. WGE is on 35.5 kc. with low power while rebuilding. PEN, now stationed at Philadelphia, sends its regards to the gang. The Rip Van Winkle Club reports new Novice members as follows: WNS PED, KHQ, and KWO. A new net on 144 Mc. when he gets up an antenna. AREC activity is at an all-time high. VP, Ulster County EC, is giving FBI cooperation from c.d. in Kingston area. L2LB, FBI, DYZ, and VP now are mobile on 3.8 and 28 kc. SNN and LDS report AREC is very active. YX6 has completed new rig which covers 3.8 through 144 Mc. WWX has completed improvements on 144 Mc. YBG, WIHX has new 183 receiver. HUB is mobile on 3.8 and 14 Mc. Appointees are reminded to check their end of season QSLs. They have been good. WY6Q is still waiting to hear ZOY, is your club represented in this newf? If not, let’s hear from you. How about a section get-together next LO-K1R? Let’s have a good time at 15,000 for the frequencies. Your SCM will be operating on the low end of 75 meter. GM was the guest speaker at the Rip Van Winkle Club; your SCM was present. APP like to hear from old-timers (10 years or better) in the Tri-City Area. He has plans for a skidz. CLL is enjoying a good rest and will be back with us in the fall. Arrangethe following items: VP and DYZ as ECs; WIHX and JQ1 as ORS; JQ1 as I’AM. Endorsements: AAD, VEE, SQW, WBH, FCQ.
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- A total of ten tubes including CR tube and five miniature.
- Cascaded vertical amplifiers followed by phase splitter and balanced
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- Greatly reduced reticle time.
- Step attenuator — frequency compensated — cathode follower verti-
  cal input.
- Low impedance vertical gain control for minimum distortion.
- New mounting of phase splitter and deflection amplifier tubes near
  CR tube base.
- Greatly simplified wiring layout.
- Increased frequency response — useful to 6 MC.
- Tremendous sensitivity 0.5 RMS per inch Vertical 8V RMS per inch Hor.
  Clear control-in-via single sweep frequency circuit — smoother actin.
- Positive or negative peak internal synchronization.
- Multivibrator type Wide Range Sweep Generator.

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standing features and really excellent performance. A scope you'll truly
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former, punched and formed chassis, etc. Detailed instruction manual
makes assembly simple and clear — contains step-by-step instructions,
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scription and parts of scope. A truly out-
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- Quality Simpson 200 micropamp meter.
- New slim battery holder and spring clip — assurance of
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- Highest quality precision resistors in multiplier circuit.
- Calibrates on both AC and DC for maximum accuracy.
- Terrific coverage — Heads from 1½v to 1000V AC, 1½v to 1000V
  DC, and ± to over 1 billion ohms resistance.
- Large, clearly marked meter scales indicate ohms, AC Volts,
  DC Volts, and DB — has zero set mark for PA alignment.
- New styling presents attractive and professional appearance.

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designed cabinet, combines style and beauty
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minimum of space on your workbench. Covers a re-
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(Continued on page 90)
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We don't claim that putting condensers in a rig that is inefficient will magically change your results to top quality. We do assure you that the high quality of workmanship and materials that are a part of all BUD products will aid in building efficiency. High Q and low inductance are the natural results of this quality product. All things being equal, BUD condensers will lead the way to better and more enjoyable mobile work.

**THREE-GANG TINY MITE CONDENSERS**

Hams, Radio Constructors and Experimenters can find many uses for these compact, three-gang condensers. Designed particularly for high frequency use, they are adaptable for use in converters, preselectors and receivers covering the Amateur, Television and F.M. bands. Well constructed with soldered brass plates and ceramic brackets. Rotor shaft extended ¾" at rear. Height 1½". Width 1¼". Length behind panel 3¼". Mounting holes 2½" apart.

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Cap. Per Section</th>
<th>Min.</th>
<th>No. of Plates</th>
<th>Amateur Net</th>
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<td>6</td>
<td>5</td>
<td>4.71</td>
</tr>
</tbody>
</table>

**TINY MITE DUAL CONDENSERS**

The construction of these units is similar to the regular Tiny Mite Tuning Condensers. The two end pieces are held together firmly with two tie-rods. A separate round plate is soldered on rotor rod to shield the two stator sections. Large surface front and rear sleeve bearings, provide smooth rotation.

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>CAP, PER SECTION</th>
<th>Max. MMFD.</th>
<th>Min. MMFD.</th>
<th>Air Gap</th>
<th>No. Plates Per Section</th>
<th>Overall Length</th>
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<td>7</td>
<td>3.93</td>
</tr>
</tbody>
</table>

**TINY MITE TUNING CONDENSER SINGLE SECTION**

This series of condensers has been designed for applications where space or weight are limiting factors and for tuning of ultra-high frequency circuits. Rigid construction, close fitting bearing, positive rotor contact and Statelite insulation are the outstanding features. Cadmium plated, soldered, brass plates and rods insure high frequency efficiency.

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Max. Cap. MMFD.</th>
<th>Min. Cap. MMFD.</th>
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</table>

*Denotes double bearing.

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No. 132C Coaxial double tapered spring ....... 8.75

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No. 132XC Coaxial double tapered spring ...... 9.85

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No. 142 Less spring, with insulator ............ 3.25
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No. 100X Heavy Duty D. T. spring only ........ 5.50

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Fits All No. 132 and 132J Models

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AB/W20, 40 or 75 meter coils,
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MASTER CIVIL AIR PATROL ANTENNA 2374KC .... $9.95
Extra C.A.P. coil ................................ 3.60
Extra C.A.P. shield ............................ 1.75

STAINLESS STEEL WHIP ANTENNAS
Fits All Master Mounts
SERIES 100 with ¾, 24 Thread Studs

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<th>Model No.</th>
<th>Length</th>
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Series 106 Without Studs, Fits Model 92 Extension

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<td>106-96S</td>
<td>96&quot;</td>
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</tbody>
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Master Mobile Mounts, Inc.
P. O. Box 1817 · Los Angeles 36, California
Warehouse and Shipping: 1306 Bond Street
Hudson Features

Eldico of New York

Equipment

2-Meter Superhet Receiver

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Complete kit with instructions $59.95
Wired and tested $94.95

2-Meter Crystal Controlled Transmitter

Crystal controlled 144 to 150 mc. 6A5G's crystal and double stages driving 2E26 final up to 22 watts input. 805 speech amplifier for carbon microphone input, 805's modulators. Modified pi network output for ease of coupling to any type of antenna.

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The instrument to give you positive antenna performance and efficiency. An impedance measuring meter used in conjunction with the Grid Dipper. Measures radiation resistance, resonant freq., transmission line impedance, receiver input impedance, etc. Each kit complete including 10 Meter.

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Holds WNBFEK. RR is back on the air after several years' inactivity. LF is preparing to move into his new home and equip it for new 15-meter band. FZK is trying to work V7 on 75-meter phone with 6 watts. JYF is going mobile with clamp-modulated S67. BUL now is in West City. HARC held its regular meeting Jan. 18th and presented two technical pictures obtained from General Electric. Now that the new call-letter issue is no longer an issue, JYF urges that all Missouri hams apply for their new plates promptly. Between traffic schedules on 80 meters, BVL has worked some nice 80-meter DX. DXC also called JYF at 1630 ZL, being the winner of another $100 certificate. Traffic: WQXO 716, KXV 146, IGY 127, GAI 113, GBR 77, C7F 72, EBE 38, FHR 36, PTQ 34, CRK 29, HUI 22, OUD 21, PTG 10, QAIF 9.

Nebraska — SCM: Guy R. Bailey, W8KJP, Omaha. Emergency Corps, with 14 members, conducted the Omaha Mothers March of Dimes collection Jan. 31st, helping to collect $2,020. Control Station EQU in City Hall was manned by BQZ, DSM, QSC, QXX and OCQ. Officers of AROE are PHW, pres.; CQX, vice-pres.; QHG, sec.; YMU, treas. CRZ reports new officers of North Platte ARC are CBR, pres.; EXK, vice-pres.; CRZ, sec.; with ATU his assistant. EEN is the new call of Jack Mertner, back on with an 816 after many years' lay-off. PJD and BDR are mobile now. Nearly every RYV is handy to help Greenwood on the Nebraska nets. VNN, new reporter on the c.w. net from Norfolk, has Harvey-Wells and Linnet. Do exec. KHG reports on commercial u.m., KPZ in Omaha, KAT, and BDR are on their tours. BZC and KCG are on 10 meter. BZC still is keeping his daily sked with BOQ. KDW still is keeping weekly sked with AJX. NNR reports that he and VDC have finally heard WZI. ATRK is tuning up on 14 Mc. JGX and QAX are both on白领, CRZ reports new officers of the 75-meter net. All Nebraska nets are tuning, WZI, thanks to the Ns KON, KJN, FMW, and UUV. Also thanks to the gang for the nice reports this month. Traffic: January W8KJP 303, FCQ 88, JAI 99, KDW 47, FMW 29, SA1 19, EJX 16, VNN 16, WBP 9, AUH 17, HXQ 6, BZC 5. (Dec.) WBFM 28.

New England Division

Connecticut — Acting SCM, Roger O. Amundson. 1WJHVF — SEC: LRE. LAM: STU. RM: HYF, KYQ still is a topsy turvy man with 92 QSOs, all with different stations, and 1000 MHz. AYC 26, RRE 25, GVK 21. ONU worked FA6BG on 3.5 Mc. with 35 watts. CDB is busy on 10-meter mobile. OO JWZG/1 still says signals are more than plentiful. JA2/21 appeals for a successor as editor of the bulletin. This goes to the first one we can find with printer's ink in his blood. KWD, active in mobiles, says he is on the move 111 Woodbridge. JDW is building 7-Mc. ground plane. The Manchester Club has transmitter huntas with mobiles. EMM and LLM, both Ns, send long reports on traffic runoff. UYF and UWF are the second-and-son team with TBS-8 on 3.5 Mc. LNN is on 75 and 10 meters with TBS-80. EMM has his new S25 modulators. MIL is ARB mobile on 3.8 Mc. FXX is mobile on 3.8, 14, and 28 Mc. L2Z has 2E26 on 144 Mc. RMZ has phone patch. OFY is on his new 75 mc. QHL-WUW on 30 Ns. Now he's in Milford. KUN is moving to new QTH. WNLKYN is new on bob and 28 and 30 meter antennas. KUN is for the Sa. APA goes out on 6-7 and 7Mc. NE is back on 7052 kc. The CARA had a transformer sale by PDP, SLN and BZG visited TBE, GVK worked by phone for the CRZ prize and HYF fourth prize in the CN Party held last fall. GVK got 3-inch scope tube and tuning condenser and HYF got a pair of 801B tubes. VB is looking for someone to climb a tree to put his wire up again. CTT is now on phone, 2-meter mobile. LEH is still on 14 Mc. NOM is building 10-meter mobile. STU visited the New London gang. My RFD mail-box is hard to fill so keep the mail coming, gang, with news for this column. If your appointment has not been renewed by the time you read this you probably won't have it long. Last warning. Traffic: (Jan.) W1ACT 328, HYF 164, AW 152, SCQ 184, KYQ 93, LK 93, BDI 75, HOQ 55, NAM 87, STU 26, RKN 13, JAI 17, ODW 18, RRE 17, USA 13, NBP 9, KX 6, (Dec.) W1STU 47, C0UE 18, APA 13, MNE 13. SCM: ORE, NRE, R. BRACKETT, HWP: SEC: ISG: RM: LK; New frequencies and time: Fine Tree Farm, 39693 kc. at 1900, Mon. through Fri., Sea Gulf Net, 39631 kc. at 1700, Mon. through Fri., All is the first old timer in the State to our knowledge who has applied for and received the new type of license (B). This shows that we have been in ham radio since about 1913. TAM, of Berwick, is doing a nice job on 10-meter phone. SCQ, of Gouldsboro, also on 75 meters, has a very nice signal. New Net is one that we know of to date are VBS, Erwin Parker, Madison; Ult. Hollis Brown, Auburn; UTR, Berwick Taylor, Auburn; URE, H. Taylor, Auburn, MA and the XYL of JYF, also got her ticket with the call UQT. Phyllis, the XYL of JYF, also got her ticket with the call UWE. The first get-together that we know of for the group was on December 12th at the Clarke Schoolhouse (Continued on page 94)
Here's your Opportunity

to prepare for a good job or a business of your own in TV SERVICING

There are today more good jobs open in TV Servicing than there are trained and experienced men to fill them. Yes, thousands of opportunities exist now for good-pay jobs offering employment security for years and years to come. Thousands of TV Servicing jobs are going begging. Do you want one of them?

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Under-dash xmtg, offering VFO on all 77-20-11-10M bands, VFO or xtal control, complete bandswitching tone or CW, direct reading, plate mod., 50W max. input. Includes 3-5AG, 6AR3, 6C4, 12AU7, 2-816G, 807. Requires 200-600VDC on 250 ma, 0.3 AC/DC @ 4.5A. Compact 75x7x12", 14½ lbs.

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38-200 A84 High Imped. $149.00
38-201 A84 Low Imped. 139.00
23-435 PSAS500 Pwr. Supply 39.50

GONSET CONVERTERS!

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MONITORADIO FM MOBILE RCVS!

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<tr>
<td>*Antenna</td>
<td>6.85</td>
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MASTER MOBILE!

Radio Shack stocks the complete line: mounts, whips, extensions, roof-top and side-mount coax 140-165 MC antennas (with cable).

SALE OF 3-WAY PORTABLES!

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HALL on the 31st of May. There is going to be a pie-baking contest for the XYLs. Don't ask me how it is going to be judged but it will be fun and we will have dessert after and a swell supper that will be served. There also will be a glass-blowing demonstration and one on electronics put on by Jack Colle and last but not least one on computer by Clubs mobile, too, with prizes. Traffic: W10HT FT 50, FT9 43, LK1 41, E8F 39, HX2 28, MFJ 23, OLQ 20, NW 18, QEX 14, SEC 12, FDN 7.

EASTERN MASSACHUSETTS - SEC; Frank L. Baker, Jr., W1ALF - BHW now is EC for CHEC; UG is working on Falmouth; WP is helping with the committee for c.d. work. Apointments endorsed: As EC - RCJ, Marlboro; JNY, Milton; KTO, Cambridge; UE, estates; AAQ, Concord; AJV, Brookline; TCY, Quincy. WR, Hamilton: OLF, QBN, Walpole: UAW, UXO, Quincy. WB reports the forming of the Belmont Amateur Radio Club for c.d. work. CHS is on 490 MC, RTO and RR have gone to sea again. IXH called a meeting of the HFOC gang; THU transferred to WX-L, and BD is busy with tests on 1.9 MC for DX. W1NUIEC, Joe Mahoney, is a new ham in Milton. Louis Prince is W1VOH and K25LP. THS, GUI, S0TO/L, IFL, and one or two others, have been building wire, LIM, LYL, HYG, KHV, and T9ZQ present and an 11 o'clock toast to UDC, who left for the South. Club officers are IFL, pres.; KVT, secre.; YZ, treas.; and four others, board. Shore Club had an FCC meeting with GM, QVC, and QAM as guests; also slides by FWS of various members' stations. T-2 FT is building a Club held evening of a meeting and a lecture. The Quincy-Amateur Radio Assn. had OEX as a speaker and held an election of its officers. The Eastern Mass. Club had RYB as a speaker and CW's and G3B on cable. They conduct code practice at 7 p.m. DOW now is in MARS. The Brimbee Radio Club held its monthly meeting; G2Y has Extra Class license. W1UVO, ex-QZB, is in Cambridge. UBO has his Advanced Class ticket. W1NUI/B1 is in Boston. The T-9 Radio Club had its first meeting of the year with KXN/KB4 a new member. HZS has HH50 and is on several bands with a VFO being built. Heid, Wright, W1NUI/B, is on 3.5 MC and is working with PGW in c.d. work on QSL cards. W1PHC has HZS on 3.5 MC, RSE is busy TTV-proofing his 150B, and is in NPL. Emergency Net on 9.9 MC. BWN, Lynn, has a 9B50 and gets on 7 MC. W1JID reports that a meeting was held in Lowell for c.d. work for Region 4. SCS has applied for OCS appointment. She and W1CQ, C6, are building wire. G2DR, a member of the Sea Gulf Net, and has MARC certificate. New Novices in Wellesley: UYV, TTY, XYL. UBO, UXB, UXG, and the Novice Crew are building wire. ELP has new beam, a 3-over-3, W1NUI/B is Bob Morse, the Gypsy Radio Club has a net on 28 MC. Tues. and Thurs. at 6:30 p.m. The Club had as guests two members of the Merrimac Valley Radio Club. STA, our EC for Haverhill, has as his assistants IWR, MTS, and SNZ. STA is on 7 and 28 MC. FSH has a net going in Malden on 7 using KXW, KRS, L2D, and LEE. On have asked FEC to be our EC. JYJ gets on MARS, the Dog Net, and MIX. W1WAF moved to the city Club. Over the weekend, RCJ, our Marlboro EC, has had a busy week with c.d. work and as president of the Framingham Club. Officers of the Wilkes-Barre Club are all MC. W1H, ex-W2YN, KYO, sexy-turns. PIM gave a talk on crystal converter for 144 MC. KVQ gave a talk on color TV systems. Pat Smith and EOC, Winthrop, RR, our SEC, is getting up a set up for c.d. work. TQF is forming a mobile net in Boston on 28 MC. Traffic: (Jan.) W1DFE 648 LM 100, JY 198, JCA 121, NUP 74, S59, W1NUI/B, DM 61, BT 26, CTR 17, AVY 11, NML 10, THU 6, BB 4, QON 4. (Dec.) W1NUI/E, ILN.

WESTERN MASSACHUSETTS - SCM, Victor W. Paunoff, W1E0B - SEC; JYH, PAM, RDR, RMI; EBX, West Mass. Net meets on 3720 ke, 7 p.m. Mon. through Fri., combined regular and slow speed. Sixteen different stations reported into the net during January. Let's have some more. W1DUI/E already has the "N". Who will be the first to come up with an Extra Class license? MUN met several of the W4 gang in Florida and handheld mobile traffic was on. A lot of the finalists in the science talent search with his home-grown Geiger Counter, AMI is a civilian again and is active on the air. BDV is finishing up his mobile and he may have to submit to an educational publication shortly. TZA has 10-meter phone rig parking. TRS expects to join WMN shortly. New DXC are N2D, Authority, W1CQ, North Brookfield; BNO, Fitchburg; HPB, Westboro; and SPP, Worcester. If you haven't registered with your EC yet, I urge you to do so. It may prove to be a real help for RACES operation. See QST for details on RACES. I am looking forward to meeting each and every one of you at the coming New England Club Convention to be held at West Springfield to be held June 14th. Traffic: (Jan.) W1DUI/E, RHO 100, TYA 19, TZA 18, MOK 12, GVR 10, BDY 4, NY 4, CKR 2, RXD 7, QL 1. (Continued on page 98)
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ONLY $42.95
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★ 10 TUBE, AC OPERATION!
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BOTTOM PHOTO at right shows SOME of this tuner’s amazing features: (1, 2) selective FM-AM pilot light system; (3, 4) separate 3-pang tuning condensers for FM and AM; (3, 6) separate built-in AM and FM antennas for local reception; (7) miniature tubes throughout; (3) built-in dual-filtered AC power supply.

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SPECIFICATIONS: 10 tubes — FM: 3-GBA6, 6BE6, 6AL5; AM: 2-GBA6, 6BE6, 6AT6, and 6X5 rect. Three controls: tuning; on/off/vol.; switch AM/FM/Phono/T.V.-Audio. Separate inputs for Phono and TV-Audio. Output for audio connection to any amplifier or TV set. Ultra compact size: 11 1/4” wide, 5” high, 4 1/2” deep (10 1/4” deep incl. knobs) 15 lbs. Ship wt. 15 lbs.

SHIPPED COMPLETE with brown and bronze escutcheon, built-in angle brackets for shelf attachment, all tubes and knobs! Virtually TWO separate hi-fi tuners built on one chassis, built only 10 MONTHS ago with new, quality components used throughout!

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QST-002 Tuner with 12" Coax Speaker*..........................57.90
QST-003 Tuner with G-E Dual Cartridge*........................46.85
*Described below pictures at right.

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#4 — S$AVE $53.00. Complete CLOCK-RADIO system! Includes FM-AM tuner, Economy-King 5-watt AC amplifier with mike and phono inputs, and 12" coaxial PM speaker having a 2-pound Alnico-5 magnet, and ELECTRIC SWITCH-TIMER.
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Very truly yours - 73

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  Receivers, Transmitters, Power Supplies, Radiotelephony, V.H.F.,
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- A separate chapter on test and measuring equipment
- 59 pages of tube data, a great time-saver to both engineer and ham
- 161 pages of valuable catalog/advertising sheets, containing manu-
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Regardless of model or age, we will allow you $5 for your old Vibroplex in working condition toward any new, improved De Luxe model.

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Send your Bug and the balance to Harrison, NOW!

PRESENTATION MODEL
24 Knurled gold-plated base top. New adjustable main spring gives wider range of speed than ever before. Polished chrome top parts, beautiful red paddle. Here’s a Bug that will really dress up your operating position!

NEW HAMPSHIRE — SCM, Norman A. Chapman, WJINC — RM; GRW. It is my sad duty to report the death of WIBEJ, Otto Halmach, Nashua. SYG, Toledo, Ohio, has received his W.N.H. certificate, No. 9, for working all ten New Hampshire counties. Ten Hams held annual Banquet at Howard Johnson’s in Nashua. Fifty OMs, YLs, and XYLs enjoyed the social gathering. George Hart, National Emergency Coordinator, gave an interesting talk on civil defense. KEK is on the air with a new bug transmitter. KXU reports working HRIBG on 3.8 MHz. Phone, TRM is working plenty of DX on 7 Mc, KBU, TD, MC 3, and IRC are ticket holders. Members of the Transcontinental Phone Net, TTT, and RMM have new 75A-1 receivers. TBS is our newly-appointed Amt. Route Manager. The following new Novice ticket holders have been reported: UON, Farmington; UPX, Rochester; UGQ, Nashua; USK, Lebanon. We wish to welcome to New Hampshire, HS, Pobrooke, and RR, Farmington. BPT won the W.EY Contest Cup awarded by the Montreal Amateur Radio Assn. The Concord Brassponders elected the following officers for 1962: CMX, pres.; RZK, vice-pres.; BMH, secy.-treas. Trafle: WJNCO 30, FPU 24, POK 22, JGI 9.

RODHE ISLAND — SCM, Roy R. Fuller, WICJH — SEC; MTL, RM; BMN, PAM; BPR. The Rhode Island Net (RIN) meets Mon. through Fri. at 1000 on 3540 kc. The Newport County Radio Club held its semi-annual elections. New officers are ULO, pres.; BBN, vice-pres.; TXF, secy.; TXL, treas. JFF, of the code and theory committee, reports nine new licensed members for the year 1961. At the annual election meeting of the Providence Radio Association, the following officers were elected: CMX, pres.; KOE, vice-pres.; WXY, secretary-treas., licensed but no call; AEJ, secy. NAARO has initiated a radio course in cooperation with the State C.D. Authority to train ham communications. Trafle: WBNB 45, OLB 13, TRX 12, CPY 5, HRC 4, TNN 3.

VERMONT — SCM, Raymond N. Flood, WIFTS. AXN reports TVI trouble. AVP has been reappointed Emergency Coordinator for Rutland County. We need (Continued on page 100)

FIRST VERMONT TO OUTSIDE QSO PARTY
The Tri-County Amateur Radio Club of Brattleboro, Vermont, announce their sponsorship of the First Vermont to Outside QSO Party and cordially invite all interested radio amateurs to participate. Here are the details:

(1) Time: 24-hour week-end period Saturday, April 26, 1962, 6 A.M. to Sunday, April 27, 1962, 6 A.M. EST.
(2) No time limit and no power restrictions.
(3) Scoring: Vermont stations count 1 point for each outside contact and multiply by number of ARAW, Sections and foreign countries worked during contest period. Outside stations score 5 points for each Vermont QSO and multiply by number of counties in Vermont you work. Same station may be worked on other bands for extra score. Vermont stations may work one station in their section for section multiplier.
(4) Engraved certificates will be issued to highest scoring station in each ARRL section or foreign country in the following categories: ‘phone only, c.w. only, combined ‘phone and c.w. A prize to highest scoring Vermont and a certificate to highest scorer in each country.
(5) The following frequencies are suggested to congregate around for this party: 1810, 3525, 3095, 3740, 3800, 7200, 14,000, 14,250, 27,000, 28,100, 28,800 kc.; 51, 146 and 221 Mc. Stations are urged to spread out near these frequencies to help keep QRM down and to allow some of our low power stations to be heard.
(6) General Call: “CQ VT” on c.w.; “CQ Vermont QSO Party” for ‘phone. Vermonters call “CQ de [or call] VT” for c.w., “phone” name your state.
(7) Contact Information Required: Outside stations: Send RST on ARRL Section. Vermont stations: Send RST and county.
(8) Logs and scores must be postmarked not later than May 12, 1962, and should be mailed to Ray N, Flood, SCM Vermont, 2 Marlboro Ave., Brattleboro, Vt.

Vermonters are especially anxious to help those who need Vermont for WAS so here’s your chance. It is requested that the Vermont band frequency of 3740 kc. be left to the Novices to enable them to join in without a pile-up of QRM. Other class licensees who wish to work with Novices stations should transmit near 3005 kc. and tune the Novice band.
Proper selection of your antenna, and its correct adjustment, feed, and matching, can usually at least double your radiated power! For only a fraction of the cost of increasing your transmitter power you can buy the material and measuring equipment to do the job right (and far more easily).

As usual — Harrison has everything you need!

GRID DIP METERS
Look at the used! Grid Dip Oscillator Absorption Wave-meter. Signal Generator. Oscillating Detector. Check antenna frequency. Check circuit Q, etc. etc.
MILLEN 90551 $61.50
LYSCO D11 39.95
ELDICO GDO (kit) 28.50

ANTENNASCOPE
Use in conjunction with GDO! Measure radiation resistance of antenna — impedance of transmission line — standing-wave ratio — receive input impedance.
ELDICO ANTENNASCOPE $24.95 (kit)
Wired and Tested $29.55

MICRO-MATCH
A necessity in the shack! Measure SWR, Measure RF power, Measure RF resistance. Check load impedance. Make sure of more RF in the antenna!
JONES MM-1 (open line) $32.50
JONES MM-2 (coax line) $41.25

SWR BRIDGE
Measure Stand-wave ratio easily — inexpensively with the Millen SWR Bridge. Another must in the shack!
MILLEN 60671 $16.90
M.C. JONES meter for above $19.30

BEAM ROTATORS
Aim your beam for maximum results! Pin-point your signal on that rare DX. Here are the rotors to do the job right.
SMALL PROP-PITCH collars-converted $29.95
Step down xmas 115V to 30VAC 7.95
Radian-tele-rotor TR-1 (control light at end of rotation) $25.97
TR-2 (complement control rotator) 28.97
Alliance Rotator — EIR — $28.97
Four conductor cable 2.98/C

ANTENNA TOWERS
Get that beam up where it will do the most good! TYPOLN mast toppers can be made in ten foot sections up to 60 feet high! Really inexpensive!
TYPOLN 10' mast sections $10.00

ANTENNA COUPLERS
Universal coupling of any coaxial or non-coaxial antenna regardless of impedance to any conventional tank circuit. Adds another tuned stage to your rig.
HARRISON AN-4 complete $37.75
ELDICO ANTENNA TUNER 21.05 (kit)
ANTENNA TUNER 23.05 (wired)
LYSCO Model 50 14.50

ANTENNA WIRE
Type Your Price
1/4 stranded $4.74/100
1/10 solid 3.20/C
1/10 COPPERWELD 3.42/C
1/12 COPPERWELD 2.73/C
1/14 COPPERWELD 1.92/C
CONSET copperweld open wire line $3.70/C
RG-8/U 50 ohms $1.55/ft.

COAXIAL FITTINGS
RG-11/BP (PL-259) $ .59
RG-11 (chassis) .65
RG-11 (elbow) 1.15
RG-11 (junction) .75
RG-11 (T-connector) 1.55
RG-223P (plug type) .55
RG-232R (twisted pair) .55

*ANTENNA RELAYS
Transmitter/receiver control the easy way! Convenience of operation with instantaneous break-in. Ideal for contest work!
ADVANCE K104TR (110VAC) $2.27
7200 (coax 110VAC) 5.95
7201 (extra DPDT contacts) 12.95

*Tie most type of relay in stock; however, for fast delivery, make sure to send us a DO! Free DO forms upon request!
How many do you need?

TEN METER BEAMS
Here's the least expensive way of increasing radiated power. Hear the signals come up as you rotate! There's a directional array to fit every pocket!
HY-LITE PD-2E10 (all-grounded) $24.95
SEND (including "T" Match) 41.95
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#233D (diapole) 8.00

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Looking for a really good Grid Dip antenna for 10 meters? Check the new HARRISON GP-10A. All grounded Write for details on the new HARRISON GP-10A. All grounded Write for details on the new HARRISON GP-10A. All grounded Write for details on the new HARRISON GP-10A. All grounded Write for details on the new HARRISON GP-10A. All grounded Write for details on the new HARRISON GP-10A. All grounded Write for details on the new HARRISON GP-10A. All grounded Write for details on the new HARRISON GP-10A. All grounded Write for details on the new HARRISON GP-10A. All grounded Write for details on the new HARRISON GP-10A. All grounded

SHURE POLICE-TYPE
CARBON MICROPHONE
Ideal for commercial and Amateur mobile units.
Heavy duty push-to-talk switch for relay and make circuits.
Cable Cord.
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Clear, crisp voice response.
Model 102C complete with mounting bracket. $16.17

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25 WATTS PEAK POWER

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Mod. Band | Tubes | Mod. Band | Tubes
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A-14T | 20 M | 3-A9Q5 | A-14T | 10 M | 3-A9Q5
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Any Model with tubes. Each. $33.55

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"Colpitts" Oscillator

Illuminated Dial

Calibrated for 80, 40, 20 and 10 Meters. Output on 80 or 40 Meters, Power requirements 6.3v AC/DC; 1.35 Amps. 200v DC Max., 30 Ma. Tube complement 6AK5 Gk, 6AK5 Buffer, 6AK5 Doubler.

MODEL 381—High impedance, 14" Ribbon Lead with plug for axial socket. Amateur Net complete. $26.95

MODEL 381R—Same as Mod. 381 except that it has 12" Coax cable with plug for axial socket or on 80 or 40 meters. Amateur Net complete. $33.95

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new ECCs for Orleans, Essex, and Lamoure Counties. A new club is getting under way in Rutland called the Rutland C.W. Radio Club. Meetings are held every Sunday night at 8 p.m. A.T.C.T. members’ shack each week. RTTY, SWL, DX, APF, and SPK. The club has a VHF and SPK is deputy commissioner for c.d. in Addison County. M.H. has organized a Slope Club. Ten M.C., and Vermont’s operating nightly on 2740 kc. Mon., through Fri., at 6:15 p.m. All are welcome, so please QNI.


NORTHEASTERN DIVISION

A LASKA—Acting Soc., J. W. Walden, KL7BR

WIDEN activity is good. W7JZH, W7K, AMQ, AMJ, and W7AT are on nightly and AMS is building. Winds of more than 100 m.p.h. in Kodiak in January put most of the west off the air for a while. AA9B, W7BD, and WA9RR will have more chances, and put his skywire back up with 8 copper.

The Anchorage Club station, AA, now is running 10 watts to WJF, AA, running club’s club station, on 11-meter. W7FZJ is running code practice in Fairbanks on 2830 kc. Elmer has moved to Seattle where he was working with v.h.f. gear. FJ is trying out his clamp-tube modulator. How about some reports? I can’t write about what I don’t hear. Congratulations to K1AIF on making BPL two months in a row. Traffic: K1AIF 630, YU 93, AN 5, UM 3.

IDAHO—SCM, Alan R. Ross, W7IU—Burley: EC HAH reports VAC, MJZ, and HAH now able to check into the FARM and GEM Nets. MJZ is working on a home-built 3-hand converter for 20-, 30-, and 75-meter modes. W7JH reports he is building a Hayden Lake: EC FIS is figuring out a way to put a mobile in the Jeep. He would very much like to hear from some of your fellows who haven’t written him before. AA9B—W7BD has worked 111 countries but falls a few short of 100 cards for DXCC. Boks: The gang is going 144 Mc. nightly at 8 p.m. under the leadership of JA1, who is working on a portable rig. JA1 is standardizing a portable rig for c.d. and other uses for 144 Mc. Q10, ORL, ORE, FRA, KSH, Q4X, W4W, K4F, W2V, and AH5 are active in Bozeman on 144 Mc. The Nampa gang consists of YGJ and GPM, and PIT. We urge anyone in the outlying areas to get on 144 Mc. and join the fun. Who said there is only a few of us in the first in the Magic Valley Area to contact this area? Traffic: W7NHI 328, GHT 80, FIS 14, LQU 5, IWX 4.

MONTANA—SCM, Edward T. Brown, W7EZI—COH, BSU, and KQJ reported active in the recent QD Contest. BSU is vacationing in Arizona and California. Throughout weeks of being over the band, we heard few good reports. The best we heard were from the Monatan Power Co. We have been reaching the power-line noise in Billings. Montana amateur news now is appearing in the Pacific Area News every six months. A few copies of this new weekly paper of western going-on’s should contact the State Wg Grub, W7FPIX. We are anxious to receive reports on Montana activity. Traffic: W7REG 148, CT 86, CQV 16, COH 7, BNU 5, PX 1.

OREGON—SCM, J. E. Roden, WMQ—MMW, of Medford, is now Silent Key, and will be greatly missed by the boys in that section of the State. HDN stations he soon will be active on the band again. New officials of the Rogue Valley Radio Club are JPK, pre.; NOL, vice-pre.; LNG, secy. QMK is a new Novice from Baker. AWE is building a new 2-meter rig. LT is on his way from Singapore to Japan. KTC got in his December report on traffic too late to list; he had a fine total of 221. MT is busy building another 2-meter rig. PHM is busy reorganizing the Pendleton gang into an efficient 10-meter bunch, especially the mobiles. HPC reports that the Pendleton gang is wondering who the whereabouts of CH11, formerly of that City. APF has been carrying the burden of the burden in supplying Net Control for the QRM phone net. Because of the lack of a player in the west, our current is about the most heard station and is making use of that fact. ESI, Oregon’s top OQO, sends out reports of the few low sounds and gets in the occasional thank-you and replies. Because of very poor radio conditions, mostly QSB, the traffic reports as well as station reports are quite scanty this month. QRM is W7H 402, APF 271, MQ 101, AW 61, GWE 58, GNN 36, FY 30, HDN 20, KQ 18, IJU 17, EUG 14, TIB 14, DZT 12, NFG 6, PRG 5.


(Continued on page 1/38)
New Pilot AF-605 Hi-Fi AM-FM Tuner
at a sensationally low price

only $42.95

Lowest Cost High-Quality Tuner
Ideal for Custom Installations

The new Pilot AF-605 Tuner provides splendid reception of standard AM broadcasts and the 88-108 mc FM band. Features flat response within 2 db from 20-15,000 cps, with low distortion and high signal-handling ability. Has relatively low output impedance to minimize high frequency attenuation in output cable. Includes inputs for phone and TV, controlled by band switch. With slide-rule dial (each band separately illuminated); separate 3-gang tuning condensers for AM and FM; provision for outside AM and FM antennas; self-contained power supply.

FM Features: Tuned RF stage for maximum sensitivity and selectivity; built-in line; antenna temperature-compensated oscillator; ratio detector with 225 kc wide linear response; 1F response 200 kc wide at 6 db points; 200 ohm balanced input to antenna coil with electro-static shield.

AM Features: Tuned RF stage; built-in high efficiency new "ceramic loop stick" iron-core antenna; IF wave trap; 1F response 7.5 kc wide at 6 db points; separate diode for AVC voltage.

Pilot AF-605 Tuner Complete. Chassis size, 11 1/4 x 6 x 9". For 110-120 volt, 50-60 cycle A.C. Complete with 9 miniature type tubes and rectifier. Shpg. wt., 8 1/2 lbs. 97-944. ALLIED'S low price only ............. $42.95

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IN A CUSTOM
Hi-Fi AM-FM-
Phono System

Here's the special value ALLIED complete home entertainment system that provides superb reproduction from records as well as AM-FM broadcasts. The system includes (A) the famous KNIGHT 20-Watt High-Fidelity Amplifier with response +1 db, 20-30,000 cps—unconditionally guaranteed for one full year; (B) the Pilot AF-605 FM-AM Tuner described above; (C) the General Electric SI201D 12" High-Fidelity Speaker with 14.5 oz. Alnico V magnet; (D) the Webster-Chicago 108-27 Three-Speed Automatic Record Changer with plug-in heads and 2 General Electric variable reluctance cartridges (one for standard records, one for LP records). The system is supplied complete, with all necessary cables and leads for interconnecting the components, plus all tubes, hardware and complete installation and operating instructions. Cables are equipped with plugs, ready to connect—no soldering required. Shpg. wt., 66 lbs. Here is a complete High-Fidelity system, unsurpassed for value, providing wide-range reproduction from records and AM-FM radio.

93-422. Complete AM-FM-Phono System. ALLIED'S low price... $169.50...
$25.43 down, $12.75 monthly for 12 months

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Send today for ALLIED'S authoritative, complete 1952 catalog, listing full selections of tubes, parts, test instruments, audio equipment, industrial components—everything in Electronics at lowest prices. Look to ALLIED for speedy delivery, expert personal help and complete satisfaction. Get your FREE 212-page ALLIED catalog now.
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Adjustable speed control, maintains constant speed at any Setting. Complete with ten rolls of double perforated tape. A wide variety of other practice tapes available at 50c per roll.

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PACIFIC DIVISION

Nevada—SCM. Carroll W. Short, jr., W7BVZ, SEC; JQ, ECH; KJ, JQ, JW, KJ, RO, MAQ, GYA, VO, and Z7. RM: 1ST, OJU, OQ: LG. Nevada State frequencies are 3609, 7225, and 29369 kc. Naco in Elko is QRV. He uses QTK. NWU skeds BZV daily on 7225 kc. Novice QTH on 3793 kc. from Boulder City they bought JQ's Batching. QTH has had Advanced Class license since QJO received Certificate No. 8 for Working 28 Nevada Stations. BSK got No. 9 and 8XD got No. 10. QN is on the air from Nellis AFB. QL is the novice in Reno and has applied for AREC membership. JU made W8S on 3.5 Mc. TJ is handling traffic from Los Angeles. A portable rig to KDJ when George and other miners were marooned in a Northern Nevada snowstorm. The Southern Nevada Club enjoyed a visit to Las Vegas from Nellis AFB in January. Meet your SCM daytimes on 7225 kc. Traffic: W7JJ 26.

SANTA CLARA VALLEY—SCM. Roy I. Coulson, W6LZL. Many meetings formulating plans to combat TVI are being held, and have been held, and the results are up to the same as individuals. Their representatives and the committees will work on this to a happy conclusion. AEV, our SEC, sent in a fine report as usual and says that the e.d. activity is showing new life. Meetings are held at Compton Park. DPE is on 3.5 Mc. c.w. with a new station and is rebuilding his 100-meter rig. NRD now is on 144 Mc. with W2V in San Bruno. WMM is getting the 144-Mc. bug and converted surplus gear for receiver, and also put up square corner reflector. JY, formerly of South San Francisco, now on skeds on new G TH in Colorado and holds skeds with QIE on 7 Mc. NW reports that he still has a very limited amount of time to get on nets.

YMM reports he has been off the air for a couple of months fighting TVI but hopes to be back in the circle again soon. JPP reports he is out of New Mexico and back on the air again. BPT turned in another fine traffic report. The SCCAR had a round-table discussion on TVI at its January meeting and RNC gave a very interesting talk on the problems of TVI elimination. Lt. Comdr. Taylor spoke on decontamination after an atom attack at the first meeting of the NPEC. The second meeting was held in San Francisco. I would like to hear from the rest of the club's to add their activities to this report. Traffic: W8BTZ 31, HI 148, NE IX, YH 116, HRJ.

EAST BAY—SCM. Ray H. Cornell, W6JZJ—Astm. SCM. Gay Black, W6LB, SEC. RVC: RM—IPF, PAM, BCI, FIC. ECT: TVU, ADB, 10X. QNC. The new section offices were held at the Oakland Radio Club, Redwood City. Jan. 12th, JZ, RBL, RVC, IPF, TEP, ADB, QR, KP. HIB and W6JZJ will be launching a new station. Implementation of ARRCS/c.d. plans is in discussion. RZK has an automatic PATT and has started a phone net on 3800 kc. meeting at 10:30 Sunday. Implementation of the FCC plan for TVI is under way in this section.

(Continued on page 104)
NEW MORROW CONVERTER

The latest in Mobile Converters...Easy to operate...Sturdy construction for long, trouble-free service.

Full width dial with 1% calibration accuracy—Built-in automatic noise limiter—1 microvolt sensitivity on all bands—Throat filter, side button dial with a ratio of 20 to 1—Separate isolator coils for each band and stage—Tuned preselector mixer and oscillator—Single point tuning, no images or birdies—Antenna trimmer on front panel—Drift free, pre-calibrated oscillator—AVC on preselector, no strong signal blanking—IF filter amplifier with 4 tuned circuits, output frequency 1525 Kc.—Grey hammer tone finish—Complete with mounting hardware and instruction book.

Model 28R for 10-75 meters, net $54.95
Model 288R for 10-75 meters, net $49.95
Model 38R for 10-20-75 meters, net $64.95
Model 388R for 10-20-75 meters, net $59.95

The LN series converters are identical to the standard 28R and 38R converters, less the noise limiters.

SONAR model SR-9 Cvr.

It's a 9-tube superhet receiver with built-in automatic noise limiter, voltage regulated antenna co-ax connectors. Sensitive better than .5 microvolt. Size 4-9/16" x 5-3/16" x 5-11/16".

SONAR Model MB-26 Xmr

6 Watts output. 6 Standard tubes. Built-in antenna relay system. Power and antenna co-ax connectors. Size 6½" x 7¾" x 7¾".

SR-9 .......................... $72.45
MB-26 ........................................... $72.45
A.C. POWER SUPPLY ........... $30.00
Both Receiver and Transmitter are available in choice of 2, 6, 10 meters and commercial frequencies. AM and FM also.

GONSET CONVERTERS

New! Two-Meter Converter—144 to 148 MC ............. $44.60
Tri-Band Converter—144 to 148 MC, 10 meters and 10 MC ............. $47.60
6, 10-11, 20, or 75 meter converters. Your choice ............. $44.75
Latest Model Gonset Noise Clipper .... 9.25
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IMMEDIATE DELIVERY

MALLARD 10N, 20N and 75N Mobile Converters .................. $39.95
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NEW LYSCCO Mobile Transmitters

25 watts minimum peak power. Clap type modulation. Tuning adjustment from front panel. Dimensions 4½" x 2½" x 6½". Rounded drawn case, black wrap finish. Tubes: Model A 3-6AS8; Model B 3-6V6GT; Model C 3-12AS6. 25 watts power minimum. Amateurs: 10 meters, 20 meters, 75 meters. Civil Air Patrol: For either 23kc or 4585 kc. less tubes $29.50 Net

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Smooth, efficient voltage control, 0-135 volts output from 115 volt AC line. Models also for 230 volt input. Write for free literature. Models for 10, 20, and 30 amp., 3 phase, and hard panel mounting.

Type 20, 3 amp .................. $12.30
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1126, 15 amps .................. 46.00
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Talent and resources are being marshalled. RLD is the sparkplug. The Mt. Diablo Emergency Net meets Mondays at 2100 on 29.6 Mc. TCU is EC and YHQ his assistant for that area. HPW has been appointed a director for RN5. He is making good progress with the section net. RVC recently completed a two-week course in c.d. given by Leuka at Santa Maria College. He held a 10-meter demonstration for the c.d. boys. Harry uses his TV antenna for a top-loaded radiator for 'phone even though the programs are in progress. The NBARA Emergency Net meets Tuesdays at 1900 on 28.62 Mc. WGNL is RC. HOR and JCG were awarded the Bc. Section Net certificate. VDI checks in regularly. MTN, RLB is working on mobile rig and Region 3 c.d. problems. ENF left for Boston, where he hopes to be reassigned to WIREY, UYX and LDB. ELB is working out in the 'phone section of the DX Contest. HOR reports his all-band antenna is working FB. He has worked 45 out of 28 California counties. The CQCO February meeting was held at the QTH of LGW at Alamo. Pacific Division Convention plans and TVI organization were the principal items discussed. Recently-elected officers of the Northern California DX Club are SR, pres.; MVQ, vice-pres.; REK, secy.-treas.; CFT and NIG, directors. The Northern and Southern California DX Clubs held their annual joint meeting in Fresno Jan. 19th and 20th. In spite of "unusual" inclement weather and poor traveling conditions 72 DXCC were worked in attendance. Among those present were ex-3A2AB and W2IOP/W6IOP. LDD is planning to move to one of the more desirable hilltop areas. He is having a lot of fun and is knocking off some DX on 3.5 Mc. John is one of the few hams hereabouts who boosts a ground plane on his band. CTT has increased his FB on all bands. Traffic: W6PW 219, Z9 209, HOR 154, RLB 8, YDI 6.

SAN FRANCISCO — SCM, R. F. Czeklikow, W6ATO — Phone: JU-7-5561, SEC: 6NL, Phone: PL-5-6457, YOUR HELP IS NEEDED. In order to effectively combat TVI, the TVI Committee has been formed for the SF Area. This committee will investigate complaints turned over to it by the FCC, and will handle a conclusion with the complainant. The committee chairman has also decided that if he is radiating excessive harmonics, Reports will be rendered the FCC on the conclusion of each case. A publicity campaign is planned, including its scope appears and information to the TV listener, the amateur, and the serviceman for cooperation in this extensive program. The committee is temporarily headed by J. TOPO. Write to HELP YOURSELF, YOUR FELLOW AMATEUR, AND THE PUBLIC BY BEING PUBLIC-ENEMIES ENOUGH TO VOLUNTEER FOR THIS COMMITTEE. The work is expected to be divided among various committees of three members each, and should require no more than one evening a week for each member. We need several amateurs with certain abilities for certain jobs, regardless of their capabilities in other fields. For instance, we need three men who can talk interestingly and interestingly and who can make a good impression on the public. Likewise, we need several men who can "get an edge on TVI-elimination measures, as well as technical men, who may be called on only in case of extremely unusual TVI conditions, or as a board to suggest the remedies to apply to an amateur station causing HARMONIC TVI. Several all-around helpers are needed. The SCM committee now numbers 3 including JR. ANY EVENT, EVERY AMATEUR WHO FINDS HIMSELF WITH SERIOUS NEIGHBORHOOD COMPLAINTS PLEDGES TO VOLUNTEER FOR THE COMMITTEE TO INVESTIGATE THE TROUBLE before it becomes much worse and receives the FCC a mess of formal complaints. Phone JU-7-5561. AND VOLUNTEER NOW. RCA has, on a national basis, agreed that the RCA Service Company will provide FREE both the labor and the Drake high-pass filter to any RCA set found guilty of fundamental blocking, as long as the set itself is in good working condition otherwise, with some signal strength for at least a fair picture, with an outside TV antenna, and in a service area. (In the area FCO says the service area for TV is forty miles in all directions from Treasure Island.) Complaints of fundamental blocking to RCA sets should be made to the committee, which will handle by letter with the local RCA Co. Full particulars should be given. SO THE DDS ARE SWINGING IN OUR FAVOR — SIGN UP TODAY. The c.d. program is progressing favorably under the various EOCs. The East Bay Net and the Bay Area Net are in full swing, with SWP, JUG, U6V, and J4W handling traffic with those and with the regulars. RAC meets the 4th Fri., 1641 Taraval St., San Francisco. HAMS meet the 2nd Fri., 1023 Van Ness Ave., San Francisco. Martin RAC meets the 2nd Fri., American Legion Hall, Larkspur. Tulalpa RC meets the 3rd Fri., OSC, Vistaro near Centro East, Tiburon, Sonoma Co. ARC meets the 1st Wed., Grace Brecon, Brewery, 2nd Street, near Freeway, Santa Rosa. Humboldt ARC meets the 2nd and 4th Fri., W6CRA Rooms. Mun. Ave. and St. Burea. Traffic: WS6WP 60, J6G 43, ATO 3, U4V T.

SACRAMENTO VALLEY — Acting SCM, Willie van de Kamp, W6CVK — Northern Area: Ass't SCM, Edward (Continued on page 106)
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offers YOU:

LOW PRICES: You can't beat my wholesale prices.

FAST SERVICE: You get fast service. I have big stocks of Collins, National Hallicrafters, Hammarlund, RME, Johnson, Harvey-Wells, Lysco, Gonset, Morrow, Mallard, Eldico, Master Mobile, Hy-Lite, all other receivers, transmitters, parts at lowest prices.

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- 32 sub-miniature tubes on dual super heterodyne and phase modulated transmitter.

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HF-23 (25-50 Mc.) HF-22 (150-174 Mc.)

Hand Carry is the same model as Central Station except for it being small enough to be carried in a bag. It is operated by using the same transmitter and receiver.

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M. Cripps, OY3M. No reports were received from this area. Central Area: Astatic, SCM, Willie de Kampa, 6CKV, GUV has a new SX-71. KXO was on with emergency power during the big snowstorm. QDV lost 20-meters in the high wind. B3II is mobile on 136 meters in the Chico area. CQV net meets every Monday at 8:40 p.m. on 1920 kc. A6E paid the Acting SCM a visit while mobilizing through Chico on 28 Mc. CQV kept contact on 20 meters in the snow storm. KRK conducts code classes week nights on 28.8 Mc. AU3 was isolated for five days without power during the snow storm. AF helped keep PGW on the air during the emergency. Southern Area: Astatic, SCM, Richard M. Hall, 6ZVY. New officers of the SARC are 2WZ, pres.; 1LZ, vice-pres.; L1D, secretary; 2Q7, trustee, etc. Club radio on 146 Mc. at new and prospective amateurs are cordially invited to attend. There is a lot of action on 140 meters for r.c. Director in this area. A71 met with mixed results on 146 Mc. AVE is back on 28 Mc. for a long layoff, SOB is de- TVing receiver and transmitter. 1LZ received Advanced Class license and is on 144 Mc. for traffic; W6QJD 74, ZYV 44, KRX 23, ILZ 12.

SAN JOAQUIN VALLEY—SCM, E. Howard Hale, W6VFY—Reports for last month were few and so late that I sent nothing in for December but will incorporate them in this month's report. W6VFY/R/M/KF6AF were instru- mental in the formation of a new radio club in the Salyer School district of the Modesto Radio Dept. This club is now in operation, has already sent in their report. NOVEMBER, ROANOKE DIVISION

NORTH CAROLINA—SCM, J. C. Gasden, W4DLX Sheet, High Point, passed away Jan. 16th. He was well liked and admired by the North Carolina gang for his cheerfulness, courage, and accomplishments despite the fact that he was confined to a wheelchair. LPL and his XYL, MDM, of Fayetteville, have a new jr. operator. From Hamlet, KEU reports the Sandhill Club now has the call UBT, and is on with a 500-watt rig. A new Novice in the Club is W4ANK, KEU, a club class operator. KEU, RHR says he can't find time to eat because of traffic net skeds. Charlotte was represented in the CD Party by QD7 and DLX, and B68 says DX kept everyone on their toes. OQ, 01, CQ CQs, DDS, BBZ sends a new report from the Wilmington Area. The gang there held a big oyster roast and only one hand was absent. SVV, who had to work on the 8th, QWE, RHH, RVI, and NTB are active on 28-Mc. phone and say they are getting good results on short skip, BIL, etc. Can't believe that they are still active. In Goldsboro, GDQ, of Gastonia, reports the gang there put on a Whirly-Bang radio demonstration during which at least one car had the radio turned on. The c.d. and OAP, taxi and police radio were all tied in on it. Those fellows really put on a well-planned and smooth-executed operation. Congrats, boys, SVT reports the North Carolina 10-meter "Phone Net is going well in spite of poor conditions. SGD is sending out QSL cards, and W4M6 is on 146 Mc. At 146 Mc. W4A1K—DCE reports that the Dupont ARC is losing members faster than gaining, but new members WN4DOR, 36V, and Don Barnum have joined recently. W4RE is recovering from an eye operation and is back on 3.6 Mc. VN has complete emergency rig near Charlotte on 1.5 Mc., o.v.s, OQG, B31, RYO, A67, DXU, etc. Paul Nance met for breakfast Jan. 27th with 6 mobiles present. TO6 is on 7 Mc. from Loudonville, MCV has moved to Churchland, Va. QRG is in full operation, using transportation overseas and operating K4AIR. A club was organized at the Charlotte Naval Shipyards on Jan. 29th with 27 members present. Officers are DMR, A6, DXU, QOG, RYO, and DXO, etc. White, etc. and 1ZD, trustee. CVG is on 1.4 Mc. from Armstrong, 3 1/2 Mc. From Greenville, DX, AZT, EDQ, and 57B met in Augusta on Jan. 30th. A South Carolina Novice net is being organized on 3749 kc. All were active to the SCM. Traffic: W4ANK 332, CHD 41, AZT 8, DX 6.

(Continued on page 108)
SPECIALS

Rack panel cabinet - 8 1/4" panel space $11.00
Double Vee antennas ................................ 3.88
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100 ft. coil, 300 ohm lead ..................... 2.19
RG/8 coax cable 1/2" leads, 72, ohm, per ft. 106
#14 enamel, 100 ft. coil ......................... .95
#12 enamel, 100 ft. coil ......................... 1.25
#10 enamel, 100 ft. coil ......................... 2.45
1/25W. neon with leads ......................... .08
2 1/2W. argons ................................... .10 for .50
Pilot assemblies with dimmer ................... .19
6 ft. cheater cords, each ....................... .29
1/2 x 19 alum. (black or gray) ............ .50
3 1/2 x 19 alum. (black or gray) .......... .94
5 1/4 x 19 alum. panel (gray only) ...... 1.29

STEEL CASES
Black Crackle Finish
4x4x2 ............................................. .70
4x5x3 ............................................. .80
6x6x5 ............................................. 1.10
12x7x6 ........................................... 2.13
15x9x7 ........................................... 2.88

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| 7x11x2 | 1.06 |
| 7x13x2 | 1.20 |
| 10x14x3 | 1.97 |
| 7x15x3 | 1.76 |
| 7x20x3 | 1.91 |
| 8x17x3 | 2.03 |
| 10x17x2 | 1.91 |
| 10x17x3 | 2.20 |
| 11x17x3 | 2.67 |
| 12x17x3 | 2.76 |
| 13x17x3 | 2.82 |

**FLEXI-MOUNT ALUMINUM BOXES**

Gray Hammerloid finish

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| 436 2 1/4 x 3 1/4 x 1 3/4 | .69 |
| 437 2 1/4 x 4 1/4 x 1 3/4 | .72 |
| 438 2 1/4 x 5 1/4 x 1 3/4 | .95 |
| 439 3 x 2 1/4 x 2 1/4 | 1.05 |
| 440 3 x 3 x 3 | 1.08 |
| 441 3 x 4 x 4 | 1.14 |
| 442 3 x 5 x 5 | 1.24 |
| 443 3 x 6 x 6 | 1.37 |
| 444 3 x 7 x 7 | 1.59 |
| 445 4 x 8 x 8 | 2.18 |
| 446 5 x 10 x 10 | 2.69 |
| 447 7 x 12 x 4 | 3.19 |

**FILAMENT TRANSFORMERS**

For Amplifier, Amateur, Industrial Use. Pwr. 115 Volts, 60 Cycles

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<th>Type No.</th>
<th>Sec. Volts</th>
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*Indicates TV Replacements.

**POLYSTYRENE ROD AND TUBING**

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Both Rod and Tubing also available in 48" lengths to order.

**ROD 12" LENGTHS**

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ROCKY MOUNTAIN DIVISION

COLORADO — SCM, M. W. Atchell, WAFQZ — SEC: KGQ, AAS, SEG: PGX. RMX: LFZ and ZJQ. KGQZ is getting to be a real traffic hound! He has the bugs worked out of his rig and it sounds FB. His brother, YCD, is on 160 meters with an 814. A new reporter this season is KGQFAM from Lowry Field. This station sponsored the Lowry Amateur Club and is active in the DARN and PARW, TRM is overhauling his rig and may get a little more DX. IA has his 2-meter rig going but all he hears is taxi, police, and other services, no ham! PKN spends most of his spare time snowboarding out of the heavy snows. BXCM comes through with a nice newby letter of the doings of the El Paso Amateur Radio Club of Colorado Springs. The Club has sponsored several transmitter hunts, the last of which was won by HDU and KMI. HDU has new Viking and VFO. KMS is working on a super-hot 1-meter receiver. COF has a new mobile, OCG has new Tri-Band. NIP is rebuilding his rig for 14 Me. WPK is wiring up a new Viking. COX and GMS are both new students at the Industrial School. They plan to turn out a lot of new WN licensees. BXM is working a lot of DX on 3.8 Me. With a 3-watt vertical. COF worked a VK on 7 Me. The National Bureau of Standards HF monitoring station on Cheyenne Mountain called in on a 10-meter round table and gave the Colorado Springs boys modulation and frequency reports. Traffic: W5XKQ 415, K5FAM 153, W6YMP 21, LA 12, PKN 4.

WYOMING — SCM, A. D. Gaddis, W7HTN — With the new year we have turned a new leaf toward moving traffic in Wyoming. PKX has taken the Route Manager job and, with LVU as GHS, plans for state traffic net taking shape. WHEKQ and AII moved to Laramie. KEV reports the Laramie Club is starting meetings again. GOH reports he has swapped his TVI, KMI. JDI is hoping for Guam, JXJ rebuilt excited to simplify operation. MWS is a grandflea. PKX says there are three Novice licenses as a result of club efforts in Sheridan. RXR is on 30 Me. AXG says HX is doing FB but still is in the hospital. Mrs. (Continued on page 110)
SUPER SPECIALS

JACK BOXES

(A) BC-545, 3½" x 3" x 1½" aluminum, 2 standard open-circuit jacks, 5-position switch, 6-contact banana plugs and jacks.
(B) BC-1356, 4½" x 3" x 2¼" aluminum, 1 standard open-circuit jack, 1 3-circuit mike jack, 150,000 ohm volume control, 5-position switch, 11-contact banana plugs and jacks.
(C) BC-213, 5½" x 2¾" x 2½" aluminum, 1 standard open-circuit jack, 1 3-circuit mike jack, 150,000 ohm volume control, 4-position switch, 8-contact banana plugs and jacks.

YOUR CHOICE 30¢

CONDENSER SPECIAL

75 mmf, 4250 peak voltage, ceramic button insulation, adjustable spacing, straight-line capacity, precision construction, 3¼" long, 1½" wide, shaft ½" x 1", adjustable tension, double-bearing................. 89¢

8/8/8 MFD.

500 V. D.C.

Triple 8 mfd. 500 working volt D.C. oil-filled condenser, common negative, solder terminals, hermetically sealed, 5" x 3¾" x 2¼". A one-time buy. $1.95

GRID BIAS CONTROL

2500 ohm, 25 watt Clarostat potentiometer, perfect grid bias control for panel mounting, excellent heavy-duty P.A. speaker volume control, TV focus control, worth $5.20 list, brand new... 69¢

PHOSPHOR BRONZE AERIAL

125 ft. of the finest aerial wire obtainable, 42-strand phosphor-bronze with liner center. Will not stretch, very high tensile strength, diameter approximately same as No. 14 copper, very flexible. Excellent for transmitting or receiving antenna, control cable, guy wire. Regular list $4.95................. 90¢

MINIMUM ORDER $2.00.
Send 20% deposit with COD orders. Please include sufficient postage or instruct us to ship by Express Collect. Overpayment will be refunded by check.

STEINBERG

ELMAC-A54

Under-dash Mobile Xmtr.

VFO or Crystal control. Direct-reading VFO on all bands—75, 20, 11, 10. • Plate modulation • Completely band-switching, tone or CW. • 50 Watts max. input. Power required: 300–500 V.D.C. at 250 ma., 6.3 V AC or DC at 4.5A. • Uses 3-6AGS, 6AR5, 6CA4, 12AU7, 2-6SL6-G, 807 (included). • Only 7½" x 7½" x 12", 14½ lbs.
For carbon microphone input.......................... $129.00
For Dynamic or crystal microphone.................. $149.00
Power Supply, 110 Volt AC.......................... $39.50
ELECTRO-VOICE 210 Mobile Carbon Mike............. $37.10
ELECTRO-VOICE 600D Mobile Dynamic Mike........... $53.10

MORROW 3-BAND CONVERTER

• No Images or Birds
• Automatic Noise Limiter—Built In
• 1-Microwatt Sensitivity—All Bands
• Antenna Trimmer on Front Panel
• Beautiful Grey Hammer tone Finish
• Drift-free, Pre-calibrated Oscillator
• Full Width Dial—Calibration Accuracy 1%
• AYC On Preselector, No Strong Signal Blocking
• LF, Amp. with 4 Tuned Circuits, Output 1525 Kc
• Complete with Mounting Hardware, Manual
• Case—Height 4", Width 5½", Length 6½"

$64.95

MORROW 3-BAND CONVERTER

Hi-Q. 20 col to base load 96" whip.......................... $8.95
Hi-Q. 75 col to base load 96" whip.......................... $7.95

MASTER MOBILE UNITS

All-band center-loaded antennas for 75–20–10, specify coil wanted, less mount................................. $6.75
100-945, Stainless Steel 96" threaded whip........... $5.25
9-967, Silicon-Chrome 96" threaded whip.............. $3.75
100-605, "All-Band" top section only.......................... $4.95
132, Tapered spring universal body mount................. $8.75
132X, Heavy-duty universal body mount.................. $9.85
132J, Junior model universal body mount............... $4.17
140, Tapered spring bumper mount......................... $6.55
140X, Heavy-duty bumper mount.......................... $7.65
140J, Junior model bumper mount.......................... $4.17

Your order will receive my personal attention and will be shipped the same day order is received. We distribute all top-flight amateur lines... let us know what you need.

73, Julie Burnett, W8WHE

633 WALNUT STREET • CINCINNATI 2, OHIO

109
NEW 2-WAY FM RADIO-TELEPHONE

A new Hallicrafters product, the "Littlefone," is now ready for thousands of important uses in hundreds of industries.

- FULL TWO-WAY ANTENNA OUTPUT
- Weighs only 14 pounds
- Complete, self contained 8-handset telephone
- Rugged, waterproof
- Powered by Dry or Wet Rechargeable Batteries
  (can be recharged from car battery or 117 Volts AC)
- 22 sub-miniature tubes on dual super heterodyne and phone
  modulated transmitter.

CENTRAL STATION

CT-22 (28-50 Mc.)
CT-24 (150-174 Mc.)

Some performance and specifications as follows:
- Littelfone 545C Carrying Case.
- AC-operated Central Station
- Audio-amplifier, providing one watt of
  audio for loudspeaker
- Power consumption is 35 watts
- Plugs in any AC outlet (117 Volts)

Where extra stationary receiving stations are desired, Hallicrafters economical BT-11 and BT-82 receivers may be added.

HALLICRAFTERS
littlefone.

AMU now is Major Brunson in the CAP, MIKE, MWS, and OWZ still are on 144 Mc. in Cheyenne. IDO is reporting
news of the Casper gang. Things are looking better—
let's keep 'em rolling, gang. Traffic: W7FPIX 111, L0VU
13, H1N 5.

SOUTHEASTERN DIVISION

LABAMA — SCM. Dr. Arthur W. Woods, W44G
KIX has TVI-proofed four rigs to date. RTI has
40-watt suitcase rig and receiver. SCM is now on
10-meter mobile. PPK's dad is WN4UTJ. BFJ meets
three amateur nets and two MARS nets. KDJ meets three
QSOs. FID, KEC, LIX, KUX, and FSU have six
states confirmed on 144 Mc. KDT will have new Motorola
mobile job. KN1W is working ten on 2-meter mobile.
HCV is building convertors for newcomers to 144 Mc.
RCU is on 144 Mc. in Amityville. N4NR's New Year's
planning stage, and probably will be QRV in 2001. KGT
to move to Tennessee. New WN calls are USF, USP, UTR,
USL, USQ, USA, and KN411. Finally, the Functional
TVI committee. EDR is rolling up a good DX total on
7 Mc. AERN soon will have 10-meter walkie-talkies to
support equipment in its emergency service. Directions:
WN4EZJ 89, KIX 72, OAO 24, BFM 23, FPK 18, RTI 4.
FLORIDA — SCM. John W. Hollister, Jr., WJZP
— W282 is the new WN member. Our
the regenerated 3675-ke. net, ONM, FFC, SIZ, and 7813
are doing a bang-up job of rejuvenating the Palmetto (F) Net on 2825 ke. Other members include ACP, LMT, JAP, BZV, JAB, ARV, and PZT. And the first net bulletin from OMM
brings out clearly the aims and needs of the net. All nets
need a schedule to keep DX active at least one night per week. So 3675 or 3845 kc., make it your meeting place. Clear-
water: CDC has obtained the ex-police 250-watt a.m.
transmitter to go along with its CDC license. MID has
a charge. Clewiston: How's this from PJU: "Due to health,
traffic took a beating; due to traffic, health took a beating!"

Dade City: SAS operated portable to the 10-meter
band and says "Sold one-tube and have started new two-tube."

Daytona Beach: RWM reports that OY is back on De-
land; PJU has plenty of space for the K. NG, and
WS passed the hundred traffic mark for the first time in
a few years. Jacksonville: DAA gave a nice talk on ham
TV gear at the JAMS meeting and Jacksonville
has been a big shift to 70-meter 'phone. HWA reports
really good results from his John Viking on 7 Mc. with his
3.5-Me. coax-fed half-wave because of the possible
operating on both bands. Miami: Channel traffic to the Swig
Shift Net goes through SAT. Okeechobee: PZT has
five net affiliations, "phone and c.w.
Sarasota: LMT has
six, 'phone and c.w.
Sunford: WN4TRT is another Nortie
with a few for a WN net. James: WN3TRT is also a hank-
ering for a WN net and runs 70 watts. Unattainable: WN4TED
scored 107 points in the Novice Contest. West Palm
Beach: WN4TOP is the new WN1 member. Our
good DX contender, CKB, worked VU 228 for his No.
160, St. Petersburg: The St. Petersburg Club had a booth
at the Large Fair on 3-5, 15, 29, 44, 52, and
with CDC demonstration set-up. The CDC calls is KIAB/3, M71 in charge. Traffic: W41MT 645, PJU 302, ONM
198, FPT 189, W6T 185, W6Y 322, W6Y 334, W6K 33,
WZ 32, SAB 28, WN4THE 16, W4TRT 9, CK5 5,
DSS 2, UBM 1.

sizing final and QSL. ORX is heard regularly on 75-meter nets. AGB has been heard from AYK. NQY is farther west. Newest calls: WN4UTB, WN4UTS, WN4UJ, WN4TRR, now WN4W, on air on 2714 kc.

Nightly round tables at Panama City are TRX, TVD
TDC, FJQ,jq, SGQ, FOG, MMA, and KYJ. UOZ
reports to the SEC on his emergency equipment. TTM keeps the 10-meter band going on Pensacola. KZT has received three
QSOs. PEN has 250-Mc. QSOs. The SEC is trying to
get the 10-Mc. band going. Nightly round tables in Pensac are UGY, PTK, PTH, SSW, BIF, ARQ, ART is hear on
traffic on 7 Mc. VE and MUX are on 7 Mc. BQK has been
heard on 25 Mc. DAO is having trouble with 12-year-old 7-Mc. ODO is adjusting HF-9 again. PTK has 75-meter mobile. PQW is looking for 144-Mc. skeds. UCB has mobile antenna farm. MS is
rebuidling 14-Mc. hearing is for peak efficiency with 33-V. ZSW has NC-125, QX has Extra
Class ticket. NYZ has been working 14 Mc. WN4UTD's
X7 is his favorite. LFK was QRV in Cheyenne. GHP was
on Mc. NQY has FB signal on 75 Mcs. Traffic: W4OXO
22, GQM 4, MS 8.

GEORGIA — SCM. James P. Born, Jr., W4ZD — Our
RM, USE, has formed the Georgia Novice Net (GNN),
which meets every Saturday at 1:00 EST on 3875 kc.
Novice interests in Jacksonville is Bob Kudrle, W4MC, of
Bob 672, Gainesville, or call in on the net. OCO has moved from Orlando, Fla., to Augusta, Ga., and is active on 3.5-
7 and 14-Mc. c.w. with W4QWX. WN4DFV is new in Savannah. RGP is rebuilding his W4KCS and LQX visited
the Atlanta Hamfest in January. POI has completed his mobile rig and is building
a new YFO. MBK has lost his 28-Mc. beam in the recent
(Continued on page 118)
NOW! TERMINAL offers
2-WAY FM COMMUNICATION • COMMERCIAL QUALITY AT LOW COST

FOR:
Disaster control... Construction... Ranching... Forestry...
Exploration... Telephone... Pipe-line inspection... Railroading, etc.

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- Up to TWO WATTS antenna output.
- Rugged and weatherproof.
- Dry or wet rechargeable batteries.
- Frequency within operating range to your specification.
- No extras to buy... price includes: push-to-talk handset; receiver and transmitter crystals; all tubes; plug-in antenna; and applicable vibrator power supply with wet-battery models.

MODEL FREQUENCY POWER OUTPUT POWER SUPPLY PRICE
HT-21-DS 25-50 Mc. ½ Watt Dry Battery $324.95*
HT-21-LWS 25-50 Mc. ½ Watt Wet Battery 349.95*
HT-21-RWS 25-50 Mc. 2 Watts Wet Battery 399.95* Federal Excise Tax
HT-22-LS 150-174 Mc. ½ Watt Dry Battery 324.95* Federal
HT-22-LWS 150-174 Mc. ½ Watt Wet Battery 349.95*
HT-22-RWS 150-174 Mc. 1 Watt Wet Battery 399.95* Federal Excise Tax

S-81 115V AC/DC 152 to 174 Mc. FM receiver 549.50
S-82 115V AC/DC 30 to 50 Mc. FM receiver 49.50

ELMAC 50 Watt XMTR
Fills a long-felt need for a moderately priced mobile transmitter with a real SOCK—or for a low-power regular or stand-by fixed station transmitter. 10, 11, 20 or 75 meter with crystal or with direct-reading VFO on all bands. 50 Watts input, hi-level plate modulation, built-in Pi antenna Network, compact measuring only 7½" x 7½" x 12", complete with tubes.

A-54 for carbon mike... $139.00 6 VDC dynamotor supply... $87.50
A-54H for hi-imp. mike 149.00 Electro-voice 210 carbon mike 16.50
110 VAC power supply 39.50 Electro-voice 6000 dynamic mike 23.10

TERMINAL for: MOUNTS, WHIPS, LOADING COILS, etc.

MOBILE TRANSMITTERS
MB-26
2, 6 or 10 meter models, 6 watts, power filter network, low power consumption. Crystal controlled output. 6 tubes, built-in relay, compact. $72.50

MOBILE RECEIVERS
SR-9
9-tube super-het, not a converter. Self-contained, with noise limiter, voltage-reg. oscillator; better than .5 mcv sensitivity. 2, 6 or 10 meter models. $72.50

For Fixed-Station use: Power Supply (117V-60 cycle, AC, 325V at 190 Mc, 6.3V at 6A) complete with tubes, stand-by switch and auxiliary output. PS-117, $30

(SONAR transmitters and receivers also available for VHF, commercial and aircraft frequencies. Write stating your requirements.)

mallard MOBILE CONVERTER
10, 20, or 75 meter models. Features: "slug-tuned" coils, high sensitivity, stability. Very popular. $39.50

LOOK! JOHNSON "VIKING" TRANSMITTER
No. 240-101 Now available for optional use of 829 B or RAYTHEON RX 4022/321.
Complete Kit (less tubes) $209.50
Complete Kit with tubes $244.92
Completely wired with tubes and air tested $298.50

TERMINAL RADIO CORP.
Distributors of Radio and Electronic Equipment
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high winds. RKK has returned to the air with a new 35-watt transmitter and is working 3.88-Mc. cw and phone. CFJ is building a new 1-kw. rig and has a new 5-inch scope for checking per cent modulation and signals. KPL has turned to Atlanta after a year in the Army and is on 7-Mc., etc. It is with deep regret that we report the passing of RAL of Atlanta. New operators are: WDF for Bleckley County; TCF, for Cobb County; IPY, for DeKalb County; EYQ, for Fulton and DeKalb Counties; OOH, for Forsyth County; AB for Forsyth County; ASC for Forsyth County; ASO, for Forsyth County; NLD, for Forsyth County; and RZU, for Forsyth County. As of NS, KAOS, KL, and RZU, general conditions are improving. Be especially careful when using AFS, it's a great aid to traffic. K4W4R, W4KGK, RKK 50, ZD 44, POI 40, NS 37, ACH 34, OSE 29, EJC 19, FBH 17, MZO a, MTS B, and MRE 2.

WEST INDIES — SCM. William Wanner, KP4DJ — SBO: ES, RS, PD, a new ham in Manati, uses TBS-50A, HOPA-50, and 10-20 beam atop his 36-ft. tower, and reports a large number of contacts into AARC nets. PW is mostly on 28 Mc, receiving General Class ticket. NX is rebuilding converters for 28, 50, and 144 Mc. "LH" is arranging stations with some QRM on 144 Mc. JA is the fourth year of weekly visits with COZCB. Other COs who join the round table are CO2BV, NY, WW, CV, and LY. WPSD, Barbados, reports regularly into 3625-ke, net, recent activity and ORU appointment. JA is back on the grid after a year.

Radio Shack Corporation
167 Washington St., Boston, Mass.

CENTRAL STATION
HT-23 (25.50 Mc.) HT-24 (150.174 Mc.)
Same performance and specifications as the "Littlefone" Hand Carry.

Audio-amplifier, providing one watt of power for loop speaker.

Power consumption is 35 watts.

Plugs in any AC outlet.

Where extra stationary receiving stations are desired, Hallcrafters equipped 8-21 and 8-22 receivers may be added.

HY-LITE BEAMS
20 METER BEAMS
10 METER BEAMS
2 METER BEAMS
Attention CD OFFICIALS: Whether you are using Amateur frequencies or a special assigned frequency, HY-LITE assures you the finest in construction and performance. Send us your specifications and price for our quotation.

HY-LITE BEAMS
Makers of Fine Antennas, 242 East 137th St., N.Y.C. 51, N.Y.

SOUTHWESTERN DIVISION
LOS ANGELES — SCM. Samuel L. Grellette, W3EBR
— SEC: RSX, PAM: P1B, RRA: CE, FYW. Section traffic nets: Mon. through Fri. — c.w., So. Calif. Net (3605 ke) at 2200 (local) to the west, (5120 ke) at 2130, (1915). El Capitan Net (5CQ) at 1700 BPL this month was conducted by RYY, CQ, GYH, GEB, WFTT, and CWO. The performance of our boys in the recent floods makes us all proud of our hobby. WFTT, at Bishop, deserves special ords for a magnificent job in “Operation Snowbound”; one hour after the power went out, communications were set-up and ham facilities were used around the clock for six days by Civil, State, and Military authorities. Among other things, was the effected rescue of 1200 marines snowbound in the mountains. Special mention also goes to the Mission Trail Net (3854 ke) for their grand work during the crisis. Many of us listened spell-bound to the fabulous job done by the Golden State Emergency Net (3605 ke) in their 24-hour operations during the flood in the San Fernando Valley. The PB team of their fixed and mobiles is credited with a huge saving of lives and property. “Well done” also, to the other nets and individuals who either aided or were standing by to be of any needed. A low bow, gentlemen, for a thrilling performance. The section suffered a great loss in the passing of L. L. Stillwell. Not a drum, but of, by, and for the ham, he will be sorely missed. We regret the resignation of LDR as Manager of SCN because of business. The new RM in charge, O'Neal, is acting CQP, and will act for the section. The new frequency is 3605 ke, Climb aboard, fellows, SCN is a hopping. GED/6 at Coastline, antenna badge for ham clubs: Newcomers, decide, WE will be there in spades. "Rango Rhombus," the car got stuck in the mud — QRL 3 hours, digging out. PKO is sporting new badges, and Class A DDE has new rig at his office (FAE). COF is on 77 mc. NCP and MJA are back in harness again after their recent illness. PMG is on vacation with America Logon and R46. Watch for N2P M/M on 28 Mc. during 80. American crews on a freighter, BLY reports: FGC has now Viking; ZFC and AYJ now are on

(Continued on page 114)
WE'RE ON OUR TOES TO SERVE YOU BETTER, QUicker, MORE EFFICIENTLY!

Fellows—you'll be glad to know that after months of planning, we've now completed the installation of enlarged, streamlined offices, new inventory control, automatic bookkeeping machines, electric typewriters, and expanded warehouse facilities. This means faster and more efficient service from WRL—one of The World's Largest Distributors Of Amateur Radio Transmitting Equipment. Our new facilities enable us to offer you the most personalized service anywhere. WE FINANCE OUR OWN PAPER, MAKING IT CHEAPER FOR YOU TO BUY FROM US. Our large volume of sales means—More Liberal Trade-Ins, Lower Down Payments, and Faster Service. Special attention given to foreign orders through our special Export-Import Office—cable address WRLT.

Leo I. Meyerson WØGFQ

NEW WRL
400-B GLOBE KING TRANSMITTER
High Power—More Watts Per Dollar
Our newest model with increased power—
420 watts Phone, 420 watts CW. Incorporates some of the latest TVI protective features. Efficient performance on all bands—10 to 160 on phone and CW. Provisions for ECO. Complete with tubes, meters, and one set of coils. Low Down Payments.

KIT FORM $475.00
WIRE-TESTED $495.00

NEW WRL
165 WATT GLOBE CHAMPION TRANSMITTER
More Watts Per Dollar
R. F. Section a complete 165 watt XMT. Provisions for ECO. Automatic fixed bias on Final and Buffer. Class B Speech Modulator. 165 watt input—10 thru 160 meter bands. Complete with tubes, meters, and one set of coils. Low Down Payments.

KIT FORM $329.50
WIRED $349.50

NEW ELMAC-A54 UNDER DASH XMTR
Mobile

For carbon mic input .............. $139.00
For dynamic or crystal mic........ $149.00
Power Supply, 110 Volt AC ......... $ 39.50

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World Everything In Radio

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World Radio Laboratories COUNCIL BLUFFS, IOWA

SEND TODAY

FREE! NEW 1952 WRL CATALOG

NEW WRL LOG BOOK
For mobile or fixed stations. Spiral binding—turns up—lies flat. Full column log listing all FCC required info. Log will accommodate 1,525 stations. Front and back covers show "Q" signals, phonetic alphabet, and amateur international prefixes. 25c

GIANT RADIO REFERENCE MAP

Just right for your control room walls. Approximately 28" x 36". Contains time zones, amateur zones, monitoring stations. Mail coupon today and............. 25c

CU ON 10-20 & 75 METERS

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Please send me:

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□ ELMAC-A54 Info
□ New Catalog
□ Globe King Info
□ Radio Map
□ Globe Champion Info
□ Used Equipment List

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NEW 2-WAY FM RADIO-TELEPHONE
A new Hallucinators product—the "Littlefoams"—
is now ready for thousands of important uses
in hundreds of industries.

**FULL TWO-WAY ANTENNA OUTPUT**
- Weights only 14 pounds
- Complete, self-contained 2-way radio-
telephone station
- Rugged, weatherproof
- Powered by Dry, or wet Rechargeable Batteries
  (can be recharged from our battery or 117 Volts AC)
- 22 sub-miniature tubes on dual super-
heterodyne and phase modulated transmitter.

**CENTRAL STATION**
HT-23 (50-50 Mc.) HT-24 (150-157 Mc.)
These performance and specifications as the
"Littlefoam" Hand Carry.
- AC-operated Central Station
- Automatic voice-activated wattage of
audio for loudspeaker
- Power consumption is 55 watts
- Plugs in any AC outlet (117 Volts)
Where extra stationary receiving stations
are desired, Hallucinators economical S-81
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Niagara, ONE OF AMERICA'S GREAT RADIO STORES

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250 mc. 85 watts output
300 mc. 70 watts output
450 mc. 32 watts output

Write for free characteristic sheet
AMPEREX—$19 each

JOHNSON VIKING

115 Watts CW, 100 Watts AM
Phone Output. Complete details
on Page 67 of July JST. Transmitter
Viking I Kit less tube, crystals,
mike, key, Amatuer Net. $295.00
Only...

$209.50

Wired & tested, less tubes.
Kit of tubes, $295.61...$22.30

VIKING VFO KIT

Complete details on Pages 68-69 neat.
QST. Complete service tubes.
Cabinet to match Viking I...
$42.75

Wired & tested, with tubes...
$52.75

FOR HOME OR FIXED LOCATION

Model PR-31 for 30 to 50 mc band...
$44.95

Model PR-8 for 152 to 162 mc band.
Complete with 14" whip indoor antenna...
$44.95

MOBILE FM RECEIVER 152

Model M-101 covers 152 mc to 162 mc.
Band...
$72.50

Model M-51 covers 30 to 50 mc.
Band...
$72.50

NOVICE 80 MTR TRANSMITTING STATION

1—TRANSMITTER KIT...$15.95
(as described in May QST)

2—POWER SUPPLY KIT...$9.95
(for above see June QST)

3—ANTENNA KIT
(80 Mtrs)...
$26.85

COMBINATION SPECIAL
All three kits are available sepa-
ratly at prices indicated
here.

$25.95

ESICO HIGH GRADE ELECTRIC
SOLDERING IRONS

55 WATT "NICK NACK"...
60 WATT "MIDGET"...
100 WATT "JUNIOR"...
150 WATT "TROPHY"...

$1.29
$1.95
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WRITE FOR LATEST TAYLOR TUBE PRICE LIST

PROP-PITCH MOTOR

ANTENNA ROTATOR

BRAND NEW

UNCONVERTED

24-33 Vac—Reversible 3-Wire
Lead Required, Rugged, Weather-
proof.

WHILE THEY LAST $17.50 each

R. L. DRAKE TVI FILTERS

High-Pass Receiver Types

TV-390,501P, 200 ohm...
Special...
Net $3.95

TV-72-501P, 72 ohm...
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Low-Pass Transmitter Types

TV-32-101P, 52 ohm...
Special...
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HEART OF BC-221

The VFO sub-assembly, used
in BC-221, fully wired and
mounted on sturdy alumi-
num chassis ready to install, Brand new—original packing...
$4.99

MINIATURE O-1 D.C. MILLIAMMETER

New Shipment—New Low Price
Perfect for mobile, home, or
X-ray use. Complete with
Flange mounting. Completely en-
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Finish. While they last...
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WEBSTER-CHICAGO

140-75, Automatic Record
Changer, 3-Speed, Flip-Over Cart.
Brand New...
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Niagara's Guarantee of Satisfaction
All items ordered meet
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aval and complete satisfaction.

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160 Greenwich Street, New York 6, N. Y.
officers of the FTARC are QZL, QRM, and AJ, v.e. We welcome the formation of the NTV (North Texas Novices) Net under the guidance of SQW. This net is primarily a traffic net for the Novice, working on 3755 ke. Mon., Wed, and Fri. at 1630. Both Novice and General class amateurs are welcome, and keeping skeds with 6FZO when TVI and politics will permit. R1Y beat VIM by a little bit for section 05 honors in the phone division. QSO now is operating 24 hours a day, handling plenty of traffic. Congratulations to Bonham on another new call, UXM. The SCM enjoyed a visit from OZP. Traffic: 8W5US 2054, JOG 1500, NLK 2400, BKE 94, RR 72, ARK 68, HBP 92, QM 83, RR 68, OCS 41, LME 50, TWW 64, ARJ 42, CWEU 12, CRG 32, JRS 90, W6USF 19, WSQI 6, BAP 2.

OKLAHOMA — Acting SCM, Jesse M, Langford, WIDE — SEC. AGM, OZQ, PAM, OZ7, K1V, and R4U, AJTJ. The Lawton-Fort Sill Radio Club dinner meeting was a big success with lots of gear-warping taking place, excellent food, and good company. ERE of the radio club is a big hit with 144-Mc. activity in Oklahoma City with HXL and OXZ testing new gear. KBA and KBE have joined the 3905-ke. ragup group, new IEC, TMV, AJTJ and R4U, AJTJ. WY1C, a new Vh1, is working 500 and 100 kHz. KGB gives a talk on converters at ACARC. WNOV works at ARSC, the state communications coordinator for O. Direct, is very pleased with the licenses we are showing. However, we need more counties represented by EIs. QNK, EC for Blaine, reports another emergency group has a call license, to be held in January. OYP is having trouble with TVI and antenna problems. He has moved and expects to put up a 1/2-wave vertical. WNSTWB has worked 14 states on 10 meters, c.w. with AT and RME. 45. He reports: WSGV 20R, U7FJ are on 3.5-Mc. c.w. SAJA recently got Class A license, he has 640 watts on all bands, RFJ has call license. K1Y moves to Panama, K1ZSW. QPL is burning up 3.5 MHz. QJ1Y's XYL is RPF, TPB now has General Class license. WNSTWB is working 14 states on 10 meters, c.w. with AT and RME. 45. He reports: WSGV 20R, U7FJ are on 3.5-Mc. c.w. SAJA recently got Class A license, he has 640 watts on all bands, RFJ has call license. K1Y moves to Panama, K1ZSW. KPWB 154, WNY 4, W6UJM, TFRF and TEG are now General Class licensees, K1WLR is on 3.5-Mc. c.w. 70 watts. RTH says 7 Mc. is no go for him and his XYL wants the SCM to handle it. Recently, RFC is putting up a double dipole rotator on 14 meters. PXN reports only one opening on 50 Mc. and that to Arizona and the West Coast. The band was open five times to 14 MHz but nothing but TVI was around. He has two corner reflectors on 220, PTV still is making QSOs every month. JPI is on 3.5-Mc. c.w. with plenty of 7-Mc. code speed QSOs. NIY has no TVI because of lack of activity. PAI is on 4 and 7 Mc. and participates in the SCM's daily DX reports. Our SCM is 4-125A. 4RZU is waiting for W6 call and running 75 watts cold. The Gulf Radio Club (Corpus Christi) now is working 10 meters with ARRL. AQE took part in the CD Party. R1D has been appointed OO. TPR is a new member of the ARIE
c. WNSTWB worked 14 states with Novice 1-tube transmitter and a long-wire antenna. Tony is 12 years old. Be sure to attend the ARRL Convention to be held the last week end in June in Corpus Christi. Traffic: W5DD 14, 105, M3KD 23, K1JF 339, PY 359, QMA 150, W4RZU 51, 136, W6QDJ 134, RTT 120, RR 77, QEN 81, CPQ 23, OYP 28, 2LB 28, K1AZ 11, QGU 1438, QGU 14. 3. NEW MEXICO — SCM, Robert W. Freyman, W5NXX — SEC. DLK: RMM: NKG, PAM: BW, PAM v.f.t.: K7R. New Mexico nets O.C., 2056 ke. 700 PM through Fri. 3308 ke., 730 PM, Sun.; 6:30 P.M., Tues. and Thurs. There will be a State ham picnic June 8th at the Manzano Mountains, 17 miles north of Albuquerque. Pack up the XYL's kids, food, and your burned-out 80'x and come prepared for a good old-fashioned picnic. All New Mexico amateurs and all out-of-state hams are welcome. Our congratulations to PXN on making BPL; he is the first in New Mexico to make it in three years. JPI has a new HRO, a new OM/XYL team in Socuperio is KI7RX. W3Z, RTR and RQK (also OM/XYL) are newcomers to Albuquerque. AK is on 7-Mc. c.w. K7WJ on 7-Mc. We have a hangman for the YL-AMC, AJ has finished all band VFO exciter and is now working on mobile rig. MYA is working the 815A. TBE has 35 watts on 28 Mc. and Grandmas rig on 7 Mc. A pair of hot rods has been put inside to be used to obtain amateur handbooks and equipment.
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117
CANADA
MARITIME DIVISION

MARTIME -- SCM. A. M. Crowell, VE1DQ -- SEC: QF, RM; OM, EC; ED--Canada. Hibs are RP, prs.; ID, vice-prs.; WY; scs.; NO, tracs.; OM, bulletin editor. With the nation-wide interest Boy Scout and other youth groups are showing in our hobby, all clubs could well provide for junior members and special training classes in code, etc. Heard in the DX Contest were S8, FQ, PX, QW, and DQ, ZS. A new call in, e.w. Recently active on 3.8-Me., 'phone are B6, AAG, YG, VW/1, NA, AAX, AAZ, AR, HD, PT, WL, and W6s about 3.8-Me., 'phone. (IU seems to do well on 3.5 Me. in G-Land. JJ was heard keying the oscillator. A0 is active on 28 and 5.8 M., BI is using the O'er for dig up the DX. RF still is the O.T. night owl. Active in the last 68 from the N.B. Area were VJ, AAY, AAY, ZR (assisted by OM), CJ, WB, YW, OL, LX, and AI. The exercise recently held with the Fredericton Fire Dept. caused much favorable comment in proper circles. Ye editor of this column greatly appreciates the recollections of several club bulletin. Trivia: (Jan.) VE1YV 290, FQ 184, MK 190, OM 39, DQ 43, AAK 94, PZ 32, Z9 29, AB 36, AH 22, HT 18, TD 19, XA 7, ZM 6, AB 5, FR 4, ZE 4, XIV 2. (Dec.) VE1DB 8.

ONTARIO DIVISION

ONTARIO -- SCM. G. Erle Farquhar, VE3IA -- It is with a heavy heart we record the passing away of the highly esteemed Ontario section amateurs: AKJ and NF. Carl G. Heilig, APL, who became one of us in 1949, did yeoman work during the last few years. He died on Oct. 22, 1952, for which he was awarded a Public Service certificate by ARRL. He was a member of the Hamilton ARC, James A. MacArthur, NI, Phone Activity Manager, received his ticket more than thirty years ago, to become the first licensed amateur in St. Thomas. Jim was commemorated on several occasions for his outstanding contributions to the Canadian Amateur Radio. His station was an integral part of the civil defense organization in his district. He was given high tribute by the Ontario Amateurs Club of which he was a charter member, when some 52 stations assembled and conducted a memorial service. The Queen City Club put on a fine demonstration of initiation into the "Masonic Knights of the Ether" recently. Mr. G. Whitman spoke on the atom bomb at a well-attended Quinte Radio Club meeting. Bellville Emergency Corps holds drills on the 20th of each month, AKZ reports his call as being booked up on 7 M. The Frontier Radio Club enjoyed the film "And a Voice Shall Be Heard." Welcome to the late Tupper. Hamilton is BDH. Regular reporters into OSN are ATR, BEM, BMU, KO, BM, BMU, BKO, DU, EAM, GI, OD, SF, SG, and TM. VR moved to Ancaster. AKC and AES are heard on 144 M., ARRL appointments and endorsements are: GRC, BPE and GZ as OHS; AHA as OBS; BTE as OPE; BB as OES. With my two-year term drawing to a close, I wish to offer myself for nomination. Trivia: (Jan.) KE2ATR 203, BUR 173, IA 88, TX 78, IL 27, BWY 70, WY 70, BER 63, BJV 42, AYW 39, EAM 24, DQ 22, PE 52, AZH 4, EL 11, VN 4, AU 3, SG 2, VJ 2. (Dec.) VE3TX 106, WE 16, TO 15.

QUEBEC DIVISION

QUEBEC -- SCM. Gordon A. Lynn, VE2GL -- SA has found it necessary to resign from the post of SEC because of increased commitments elsewhere, and the appointment of RS has been made to this important post. KQ is back on 28 M. from his new QTH, has renewed QTH, has joined a club, and has been appointed EC for the South Shore. EC, now at Truro Rivers, seeks local net, Truro Rivers, Shawinigan Falls, Grand Mere, and Cac de la Madeleine on 144 M. The annual banquet of the St. Maurice Valley Radio Assn. was held Feb. 1st with 52 members in attendance. AR, AIP, AAR, and APM are members in that region. The Montreal Amateur Radio Club held an election of officers with ADX as president. AJO is a newcomer in Truro. On Feb. 20th, AAO completed his first new frequency meter. LO had the misfortune to fall and injure his right wrist badly, putting him off for several days. On Feb. 15th, KX was busy with traffic to the North. KZ has converted to a.m. on 14 M. AKJ reports into QFN regularly. DI is on 14-M. phone now after many years of e.w. traffic. (Continued on page 180)
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2 mfd. 1000 V oil cond., GE, each .. 3.95
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NC4}
VANALTA DIVISION

A LBERTA — SCM, Sydney T. Jones, VE8MJ — I1L, one of the old-timers in the ham game, reports he is back on the bands again using a 50/0 for a start with a higher-power final being planned. OC says the poor band conditions have not hampered the operation of the Peace River Net. HM received the news of the arrival of the new

grand via amateur radio but in the most round-about way — via VE5FPQ, VE8SQ, W5AAB and VE85MC. DZ took part in the recent Frequency Measuring Contest. OC has

now call in Edmonton, as is FC, plans to join the AFRS

Net, EH has made further improvement in his mobile an-

tenna for 14 Mc. WS is QRL building a new ham shack in

the basement. JW secured a position with an oil company.

VK has returned to the air with a nice signal and is assist-

ing CE in a rebuilding job. The suggestion has been made, in

view of recent poor band conditions, that the Alberta Net

have an alternate c.w. frequency in the 7-Mc. band which
could be used when 3765 is NG. Your comments should be

forwarded to our Phone Activities Manager, OD. Traffic:

VE6HM 70, EO 8, MJ 7.

BRITISH COLUMBIA — SCM, Wilf Moorhouse,

VE7US — The Province is divided into 14 areas now and
there is an EC for each district. QC is Net Manager of the

AREC Net. VC is busy with ARES activity. VE6C is

building a new rig for a new cabinet. ASA has contacts on

7 Mc. with 20 watts. LG has a new YL, operator, TD.

The 5-m. Net is operating as usual on 5097 kc. The SCOS

of Alberta and Washington are requested to supply c.d.

stations with B. C. QC plans a trip to Chilliwack to see

some of the game that have been operated for a few days last
month but 3.5 and 7 Mc. was spotty after 8 p.m. US tours

AREC members on VHF during hanger banquet. Dan Vel-

letten worked in the ARES group. Will more ARRL members

send in a note of interest? AOB is 250 watts at last! A

report was received from T7. SS is on 35 Mc. with 13

years experience; ZM is dusting off RC-610; QX is on receiver job;

ACC is checking nets; AIW and JG are getting ready for

Class A. Traffic: VE7QO 71, DH 31, AOB 11, AM 8.

PRAIRIE DIVISION

MANITOBA — SCM, A. W. Morley, VE4AM. New

officers of WARC are SRC, pros; EI, vice-pres.; DP,

res and Dave Gilmour, treas. Congratulations to JG (ex-

3AKN) on the addition of a jr. operator. RO has new co-

linear beam for 3.5 Mc. EV is interested in 50 Mc. and in-

quired about the use of 60 Mc. GX was in the Peace River

area. AOB, on 75-meter 'phone with 307A. Ex-FN now is

signing EL. WT plans new all-band rig with 829 final.

TVL, at Selkirk, is ex-1TN. AX, of the Westman district,

is on 75-meter 'phone with Globetrotter. IR and HL received RCC

certificates. JD has new 7OA-2 receiver. NF is on 75-meter

'phone when the jr. operator isn’t busy with school. Is on

14 Mc. with 3LP, JT, at Myrtle, is using a terminated folded
dipoles on all bands and is heard in VE1-Land on 75-meter

'phone. HG has new VFO going on 80 meters. NCS on the

'phone net is being rotated to give all experience. Report via

the nets if you desire, but don’t forget it. Traffic: VE5HIG 73,

DZ 38, HV 20, CE 11, HL 11, ER 3.

SASKATCHEWAN — SCM, Harold R. Horn, VE2HR

— North Battleford has three new calls: AI, formerly

VE2AMG, at the Radio Range; MK, formerly a VE3

with the RCPM; and NX, a new ham with CJJN, DX, of

Shellbrook, is an old timer back for another fling. W1L

is a new ham at Buffalo Narrows. NC is in Saskatchewan for

a few weeks and will be missed by the v.h.f. gang. CJ is

heard on 75-meter ‘phone. VE8MC is looking for VE5

QSOs. MQ, his XYL, and DN attended the Saskatchewan

Club’s annual party. MQ bringing a TZ-30 back as a prize.

DX, XYL of GW, is a new amateur and swats a nice flat.

Congratulations, Edna. WJ has moved to Clyde, Alberta,

and will be VE6 soon. DB converted his phone rig to

Class B and puts out an SB signal. JU is a new ham heard

on 3.5-Mc. c.w. from Saskatchewan. KO has a new Commander

receiver and AS has a 75A-2 receiver. LD is increasing

power to 100 watts. PJ reports into the North. Decent

reps into the North. Decent Net nightly and will QSL any time. BZ

is taking a try at 40 c.w. and 20 ‘phone. Traffic: VE5BY 55, TE 45, IK 26,

PJ 7.

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Radio Wire Television Inc.
The "Bandbox"

(Continued from page 10)

adjust $C_{16}$ to increase the peak. The correct adjustment is the one where no readjustment of either the gang or the trimmer will increase the drive. Now turn the oscillator to 3750 kc, and retune the multiplier. The drive to the amplifier should be essentially unchanged.

Now tune the oscillator back to 3500 kc, and retune the multiplier for maximum output. Leave the multiplier and oscillator tuning at this point and turn the bandswitch to 14 Mc. Adjust first $C_{24}$, and then $C_{19}$, for maximum amplifier grid current. It may take a little juggling back and forth between these two before a maximum reading of drive is obtained. The milliammeter in the high-voltage lead should show a dip when $C_{24}$ is tuned through resonance.

Leaving all tuning adjustments fixed, turn the switch to the 21-Mc. position. Now adjust $C_{24}$ carefully and note whether an increase or decrease in capacitance causes an increase in drive to the amplifier. If it is an increase, lengthen the tap wire (see preceding section on coils) slightly. Then turn the switch back to 14 Mc, and readjust $C_{24}$ for maximum drive. Then switch back to 21 Mc. and check carefully again. By adjusting the length of the tap wire carefully, it should be possible to arrive at a condition where maximum drive is obtained both at 14 and 21 Mc. with the same adjustment of $C_{24}$. Remember, after each adjustment of the tap length, first go back to 14 Mc and retune, then switch to 21 Mc.

### TABLE 1

<table>
<thead>
<tr>
<th>Stage</th>
<th>90</th>
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<td>Switch Position</td>
<td>Cathode</td>
<td>Grid</td>
<td>Screen</td>
<td>Cathode</td>
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<td>80</td>
<td>55</td>
<td>25</td>
<td>235</td>
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* By dividing these voltages by the associated resistance values, any desired current value may be easily calculated.

Adjustment for 28 Mc. is similar to that for 14 Mc., although it will be more critical. Careful adjustment of $C_{28}$ and $C_{15}$ will be necessary for maximum amplifier drive. The 11-meter band is covered by tuning the multiplier to resonance at the desired frequency with the switch in the 28-Mc. position. The various circuits should be checked with an absorption wavemeter to make sure that they are tuning to the right multiple.

When the above adjustments for the low-frequency ends of the various bands have been completed as described, it should be found that the output will be essentially the same at any

(Continued on page 122)
S aggrav link inductors for amateur bands 160 thru 6 meters; 150, 500 and 1000 watt sizes. Two inductance values for each band permits choice of appropriate L/C ratio dictated by amplifier plate voltage and plate current. Polystyrene insulation, Steatite bases and heavier wire sizes insure highest efficiency.

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1. Experience and training.
   a. Number of months radio training and type (college, service schools, technical and/or trade schools).
   b. Number of years radio experience and type (military, merchant marine, commercial).
   c. Amount of this experience in telegraphy and amount in construction or maintenance.
   d. Present radiotelegraph code speed.
   e. Present or past radio licenses, including amateur.

2. Marital status.

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point within a given band. There should be no difficulty with this so long as the coils and condensers have the values specified. Although such accuracy in lining up isn’t necessary, it should also be possible to resonate the multiplier for maximum drive at 7000 kc. and then, without retuning, switch to 14 and 28 Mc. and find that these stages are delivering maximum drive.

**TABLE II**

Typical Total Current and Output Readings*

<table>
<thead>
<tr>
<th>Amplifier bias ** (males)</th>
<th>80</th>
<th>40</th>
<th>20</th>
<th>15</th>
<th>10</th>
</tr>
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<tbody>
<tr>
<td>182</td>
<td>195</td>
<td>187</td>
<td>141</td>
<td>140</td>
<td></td>
</tr>
<tr>
<td>Total B ma. at resonance</td>
<td>41</td>
<td>47</td>
<td>53</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Total B ma. off resonance</td>
<td>45</td>
<td>58</td>
<td>76</td>
<td>78</td>
<td>85</td>
</tr>
</tbody>
</table>
| Average supply voltage 380,
  Voltage measured across 30,000-ohm grid leak of unloaded 6146 amplifier. |

If the circuits haven’t been lined up accurately, slight retuning of the multiplier control may result in somewhat increased output. As mentioned previously, with the switch in the 80-meter position, the tuning range is different, so that it will always be necessary to retune for this band.

The accompanying tables show typical voltage readings taken with the unit in operation driving the grid of a 6146 amplifier. The unit was also checked driving a loaded 807 on all bands at maximum phone ratings. Rated grid current or more was obtained on each band. The unit was allowed to run continuously at 28 Mc. for an hour to make sure that nothing overheated or drifted. Checks were made at 28,000 kc. with a resistor load connected externally across the multiplier output. With a fringe-area picture on a TV receiver within a few feet of the unit there was no detectable interference. Of course, you’ll still have to work on the rest of the rig, but you can be reasonably sure that if you get TVI, it won’t be coming from the multiplier unit.

**Elevator Mast**

(Continued from page 83)

tower, so that the sections of rail can be butted together inside of a tie.

The hoisting detail is apparent from Fig. 1A, and you may want to be fancy and use an electric hoist. The winch we used was a Navy surplus item that is still available, and it is no real hardship to raise the carriage. It only takes about 10 minutes to unhook the four guy wires and lower the carriage, and it takes about the same time to raise the carriage and replace the guy wires.

We like to try antennas for 10 and 20 meters, and several different ones have been used already, now that they are so easy to work on. Since the pictures were taken, the boom has been extended to 30 feet. A 20-meter beam is presently fed with 52-ohm coax, which is buried under the ground along with the rotator and indicator cables for a distance of 100 feet to the shack.
the rest of the coil to reduce the inductance. The third-harmonic dip should come close to the minimum setting of \( C_2 \) as possible.

An output indicator can be made by soldering a loop of insulated wire about the diameter of the coils across the terminals of a pilot lamp. The bulb can be a 2-volt 60-ma. type (pink bead) for a sensitive resonance indicator, or a 6.3-volt 250-ma. (blue bead) type for stages where there is more power. The former, if coupled loosely to any of the tuned circuits, will not detune the stage appreciably. It may burn out, however, if coupled tightly to either of the next two stages while they are operating at full input.

Next connect a jumper from Pin 4 to Pin 2 in \( P_1 \), and the meter between Pin 5 and Pin 2 to check the combined plate and screen current in the 5763 doubler stage. Couple the lamp to \( L_4 \) and tune \( C_4 \) for maximum brilliance indication. If two meters are available, one can be connected between Pins 10 and 11 to read grid current in the final stage. This is the best tuning indication for adjustment of the doubler, and provision should be made for leaving a meter connected permanently in this circuit if at all possible. Now \( C_4 \) should be adjusted for maximum output from the stage as indicated by the brilliance of the bulb or the grid current in the final stage. Start with \( C_5 \) at the minimum setting and turn it down slowly, readjusting \( C_4 \) for maximum output intermittently. These two adjustments interlock, but a point will be found beyond which further increases in the capacitance of \( C_5 \) will cause a reduction in output. The grid current at the best setting will be 10 ma. or more; the more the better.

Adjustment of the final stage is similar to the above. In these 5765 stages there may not be appreciable dips in plate and screen currents, so the grid current in the final stage and the output as indicated by lamp load are the most reliable indications of proper tuning. The load for the final stage can be a 10- or 15-watt lamp bulb connected across \( L_4 \) when the stage is operated on 145 Mc. The blue-bead pilot lamp, or two of them connected in parallel, will serve for 220-Mc. use.

Adjust the position of \( L_4 \) with respect to \( L_5 \) for maximum output as indicated in the lamp. For the 2-meter coils this will be with the two inductances approximately half meshed, as shown in the bottom-view photograph. For 220 Mc. the two U-shaped loops will be parallel to each other and perhaps a quarter inch apart. If voice operation is to be employed, try talking or whistling into the microphone. The lamp load should brighten perceptibly under modulation. If it does not, or if it dips in brightness, it is probably due to insufficient grid drive to the final, or to excessive coupling to the final plate circuit, or both. Try reducing the coupling slightly, and
recheck all tuning adjustments for maximum final grid current. Operating conditions with 300-volt plate supply should be approximately as follows:

Oscillator plate current — 12 ma.
Multiplier plate current — 17 ma.
First 5763 plate and screen current — 40 ma.
Final grid current — 10 ma.
Final plate and screen current — 100 to 120 ma.
Output, 145 Mc. — 12 watts; 220 Mc. — 3 to 4 watts

The modulator to be employed can be almost any tube line-up that can supply 15 watts or so of audio power. A suitable design was described in detail in QST for April, 1950, and there are other models in all recent editions of The Radio Amateur's Handbook. If a good heavy-duty power supply is available it can be used for the entire transmitter, in which case it would be connected as shown in the article referred to above. A better method would be to use separate supplies on the modulator and transmitter, with the connection shown in Fig. 2. Either way, the plate and screen current of the final flows through the secondary of the modulation transformer.

We are now ready to do some transmitting. Connect the antenna to LA by plugging it into the crystal socket that serves as the output terminal, starting with the coupling in the position that worked best with the lamp load. By means of a field-strength meter, or with the aid of an amateur who has a receiver with an 8-meter, adjust the coupling to the point that gives the strongest signal indication, and you're on your way.

"It is known by all who cast eyes upon this supernatural document, that the hand carrying the Station of the Ten-meter Band for at least one hour past the stroke of midnight will be recognized as a full pledge of a member of the Ghosts' Network..."- "Spooking," p. 42.

Ten-meter amateurs in the vicinity of Washington, D. C., have gone to some length to augment their late-hour "supernatural phenomena." W3MO, W3NOL, W3PWB and W3ONY originated a "Ghost-to-Ghost" network which has been going strong since September of last year. Over 35 members are on the roster.

To become a full-fledged "Spook" a prospective member must find himself a network member between the hours of midnight and sunrise and haunt the band with him for at least one hour. He may then be awarded the above certificate of supernatural achievement. His YXL automatically becomes a "Witch" if he should later fall asleep during a won-hours QSO he becomes the lowest order of "Spook"--a "Zombie"—Katherine Smith
signals they are trying to copy. It sounds like a loud “hiss” or rushing noise on the band, and sometimes it is confused with rectifier hash from a power supply. It results, of course, from one or more high-level stages drawing plate current and acting as large diode noise generators, or amplifiers of noise generated at a lower level. The voice-control gang lick it by “keying” several stages, the voice-control circuit operating keyer tubes or relays. Al Hyde, W1GQR, uses a 304TL in the final and increases the bias to far beyond cut-off during listening periods with one of those small 24-volt relays out of a 274N transmitter. The voice-control circuit operates this relay and the others, and the present complete elimination of the noise from the transmitter lets Al dig down deep for the weak ones.

![Diagram]

Fig. 3 — This circuit, or something similar, is one that you may run into in your s.s.b. work, although it is usually shown with $C_4$ jumped. $L_3C_3$ and $L_4C_4$ are tuned to the desired sideband, and $L_2C_2$ is tuned to a frequency to be rejected (usually a local-oscillator frequency). Dick Long, W3ASW, advises you to be sure to include $C_4$ and to make it adjustable.

Although you get the impression through listening that voice control is the only thing, you can still get plenty of argument from fellows like Al Prescott, W8DLD, for example. He has voice control working fine, but he still thinks you can’t beat a foot-pedal break switch for the transmitter and a single 6H6 to control the receiver, particularly for all-around ‘phone and c.w. operation. Al has used the foot switch for years and says that it took voice control to convince him that the foot switch is good. The one relay in the system (in the antenna) does take a beating. Al says, but there are no others, and you should use the same antenna for transmitting and receiving anyway.

And if you’re looking for a way to eliminate the antenna relay in your fast change-over system (foot-switch or voice-controlled), don’t overlook the neat stunt used at W6YX and shown on page 14 of last month’s QST. It should be a natural for s.s.b. net operation. — B. G.
Portable 2-Meter Station
(Continued from page 47)

quarters. Reliable car-to-car communication is generally limited to distances of a mile or two, depending on terrain.

Under favorable conditions, much greater distances are realized, and various units have reached out as much as 50 to 100 miles from good locations. Many of the club members, in fact, are using these rigs for their home stations and have made a.e. supplies for them.

In conclusion, the writers wish to emphasize again the important contributions to the success of this project effected through the pooling of the abilities of the members of the club. In addition to those already mentioned, participants included W2s AXJ COT ICA LJS JGP NCR QNB RKB WAA, WN21HD, and nonlicensed members George Endres and Tom Harmon.

C. W. Net Operation
(Continued from page 49)...

Most nets permit the exchange of personal greetings to a greater extent than shown in the above example. However, you should limit or omit the use of such greetings until you see how busy the net will be.

Be alert for instructions from the NCS and respond promptly to them. When you have been instructed by the NCS to send your message, proceed at once; but don’t try to be a speed king. Remember accuracy is paramount. The loss of time necessary to make a correction, or to provide a “fill” is always greater than the time saved by high-speed sending.

Do not send the message double unless requested to do so by the receiving station. If a repeat is necessary, the other fellow will break you and ask for it right then and there. Use AA at the end of each line of the address. Use BT only at the beginning and end of the text. When you come to a single letter in the text send IMI and repeat the letter. This will keep it from getting lost or being hooked on to another word. You should also send IMI and repeat any word or group of letters where confusion might result.

If you make a mistake, send a string of dots and start the word over. When you get to the end of your message send AR B if you have another message for the same station and wait for the receiving station to acknowledge your first message. If you have no other messages for him, send AR N and wait. When the receiving station has acknowledged your traffic and indicates that he has nothing for you, you should then say QRU TU SK W——- DE W——- and report back to the NCS on the net frequency for further instructions. However, if you have been working on the net frequency, no further signals are necessary and the NCS will carry on.

Messages received for relaying must be forwarded either by radio or by mail within 48 hours.

(Continued on page 180)
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HT-33 (25-50 Mc.) HT-24 (150-174 Mc.)

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Messages received for delivery should be phoned if no toll charges are involved; otherwise they should be mailed. If you mail the message, include your station address in case the recipient wishes to file a reply. A convenient postcard message form for mailing is available from the ARRL.

Don't try to be a speed king.

Messages originating in your own station should be put in standard form having a serial number, showing your call as the station of origin, the check or number of words in the text, your town, the time and date filed. Insist upon a complete address. (Amateur radio call letters are not usually sufficient.) Messages containing information which would be worthless if delayed should not be accepted. Advise the originators of messages given you for transmission that amateur traffic handling is a hobby; since compensation is not accepted, delivery is not guaranteed.

Now isn’t traffic handling simple? How about trying it? You can be assured that you will receive plenty of cooperation. Besides making new friends, you will be providing a service to your community and helping to maintain a communication system which has many times proven its worth in emergencies. How about it? SU OM? 73. . . .

S. E. T.

(Continued from page 28) known as an annual newsworthy event in the nation’s press. Only in isolated instances was material submitted without being printed.

Were You There?

The annual Simulated Emergency Test is a combined self-analysis of our efficiency in conducting emergency communications, and public demonstration of what we can do. Today, with RACES in existence, we amateurs are more than ever before in the public eye. The average citizen is becoming increasingly aware that Radio Amateurs do something besides cause noises and distortion in their broadcasts and television sets. Our emergency program, our traffic program, our nationwide annual activities combined with an intensive publicity program over the postwar years have made this a reality.

All this is good for amateur radio as an institution, but it puts you on the spot. It makes amateur radio less a hobby and playing thing and more a communications service to which you, as a license holder, have a definite responsibility. If this is deplorable to you (most amateurs find (Continued on page 158)
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pleasure in executing their responsibility as a part of the Amateur Service), some recompense may be felt in the knowledge that as the most direct public service, emergency preparedness is a great contributor to retention of our precious amateur privileges, including the valuable frequency space we occupy.

And so we ask: Were you there? Although 2750 amateurs is the highest number we have ever recorded as participating in the SET, this is still far from the 20,000 who are registered in the ARRL. If you did not participate in the SET in 1961, make a mental note of the month of October as a “must” for 1962. Get another EC, or if there is none, take steps to see that one is appointed for your area by the SCM — yes, even if it has to be you!

Comments

Some of the comments concerning the SET activity in 1951, taken at random from the stack of 214 reports, include the following:

“It seems that 85% of our ARRL boys think it can’t happen here.” — W450D, EC Dillon County, South Carolina.

“I received splendid cooperation from the Disaster Service of ARC and from CD officials during the SET.” — W4EJC, EC Fulton and DeKalb Counties, Georgia.

“Civil defense plans have come a long way in the past six months locally.” — W1AIDW, EC Danbury, Connecticut.

“The publicity caused local CD officials to seek us out. Our work was very highly praised.” — W2VKEF, EC Staten Island, New York.

“The participating members showed excellent cooperation, but the test indicates that there is considerable dead wood in my organization.” — W4EHC, EC Oklahoma County, Oklahoma.

“We claim record as having greatest number of points for cities under 5000 population.” — W7UJ, EC, Boulder City, Nevada.

“Keep the ball rolling. We are in this thing too deep to back out now.” — W3SNJ, EC Area G, Cook County, Illinois.

“Quite enlightening!” — W6FIP, EC Southern Stanislaus and Northern Merced Counties, California.

“It’s only thirty-seven feet. Up here above the ground, And only sissies wear a belt. . . .” — Bow heads for Tim McClown.
Happenings
(Continued from page 58)

to straight renewals only; if a modification or
other change is sought, continue to use old
Form 610. Editorial changes in our regulations
are being made to accord with the new procedure.

Proof of operating time as a condition to
renewal is still required; the applicant by his
signature affirms a statement on the form that
he has complied with the minimum renewal
requirements.

Strays

Those amateurs tiring of TVI might take
a whack at GDI — garage-door interference.
W9GJY reports a local garage door that really
went berserk every time some local hams
switched on their rigs. Radio-controlled, the in-
stallation was accidentally tuned to 14 Mc.

... An up-to-the-minute check reveals that five
Novices now have qualified for WAS certificates.
We should say ea-Novices — the boys are already
full-fledged General Class licensees. It's difficult
to say just who was the first because Ken Lamkin,
W6NDF, and James Cromwell, W5TFD, had
their applications reach ARRL Hq. in the same
mail. The third went to Phil Battey, W4TFX,
whose dad, Ev Battey, W4IA, was assistant
communications manager of the League for many
years. The fourth and fifth candidates are Wil-
liam Brown, W4TFD, and Ray Thacker,
W5TFP, respectively. What comes next, fellows
— DXCC?

Quess Quiz

A ham has added a modulator to his 80-meter
c.w. rig so that he can operate 75-meter 'phone.
The c.w. rig gave him trouble with low-frequency
parasitics, but he finally cleaned it up by a
judicious selection of plate and grid r.f. chokes in
the final stage. Now on 'phone he gets similar
parasitic oscillations, which show up as weak
modulated carriers at 15-ke. intervals either side
of the carrier frequency. Is he in for another
choke-selecting session, or should he try some-
thing else first?

(Please turn to page 184 for the answer)

Niagara WANTS HAMS TO SELL HAMS... 

Niagara needs hams to work as counter salesmen. Full time
— steady work — good pay. Component stock knowledge
preferable but not necessary.

Send resume and salary desired to M. Santer

NIAGARA RADIO SUPPLY CORP.
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YL News and Views

(Continued from page 65)

recently added a BERTA certificate to her ever-growing collection. W1MCW covets one of these prized certificates, too. Hawaiian YLs have found their own ways to promote QSOs with their distant neighbors.

Twelve attended the first meeting... W8NCCQ, W8NJPX, W6KER, W8KYZ, and W6BO are new W6 YLRI members. GR6HQ is a new YL in England. Joan was formerly VS1YL and the first YL in VS1-land.

W4UTO gets a chance to operate forty and eighty only when her OM, W4OMW, and son, W4NUJNL, retire from the shack. A Hammond organ withs amateur radio for W2QBY's attention, but Joan confesses that if ten really open up, the decision would be obvious.

K6H0I now signs portable K7L. Flo recently moved from Hawaii to Anchorage, Alaska. VS6FRF enjoys work as a radio operator at the Forestry Department in Gerald-Ton, Ont. Joan is a police novelist whose enthusiasm and independence have inspired others. W4STH recently became the bride of W4NQP. After six years in Hawaii, W1HTI anticipates a journey to her Maine home in August. The Washington (D.C.) Radio Club sponsored a Valentine dinner at the Hotel 2400 for all amateurs in the area. W3MSO, president, and W3CDG, W3LX, W3ADB, W3QIO, and W4LMM were YLs who attended. W3RFEQ, a v.h.f. enthusiast, is finishing work on new gear for 50, 220, and 420 Mc. And on ten Margaret worked Anglos for her 120th country.

W4GOG, W8BYT, and K8AFEN are now Advanced Class. Twenty-four YLs attended the Los Angeles and San Diego YLRCs' joint luncheon. The L.A. girls voted unanimously to go out as a club on Field Day. At 14, Barbara Jordan is the youngest YL in the British Isles to have passed the C.P.O. code test. Barbara is a fully-qualified operator of G3PYN, and she also operates G3TML under supervision. In May she plans to take the R.A. examination. Presently she is giving code instruction to girls younger than herself, and who, along with Barbara, are members of the World Friendship Society of Radio Amateurs.

New YL Certificate

The Young Ladies Radio Club of Los Angeles announces that a Lad 'n Lassie Certificate will be awarded to any ham who submits proof of QSOs on the air with twenty of the Club's active members—one member per QSO. All contacts must have been made since January 1, 1952. Confirmations should be sent to the Club secretary, Mary Klein, W6AVF, 502 N. Gladys Avenue, Monterey Park, Calif. Current active members of the YLRC of L. A. are W6s AVF CEB EIA GAI JMC JMS KER KYZ LBO LNP NAZ NML NZP TDL UHA VWR WQF WRT WSV YZU, W6ns CQV PPU, VFSQ, and Joan Dobin, who swaite a ticket.

Miscellany

YLs in the New England and Chicago areas are referred to the Hamnet Calendar section of this QST (p. 10) for particular on two coming YL get-togethers.

Even if you are not particularly interested in WAS/YL, there are many who are. Let's dispel claims that YLs are sometimes a bit slow to QSL. Send along your card promptly!

W5MJU suggests that YLs who plan to journey into other districts might make their plans known to YLRL District Chairmen considerably in advance if possible. In that way, perhaps fewer opportunities will be missed, and more YLs will get to meet each other in person.
World Above
(Continued from page 61)

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 oscillators and simple receivers. George is planning on crystal control and a converter, however.

W9TQ, Milwaukee, is stirring up interest in 2-meter teletype operation. He maintains regular nocturnal skeds on 2, and a growing list of stations cooperate in promoting daytime activity. W9JIF, Waupun, Wis., would like information on where to get a machine in order to work with W9TQ and W9DGD.

W9LEE, Westboro, continues his 0745 and 2100 skeds daily with W9BBN, Grand Marais, Minn. The signal is always audible over this 160-mile hop, and has been readable about 75 per cent of the time under winter conditions. The night of Feb. 2nd brought good tropospheric conditions and W9LEE made his first Indiana contact on 2, with W9LEF, Valparaiso, 420 miles. Not bad for winter!

W9MBI, Coleta, Ill., has a 430-Mc. crystal-controlled converter with some interesting ideas that make for simple circuitry and a minimum of birdie trouble. A crystal oscillator on 63 Mc. serves two purposes. Used in half a 6J6 section it provides excitation for another 6J6 which doubles and triples to 378 Mc. It also feeds the other half of the 6J6 which operates as a second mixer on 52 to 58 Mc. The output of the second mixer works into an i.f. system that is tunable from 5 to 11 Mc. The 430- to 436-Mc. mixer uses a 1N21C crystal in a coaxial-line assembly salvaged from an 1N21C glide path receiver. A similar coaxial assembly furnishes the 378-Mc. tank circuit for the output of the injection chain. Following the crystal mixer is a 7F8 i.f. amplifier, soon to be replaced by a 6BQ7. Thus, with only three tubes, Clarke has a stable and sensitive low-noise converter for 430 to 436 Mc. The 63-Mc. crystal was obtained from the James Knights Company. A block diagram of the converter is shown in Fig. 1.

Want to help a British 420-Mc. enthusiast in distress? A London experimenter writes of his work with converters on 420, saying that he has gotten a crystal-mixer job going with a crystal-controlled injection source. Now he wants to put a lightweight r.f. stage ahead of the crystal mixer, and has built a coaxial line job for that purpose. His problem is that no more 446s or 2C46s seem to be available in Great Britain, so he would like to swap one for a subscription to a British magazine, or some other commodity of like value that is purchasable over there. (The dollar problem prevents purchases from this country). Anyone interested in helping out, write to Sven F. Weber, 65 Combenmartin Road, Southfields, London S. W. 18.

---

Fig. 1 — The W9MBI 430-Mc. converter.

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Endicott 2-8117

135
How’s DX?

(Continued from page 63)

23 watts to an 807-807 rig. A long-wave antenna is preferred and the receiver is a British BRT-100 .......... After 38 months in the Far East, JA2GA is returning to the U.S.A. and W6KNF. This will make JA2GC the long-beard of the FEARL gang; he and JA2GA fired up a rig together in ’18 .......... FQ8AB and VE5GA are now closed down. W4KDI learns the former is back in France and the latter in ZL .......... PA@BBW (W2BBW) is the first American to be licensed in the Netherlands according to DL4LQ. He is with Philips. A new class of PA license is now available and is similar to the U.S. Advanced Class. Its privileges include a permitted input of 120 watts .......... W1RWS finds that G2MI came through a major hospitalisation and operation with flying colors. Just in time to distribute over a thousand GI3UB QSLs! We could use one, too .......... The QSLs, we mean .......... ZS3AG has been unable to pry cards from Idaho W7. And desires a schedule for W3A with one who likes to QSL. ZS3AG firmly believes in a 100-per-cent QSL policy .......... Notes from the West Gulf Division DX Bulletin of W5KUC/UCQ: A ZS may go to ZD7 in a month or so for a six-week sojourn .......... VR4AE and ZC2AA are two units rumored to be active .......... MP4KAD is ex-VT1AB. FBBZ2 is shy a modulator and expects to remain on Amsterdam for another year .......... ZD9AA has been constructing a 20-watt "phone-c.w." ex-hailer with which he hopes to clean up on W5s. He is a radioman for the meteorological station on Tristan da Cunha and likes 14 Mc. .. AFB is back in India; W1BTO is the man to write for tawdry QSLs .......... P7TB has been off the air while battling bugs in his receiver. .......... Jeeves discloses his latest invention, a left-handed receiver tuning dial. Conditions being what they are, this will enable one to tune with the left hand while holding one’s nose with the right.

A.R.R.L. QSL BUREAU

(For a list of overseas bureaus, see p. 57, Dec. ’51 QST.)

W1, K1 — J. R. Baker, jr., W1JOJ, Box 232, Ipswich, Mass.
W2, K2 — H. W. Yahnel, W2SN, Lake Ave., Holmesta, N. J.
W3, K3 — Jesse Bieberman, W3KT, Box 34, Philadelphia 5, Penna.
W4, K4 — Thomas M. Moss, W4HYW, Box 644, Municipal Airport Branch, Atlanta, Ga.
W5, K5 — L. W. May, Jr., W5AJQ, 9428 Hobart St., Dallas 18, Texas
W6, K6 — Horace H. Greer, W6TI, 414 Fairmount St., Oakland, Calif.
W7, K7 — Mary Ann Tatro, W7FWR, 513 N. Central, Olympia, Wash.
W8, K8 — Norman W. Aiken, W8LJS, 701 East 240th St., Euclid 23, Ohio.
W9, K9 — John F. Schneider, W9CPF, 311 W. Ross Ave., Wausau, Wis.
W8, K6 — Alva A. Smith, W8DMA, 233 East Main St., Caledonia, Minn.
VE1 — L. J. Fader, VE1FQ, 128 Henry St., Halifax, N. S.
VE2 — Austin A. W. Smith, VE2UW, 6161 Jeanne Mance, Montreal 8, Que.
VE3 — W. Bert Knowles, VE3QB, Lanark, Ont.
VE4 — Len Culf, VE4LC, 286 Ruland St., St. James, Man.
VE5 — Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Sask.
VE6 — W. R. Savage, VE6EO, 329 15th St., North Lethbridge, Alta.
VE7 — H. R. Hough, VE7HR, 1330 Mitchell St., Victoria, B. C.
VE8 — Roy Walton, VE8CO, Box 534, Whitehorse, Y. T.
K4 — E. W. Mayer, KP4KD, Box 1001, San Juan, P. R.
KZ5 — P. C. Combs, KZ5FC, Box 407, Balboa, C. Z.
KH6 — Andy H. Fuchikami, KH6DA, 2543 Nanamu Dr., Honolulu, T. H.
KL7 — Box 73, Douglas, Alaska.
Models M-51

POLICIALARM
MONTORADIO

for emergency communications

Used by hundreds of municipalities from Boston, Mass., to Alhambra, Calif.

Says S. L. Grant, City Manager, Winchester, Virginia... "I think you have a receiver that is well built, and I see no reason why it should not be in demand by all public works departments that have a transmitter available."

Users of FM 2-Way Radio Communications equipment throughout the entire nation, find Polic-Arm and Monitoradio a welcome innovation to low-cost mobile communications radio.

For complete information: See your jobber—or write us today

RADIO APPARATUS CORPORATION
55 N. New Jersey St., Indianapolis 4, Ind.; Phone: Atlantic 1624

COMPLETE RADIO TRAINING!
Prepare now to accept a responsible position in Commercial Radio. New developments will demand technicians with thorough basic training, plus a knowledge of new techniques developed during the war. Training open to high school graduates, or those with high school equivalency. Courses 6 to 18 months' duration in RADIO AND ELECTRONICS. Approved Veteran training in Radio. Write for particulars.

VALPARAISO TECHNICAL INSTITUTE
Valparaiso, Ind.

TELEVISION • RADIO ELECTRONICS
Training in all branches of television, radio and electronics. FCC exam, preparation. Write for free catalog.

COMMERCIAL RADIO INSTITUTE
(Founded 1926. Approved by Maryland Bd. of Ed.)
Dept. E., 38 West Biddle Street Baltimore 1, Maryland

SENDING RECEPTION SPEED

HAVE SKILL, ACCURACY
Send and receive code this easy—Faster way! The Candlel System has developed expert Amateurs and Commercial Operators, and Code Speed Champions. Soon you can pass the code examination for license. You can send and receive with amazing skill and speed, without tension. Long hours of practice unnecessary to acquire proficiency. The WAY YOU LEARN IS ALL IMPORTANT! By simple progressive lessons, Candlel teaches you at home to send and receive as easily as you talk or read—FAST, ACCURATELY. SEND FOR FREE BOOK—explains how fine amateurs and radiotelegraph experts learned code and developed skill and speed.

CANDLER SYSTEM CO.
Dept. 4-D, P. O. Box 928, Denver 1, Colo., U. S. A. and at S5th, Abington Rd., Kensington High St., London W. 8, England

5 Models For All Systems

6 Volt Mobile
M-31
Tunable 30-50 Mc
M-101
Tunable 152-163 Mc
115 Volt Ac-Dc
PR-31
Tunable 30-50 Mc
AR-3
Tunable 152-163 Mc
AIRCRAFT
AM Tunable 108-132 Mc
115 Volt Ac-Dc

NEW 2-WAY FM RADIO-TELEPHONE
A new Hallicrafters product—the "Littlefone"—is now ready for thousands of important uses in hundreds of industries.

• Full Two-Watt Antenna Output
• Weighs only 14 pounds
• Complete, self-contained 2-way radio-telephone station
• Rugged, weatherproof
• Powered by Dry or Wet Rechargeable Batteries (can be recharged from car battery or 117 Volt AC)
• 52 sub-minature tubes on dual super heterodyne and phase modulated transmitter.

HARVEY RADIO COMPANY, INC.
103 West 43rd Street, New York 18, N. Y.

HAND CARRY

CENTRAL STATION

HT-21 (25-30 Mc) HT-26 (150-174 Mc)
Wt. 28.50 lbs. One watt output, 100-125 Mc

HT-22 (150-174 Mc)
Wt. 32.50 lbs. One watt output on 100-125 Mc

Radioexpy

137
MULTI-BAND TANK ASSEMBLIES

The unique MB-150 high-power and MB-40L low-power multi-band tank assemblies will tune all bands from 80 to 10 meters with a single 180° rotation of the capacitor without changing coils.

The MB-150 is intended for use in plate tank circuits having an input up to 150 watts. It is ideal for a pair of 807's, 809's or a single 829 B.

The MB-40L may be used in the grid circuits of tubes employing the MB-130L in the plate circuit. Will handle 40 watts if link is kept loaded.

Correspondence
(Continued from page 67)

It would be nice to have one band kept free of the high power now in vogue for 'phone in this country. There should be no doubt as to the large number of kilowatts now on the air if any listening is done on the 'phone bands. "But you have to have a kilowatt to get through all this QRM," is what you hear...

There is, at present, only one place where the guy with low power and the inexpensive (no xtal filter) receiver can go and get all-around c.w. operating and that is on the 7-Mc. band. Let's keep it that way.

— J. D. Wells, W47JU

10030 Holland St.
Bakersfield, Calif.

Editor, QST:

Received my February copy, QST and noted the letters regarding 40-meter 'phone.

Not one mention was made of the fact that no foreign 'phone operates in any American 'phone band. The minute any portion of the forty-meter band is opened to American amateurs every foreign amateur 'phone immediately moves out of that portion and, of course, in so moving, moves right into what we think is our c.w. portion. Out here in Southern California the Mexican 'phone on 40 is really terrible but fortunately very few of them operate in the 7000-7100 sector so we have at least that much now. Put American 'phone in the upper portion and we here know where the Mexcans will be.

I also note that only feeble arguments were presented about the fact that many (in fact most) of the 40-meter gang today are in the under 100-watt class. Crowd the band up worse than it is and watch the flight for power. Forty has been a "poor boy's paradise" — 30 watts and he can hold his own. Witness the many Sweepstakes contest results — the winners use less than 100 watts of power, and forty is the big band in that contest.

Let's keep forty for c.w.

— David M. Sanders, W6EGX

10 LeRoy Place
San Francisco, Calif.

Editor, QST:

Whoa! Hold everything! This 7-megacycle situation as reflected in the correspondence section of the February issue has every indication of turning into a first-class donnybrook which will not serve the unity of the amateur fraternity. There is much to be said on both sides and as you indicate in your proposal to the FCC asking for a delay, considerable research should be done. As might be expected the boys who think they are going to be hurt by this proposal are the ones who break into print and most of those who would benefit by it sit back and say nothing.

I have been operating for almost 25 years and the operation has been about equally divided between 'phone and c.w. The thing that stands out most vividly in my own mind are the days when the hottest spot on c.w. was between 7250 and 7300. Today you will find the spectrum from 7150 to 7300 almost dead with the hot spot between 7000 and 7100. I regret to say it but the pure c.w. boys should lose by default and the upper third of the 7-Mc. band should be opened to A3 emission.

— Richard T. Parks, W6UO

W9IDB closed down his 20-meter 'phone station one day after a contact with W2FGU/mobile. His first QSO next day was with W4FGU/mobile!

— — —

W1BL, 80 years young, can zip along on a straight key with either hand. He was formerly a traffic chief for Postal Telegraph which means he can snow you with Morse, too.
NEW 2-WAY FM RADIO-TELEPHONE
A new Hallicrafters product—the "Littlefone"—is now ready for thousands of important uses in a wide range of industries.
- FULL TWO-WATT ANTENNA OUTPUT
- Weighs only 14 pounds
- Complete, self-contained 2-way radio-telephone station
- Rugged, weatherproof
- Powered by Dry, or Wet Rechargeable Batteries (can be recharged from car battery at 177 Volts AC)
- 22 sub-miniature tubes on dual super heterodyne and phase modulated transmitters.

HAND CARRY
HT-21 (25-50 Mc.)
HT-22 (150-174 Mc.)

CENTRAL STATION
HT-22 (25-50 Mc.)
HT-24 (150-174 Mc.)

Some performance and specifications as the "Littlefone" Hand Carry
- A-C powered Central Station
- Audio-amplifier, providing one watt of audio for loudspeaker
- Power consumption is 35 watts
- Plugs in any AC outlet (177 Volts)
Where extra stations or receiving stations are desired, Hallicrafters economical S-81 and S-82 receivers may be added.

ALMO RADIO CO.
509 Arch Street, Philadelphia, Pa. (Main Store) Branch Stores: W. Philadelphia + Wilmington, Del. Atlantic City + Camden, N. J.

WANTED
Engineers and Scientists
Unusual opportunities for outstanding and experienced men
These top positions involve preliminary and production design in advanced military aircraft and special weapons, including guided missiles.
IMMEDIATE POSITIONS INCLUDE:
- Electronic project engineers
- Electronic instrumentation engineers
- Radar engineers
- Flight test engineers
- Stress engineers
- Aero- and thermodynamicists
- Servo-mechanists
- Power-plant installation designers
- Structural designers
- Electro-mechanical designers
- Electrical installation designers
- Weight-control engineers

Excellent location in Southern California. Generous allowance for travel expenses. Write today for complete information on these essential, long-term positions. Please include resume of your experience and training. Address inquiry to Director of Engineering,
NORTHROP AIRCRAFT, Inc.
1029 East Broadway
Hawthorne (Los Angeles County), Calif.

Evans RADIO
Service to hams • "YOUR FRIENDLY SUPPLIER" by hams. Nationally accepted brands of parts, tubes and equipment. Trade-ins and time payments. Write W1BFT.
10 HILLS AVENUE • CONCORD, N. H.

RADIO • TELEVISION • ELECTRONICS
In all Technical Phases
New Classes (Day or Evening) Start
FREE PLACEMENT SERVICE for GRADUATES
For Free Information, Write Dept. DT-52
RCA INSTITUTES, INC.
A Service of Radio Corporation of America
350 WEST 4th ST., NEW YORK 14, N. Y.

Quartz Crystals
Made to your specific specifications. Accurate to the minutest tolerance. Exacting in performance—with thorough dependability.
Whether one or a million, you get prompt shipment. Made by craftsmen with a quarter century experience.
Send us detailed description and quantity for prices.
MICHAEL STAHL, Inc.
215 Fulton Street
New York 7, N. Y.
HAM-ADS


SPINNIE knob. A handy spinner knob for communications rece- ive and transmitters. Broadway. Chrome, nickel, and one with metal inserts and aluminum or bakelite handle. 2½" dia. and fits a 3/8" shaft. $1.00, C. Dowler, W9HIA, 2015 Broadway, Vallejo, Calif.

WARNING: Do not buy BC-148-A serial 4010. Lost in mail from Gurney, West Virginia. Inspecting copies for reward. W9QDW, Center St., Moundville, W. Va.

FOR SALE: BC-6106 trans., speech amp. 6106, also aut. tuning unit for all bands. 1000.00. N. D. R. W. T. Atkinson, 14 Chatham Ave., Pleasantville, New Jersey.

WANTED: Rate 75 per word to apply to advertise- ing which, in our judgment, is obviously non- commercial and not advertised by a member of the American Radio Relay League. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inviting for special equipment, if by a member of the American Radio Relay League takes the 75 rate. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising by him, takes the 100 rate. Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply.

(4) No rate is used on the following:

spinning

Hearing no indication of the advertisers in the classified column, the publishers of QST are unable to wait for their letters for the grade or character of the products or services advertised.


SUBSCRIPTIONS. QST is published monthly on the 10th of each month by Quaterly. Addresses are changed for the Improved Quality Service. No change of address will be allowed. No charge for change of address. The December rate is 75 cents per word to apply to advertise- ing which, in our judgment, is obviously non-commercial and not advertised by a member of the American Radio Relay League. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inviting for special equipment, if by a member of the American Radio Relay League takes the 75 rate. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising by him, takes the 100 rate. Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply.

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(4) No rate is used on the following:

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Hearing no indication of the advertisers in the classified column, the publishers of QST are unable to wait for their letters for the grade or character of the products or services advertised.
The No. 90651 GRID DIP METER

The No. 90651 MILLEN GRID DIP METER is compact and completely self-contained. The AC power supply is of the "transformer" type. The drum dial has seven calibrated uniform length scales from 1.5 MC to 300 MC plus an arbitrary scale for use with the 4 additional inductors available to extend the range to 220 kc. Internal terminal strip permits battery operation for antenna measurement.
For HF insulation specify the best!

A L S I M A G
U. S. PATENT NO. 2,214,703 AND OTHER CLAIMS PENDING
Custom Made Technical Ceramics
SOLD ONLY TO MANUFACTURERS

AMERICAN LAVA CORPORATION
50TH YEAR OF CERAMIC LEADERSHIP
Chattanooga 5, Tennessee
CALLING ALL HAMS!

Centralab offers you a special service free of charge!

Centralab will send you — every month — a list of all the necessary Centralab components needed to build the electronic rigs you read about in the pages of Q.S.T. The components listed for each rig will be available singly or in kit form from your distributor.

Get your name on the mailing list now. No charge or obligation. You'll receive each month the list of Centralab components needed to build the rigs described in all issues of Q.S.T. starting with the December 1951 issue. Just fill in the coupon below.

Centralab
A Division of Globe-Union Inc.
912 E. Keefe Ave., Milwaukee, Wisconsin

Yes, please send me every month the lists of Centralab parts needed to build rigs described in the pages of Q.S.T. from December 1951 on.

Name:............................................Call Letters:............................................

Address:...........................................................................................................................

City:.............................................State:.............................................
DUAL CONVERSION! 12 TUNED I.F. CIRCUITS! 1 M.V. SENSITIVITY ON 6 METERS!

National proudly announces a brand-new receiver — the NC-183D — every feature you want in a truly modern receiver! Dual conversion on the three highest ranges (including 6, 10, 20 and 40 meter ham bands) — no "birdies"! Steep-sided skirt selectivity with 3 I. F. stages (16 tuned circuits on the 3 high bands — 12 on all other bands, compared to 6 normally used) plus a new crystal filter. Approximately 1 microvolt sensitivity on 6 meters for a 10db signal-to-noise ratio! New, indirectly-lighted lucite dial scales! New bi-metallic, temperature-compensated tuning condenser for drift-free operation! Plus all the time-tested features of the famous NC-183!

Truly it's the receiver of the year — see it, hear it, compare it!
RCA-6146 ... the most sensational beam power tube to come your way ...

You're looking at the biggest $4.90 worth of power—and versatility—ever packaged into a single tube. In fact, the new RCA-6146 is capable of performing more services for more amateurs than any other power tube. For instance...

Below 60 Mc:—On CW, this rugged tube will handle an input of 90 watts, and can deliver about 69 watts output. On phone, the RCA-6146 will take an input of 67.5 watts, and can deliver approximately 52 watts output. You can drive the RCA-6146 to full input with a 6AG7 or 5763... to drive any amateur high-power tube.

At 150 Mc:—The RCA-6146 is a natural for 2 meters. With a simple, inexpensive 350-volt power supply, it will handle an input for phone of 44 watts—and can deliver an output of approximately 25 watts. An RCA-2E26 will provide ample driving power. Base pins permit three connections to the cathode, to provide good rf grounding.

For Audio:—A pair of 6146's operated Class AB1 can provide an audio output of 120 watts... or 130 watts Class AB2. A pair of triode-connected 6146's can provide 19 watts output with a total harmonic distortion of 4.6%.

A technical data bulletin is available on the RCA-6146. Ask your RCA Tube Distributor for a free copy, or write RCA, Commercial Engineering, Section EM48, Harrison, N. J.

Tubes for the Professional... priced for the Amateur

The dependability of commercially proved RCA Tubes costs you no more. Buy genuine RCA Tubes and you buy the best. See your local RCA TUBE DISTRIBUTOR.