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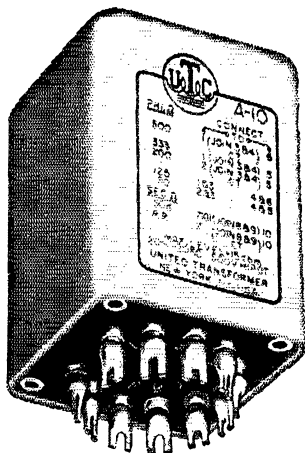
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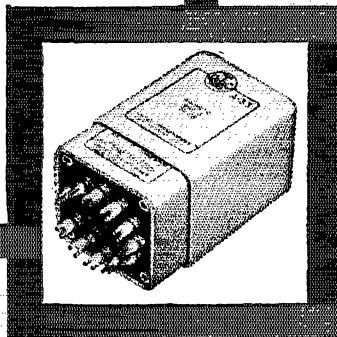
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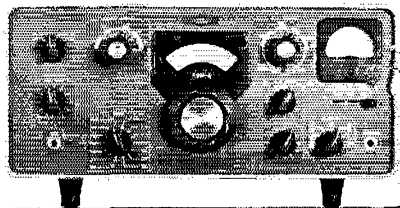
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OFFICES

225 Main Street
Newington, Connecticut 06111
TEL: 666-1541
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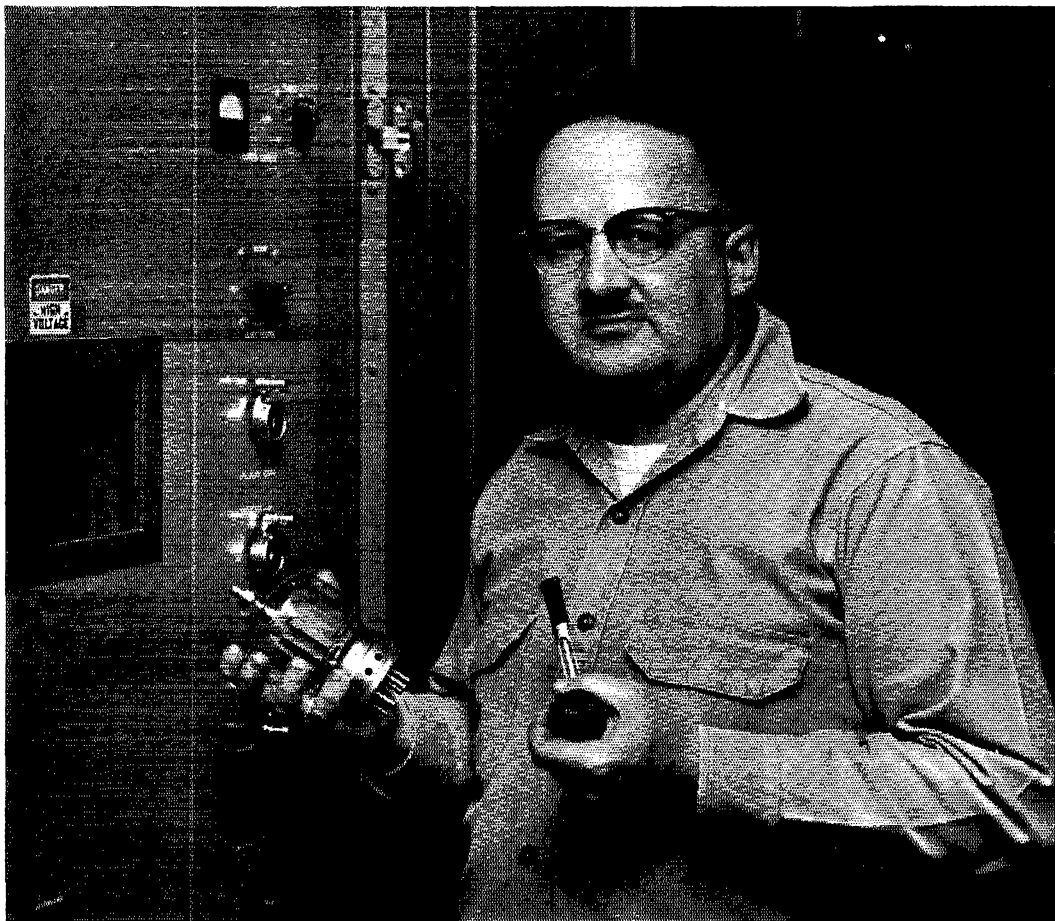
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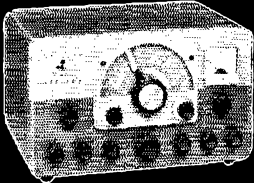
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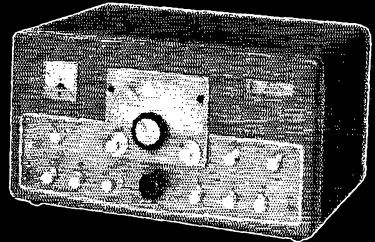
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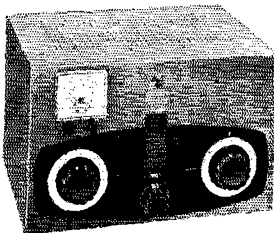
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7700 31st Ave., N.E., Seattle, Wash. 98115
Vice-Director: R. Rex Roberts W7CPY
837 Park Hill Drive, Billings, Mont. 59102

Pacific Division

HARRY M. ENGWICHT W6HC
770 Chapman, San Jose, Calif. 95126
Vice-Director: Ronald G. Martin W6ZF
1573 Baywood Lane, Napa, Calif. 94558

Roanoke Division

P. LANIER ANDERSON, JR. W4IWH
128 Maple Lane, Danville, Va. 24541
Vice-Director: Joseph F. Abernethy W4AKC
764 Colonial Drive, Rock Hill, S.C. 29730

Rocky Mountain Division

CARL L. SMITH W0RWJ
1070 Locust St., Denver, Colo. 80220
Vice-Director: John H. Sampson, Jr. W7OCX
3618 Mount Ogden Drive, Ogden, Utah 84403

Southeastern Division

THOMAS M. MOSS W4HYW
P.O. Box 578, East Point, Ga. 30044
Vice-Director: Charles J. Bolvin W4LVV
2210 S.W. 27th Lane, Miami, Fla. 33133

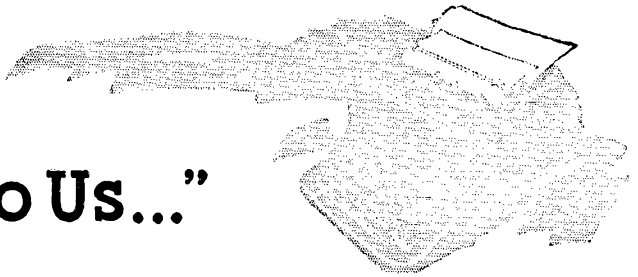
Southwestern Division

HOWARD F. SHEPHERD, JR. W6QJV
127 South Chrus Avenue, Los Angeles, Calif. 90036
Vice-Director: John F. Martin W6FCP
1135 Crest Drive, Encinitas, Calif. 92024

West Gulf Division

ROEMER O. BEST W5QKF
P.O. Box 1658, Corpus Christi, Texas 78403
Vice-Director: Ray K. Bryan W5UYQ
2117 S.W. 61st Terrace, Oklahoma City, Okla.
73159

"It Seems to Us..."



CONGRESS—OR FCC?

EVERY now and then the urge comes to all of us to speak out on a subject, to exercise the fundamental right in a representative democracy. For amateurs, such a time may be now, while discussions are all around us on the subject of incentive licensing. But to whom do we speak? From indoctrination in our first civics class onwards, many of us would immediately respond, "Our representatives in Congress."

But isn't it expecting a little too much of Congressmen that they would be informed on every little regulation in every specialized area of the Federal Government? Indeed it is, and Congress long ago realized this. It has created the "independent agencies"—the Interstate Commerce Commission, the Federal Aviation Agency, the Federal Communications Commission, and so forth—and laid down broad policies for them to follow. Otherwise, the agencies have "sub-legislative" powers to adopt rules for various functions, and to change these rules from time to time.

FCC now believes that changes in our rules are in order to provide additional incentives for progress within the amateur ranks and, in accordance with the routine prescribed by Congress in the Administrative Procedures Act, has issued a Notice of Proposed Rule Making (Docket 15928) to that end. Some amateurs opposed to the docket, and unable or unwilling to accept normal regulatory procedures¹ and decisions, have urged a campaign of writing Congressmen to seek their help in defeating the proposals and to "get the FCC back in line." It certainly will do no harm to your position if you let your representative in Washington know of your interest in the present rulemaking proceedings. But despite an occasional clash on broadcast matters, Congress recognizes that FCC is expert and wholly capable of proper adjudication of communications regulatory problems; indeed, most of the amateur correspondence to Congress will end up in FCC files anyway! It is perhaps here worth mention that disgruntled Citizens Banders, failing to convince FCC with logical arguments, undertook a write-your-Congressman campaign last year in an

attempt—entirely unsuccessful—to block new restricted rules for 'B operation.

In accordance with the guidelines in the Administrative Procedures Act, the Commission has allowed plenty of time for amateur discussion—3½ months—and has invited comment by July 15 from all interested parties. Doesn't that include you? Notice the word is *comment*, not votes or ballots. FCC wants reasons why a proposal is considered to be in the public interest and good for the amateur service—or reasons to the contrary. It will give full consideration to all constructive comment received.

HAMFESTS

This is the season when a page or more of each *QST* is filled with tabulations and highlights of coming hamfests. In nearly every portion of the country, several weekends each month offer a wide choice of locations and types of interest for ham gatherings. Given only decent weather, hundreds (sometimes thousands) of hams and families load the car early in the morning and head for the current week's mecca. Conventions in miniature, hamfests differ only in informality and, in most cases, less urban locations.

Scheduled programs are normally less extensive and less formal than at conventions. Nevertheless, hamfests provide an opportunity for technical and operating discussions, for an exchange of views on problems of the day, and for setting regional objectives to improve the over-all effectiveness of amateur public-service activities.

ARRL conventions regularly schedule talks on and discussions of organized operating activities—nets, emergency preparation, traffic work, etc. We suggest to sponsors of hamfests that similar programs can both increase interest in attendance as well as be constructive in the progress of amateur public service activities. Invite your director, SCM, SEC, or other local League officials; one or more will be glad to attend if at all possible, and conduct a discussion. If you are not certain of an official's name or the relationship of various regional and local administrators, start with the information on page 6 and 8 of this and every issue of *QST*, or write Hq. QST

¹ One thinks FCC is a sub-agency of the Department of Commerce!

COMING A.R.R.L. CONVENTIONS

June 5-6 — Georgia State, Atlanta
July 2-5 — ARRL National, San Jose, California
July 3-4 — West Virginia State, Jackson's Mill
July 9-11 — West Gulf Division, Oklahoma City, Oklahoma
July 17-18 — Rocky Mountain Division, Denver, Colorado
July 17-18 — Hawaii State, Honolulu
October 1-3 — Ontario Province, Sudbury

WEST GULF DIVISION CONVENTION

July 9-11 Oklahoma City, Oklahoma

The 1965 West Gulf Division ARRL Convention will be held Friday, Saturday and Sunday, July 9-11, at the Sheraton Hotel in Oklahoma City, Oklahoma. Festivities will get underway with a pre-convention party Friday night.

In addition to ARRL and FCC officials, manufacturers and other speakers, the convention will feature a QCWA exhibit, code and homebrew contests, and displays of emergency communications vehicles. The Saturday night program includes entertainment, a grand ball and Royal Order of the Wouff Hong ceremony. Free child care will be provided throughout, to enable parents to participate fully in convention activities, which will end with the convention banquet Sunday afternoon. ARRL General Manager John Huntoon, W1LVQ, will be among those present at the ARRL forum Sunday morning; a question and answer session is planned. Registration is \$7 until June 21, and \$8 after that date; prices include banquet. Details are available from West Gulf ARRL Convention, Box 19085, Oklahoma City, Okla. 73119.

WEST VIRGINIA STATE CONVENTION

Jackson's Mill July 3-4

The 1965 West Virginia State ARRL Convention will be held on Saturday and Sunday, July 3-4, at the State 4-H Camp, Jackson's Mill (near Weston) on U.S. Route 19.

Highlights of Saturday's schedule will be the ARRL Forum, SWOOP for XYs, Army and Navy MARS meetings and a Royal Order of the Wouff Hong initiation ceremony at midnight. Other groups holding meetings will be the West Virginia phone and c.w. nets, WVN (PON), s.s.b. net, WACWV Club and YLRL.

Full registration is \$8 per person; this includes Saturday lunch and dinner, Saturday night lodging, Sunday breakfast and dinner and admission to all convention features. Children 8 years old and under, staying at the Mill, may obtain meals and lodging for \$4. Lodgings are dormitory style, with separate cottages for men and women; those desiring more privacy may

stay at motels or hotels in nearby Weston or Clarksburg. Registration without meals or lodging is \$2 per person. Cottage and dining hall capacities are 400, and full registration is therefore limited. When ordering full registration tickets, please state number of men and women in the party.

Full registration requests should be sent to Dorothy Morris, 1136 Morningstar Lane, Fairmont. \$2 tickets are available from C. R. Nelson, K8BIT, 4620 Kanawha Avenue, S. W., South Charleston. For additional information, contact Katherine C. Anderson, WSDUV, Convention Secretary, 209 Childers Court, Huntington.



Foundation Scholarship

The Foundation for Amateur Radio, Inc., with headquarters in Washington, D. C., announces the fourth award of the John Gore Memorial Scholarship for either graduate or undergraduate study, full or part time. The scholarship pays \$250 for the academic year, and is subject to renewal.

Licensed radio amateurs who intend making a career in electronics or related sciences may now apply for the academic year 1965-66.

To be eligible, applicants must have completed one year in an accredited college or university and must be enrolled in a course of studies leading to a degree. They must also be radio amateurs holding a valid FCC license of at least a General class rating. Preference will be given to applicants from the area served by the Foundation -- the District of Columbia, Maryland and Virginia, although those living elsewhere are not excluded.

Requests for application should be made not later than June 15, 1965, and should be addressed to:

Chairman of Scholarship Award Committee
FAR, Inc.
10224 Farnham Drive
Bethesda, Maryland 20014

The Foundation for Amateur Radio, Inc., is a nonprofit organization devoted to the advancement of amateur radio. It is composed of trustees representing radio clubs in the Washington-Baltimore area.

John W. Gore, W3PRL, in whose honor the scholarship was named, was until his death in 1960 the president of the Foundation. A prominent radio amateur in Baltimore for many years, he was a vice president of the Bethlehem Shipbuilding Corporation there.

OUR COVER

The cover this month is a collection of action shots depicting typical Field Day antenna raisings. It should be a reminder that now is the time for checking out the trusty power generator, shaking the dust from bed rolls and tents, and choosing the camp cook for this year's Field Day, June 26-27.

A Slow-Scan Vidicon Camera

In Three Parts — Part I

Performance and Electrical Design

BY COPTHORNE MACDONALD,* WA3BTK, EX-WA2BCW

The slow-scan equipment described in earlier *QST* articles was of the flying-spot type suitable for the transmission of photographs, drawings, or other "still" material prepared on a flat surface. The subject of this three-part article is a TV-type camera using a special vidicon tube which can handle live subjects in slow-scan. System specifications are the same as for the flying-spot camera.

THE slow-scan method of image transmission permits still pictures to be transmitted, one every eight seconds, over conventional amateur phone gear. Flying-spot scanners at the transmitting end, and long persistence phosphor monitors at the receiving end, are inexpensive and quite satisfactory for most amateur purposes. Nevertheless, the flexibility afforded by a live camera is attractive. Several years ago, a television camera tube was developed by Westinghouse that has almost ideal characteristics for slow-scan TV. The camera described herein uses this WL-7290 vidicon, and in operation transmits a live scene (even one with some motion) as a series of "stills" that can be viewed as such on a monitor similar to that described in a recent *QST* article.¹ An electro-mechanical shutter synchronized with the vertical retrace exposes the photoconductive layer of the slow-scan vidicon to the light and dark areas of the scene for a fraction of a second at the beginning of each frame scan. This exposure establishes charge patterns in the photoconductor that are scanned off by the electron beam. In addition to giving rise to a varying electrical output signal, the beam also erases the previous scene's charge patterns and readies the tube for another exposure. Conventional vidicons act in a similar

manner when scanned at 30 frames per second, but are unsatisfactory when the scan rates are slowed down because the charge patterns leak away too rapidly, even with the tube in the dark.

Those readers who have followed amateur slow-scan activities know that the system presently in use is an attempt to reach an optimum compromise between three interrelated factors: bandwidth, transmission time per picture, and picture detail. The present system requires an audio bandwidth extending between 1 and 2.5 kc., transmits one picture every 8 seconds, and presents a picture with 120-line resolution in horizontal and vertical directions.² Figs. 1A and 1B are one-frame time exposures of a monitor display of live images picked up by the slow-scan vidicon camera. The sharpness of the images is due to the high "aperture response" of the vidicon and cathode-ray tube at 120 lines resolution. In other words, the fact that vidicon and c.r.t. are capable of a "limiting" resolution much higher than 120 lines insures that the system resolution is determined only by bandwidth and line structure. Since bandwidth and line structure are sharp-cutoff effects, the images have a crispness of detail that even some old hands in the TV field say they never expected to see with a 120-line system.

* Westinghouse Electric Corporation, Electro-Optical Equipment Dept., P.O. Box 10534, Pittsburgh, Pa. 15235.

¹ Macdonald, "A Compact Slow-Scan TV Monitor," *QST*, March, 1964.

² For a detailed description of standards and how they were arrived at, see: Macdonald, "SCFM, An Improved System for Slow-Scan Image Transmission," *QST*, January, 1961.



(A)



(B)

Fig. 1—Live images picked up by the slow-scan vidicon camera and reproduced on the monitor described in a recent issue of *QST*.

Building a television camera is not a task for the beginner. Prior construction of a slow-scan monitor and flying-spot scanner represent a practical minimum of experience. Thorough understanding of what *should* be going on, and sufficient test equipment to see what *is* going on, are absolute musts before the expensive vidicon is ever plugged into its socket. A d.c.-coupled scope, with either a calibrated preamp and time-base, or an uncalibrated d.c.-coupled scope with some external means to calibrate it, is required. A frequency-calibrated audio oscillator is almost a necessity, although there are ways to get by without it if one cannot be begged or borrowed.³

Cameras using this basic circuit but completely original mechanical planning, layout, and construction techniques were built by Bob Mangold, K3BWW; Robert Gervenack, W7FEN; and Don Miller, W9NTP. Photos showing the variety of ideas will appear in Part II of this article.

Circuit Description

Sweep Generation

A block diagram is given in Fig. 3 and the complete circuit in Fig. 4. The horizontal multivibrator, V_5 , generates a 15-c.p.s. sawtooth waveform and retrace pulse that is used for blanking. During the greater part of a cycle V_{3B} is cut off and C_2 charges toward B+ through R_{13} . The 300-volt a.c. applied to the string of NE-2's causes the bulbs alternately to fire and extinguish at a 60-c.p.s. rate. The firing of the bulbs on positive alternations of the 60-c.p.s. sine wave produces sharp positive spikes that are coupled to pin 7 of V_{3B} through C_3 . When one of these spikes raises the grid voltage above cutoff, V_{3B} conducts (discharging C_2) and the multivibrator switches to the other state. The duration of this retrace state is determined by R_{14} and C_4 . R_{11} adjusts the oscillator period to the proper subharmonic of 60 c.p.s. A sawtooth waveform appears at the cathode of cathode-follower V_{4A} . The horizontal-centering pot, R_{12} , is used to set the voltage at the red yoke lead to

³ QST, February, 1961, page 33.

the average d.c. level of the sawtooth applied to the black lead. This centers the sweep by providing that the yoke current swings positively and negatively about an average value of zero.

The vertical sweep circuit is similar to the horizontal. Synchronization of the vertical retrace with a horizontal retrace is accomplished by feeding the video synchronization signal to the vertical multivibrator at Pin 2 of V_{1B} . A height control, R_9 , shunts a portion of the drive current around the yoke to permit equalizing horizontal and vertical size.

Vidicon Beam Control

The vidicon output current is very low (about 0.003 microamps) and the impedance of the target circuit is high (1 megohm). Such a combination invites hum problems. To minimize hum effects, the vidicon beam current is chopped at a 10-kc. rate, and the vidicon output is amplified in a bandpass amplifier that has very poor low-frequency response. V_{11} is a free-running multivibrator with a frequency of about 10 kc. The 10-kc. square-wave output is coupled to the vidicon grid No. 1 clamp circuit (C_5 , R_{15} and C/R_1). The beam control, R_7 , adjusts the magnitude of positive-going 10-kc. signal that is added to the -105-volt bias. It is adjusted for adequate beam current to charge down the target, but not so much that resolution suffers.

During retrace, positive-going pulses from the sweep oscillators drive the two halves of V_5 into conduction. The conducting V_5 section loads down the 10-kc. multivibrator, dropping its output sharply. The reduced output keeps the vidicon beam cut off for the duration of the pulse, thus blanking the sweep retrace. The output of V_{11} is coupled through T_1 to a rectifier-filter circuit where d.c.-referenced synchronization pulses are formed at the grid of V_{6B} .

Video Amplification

The vidicon delivers its output current to a relatively high impedance load for best signal-to-noise ratio. The video amplifier is similar to an

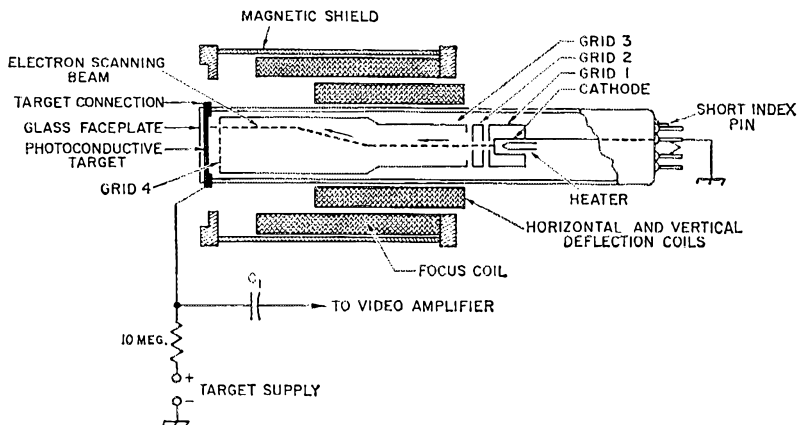


Fig. 2.—Cross-section view of vidicon tube and focus and deflection-coil assembly.

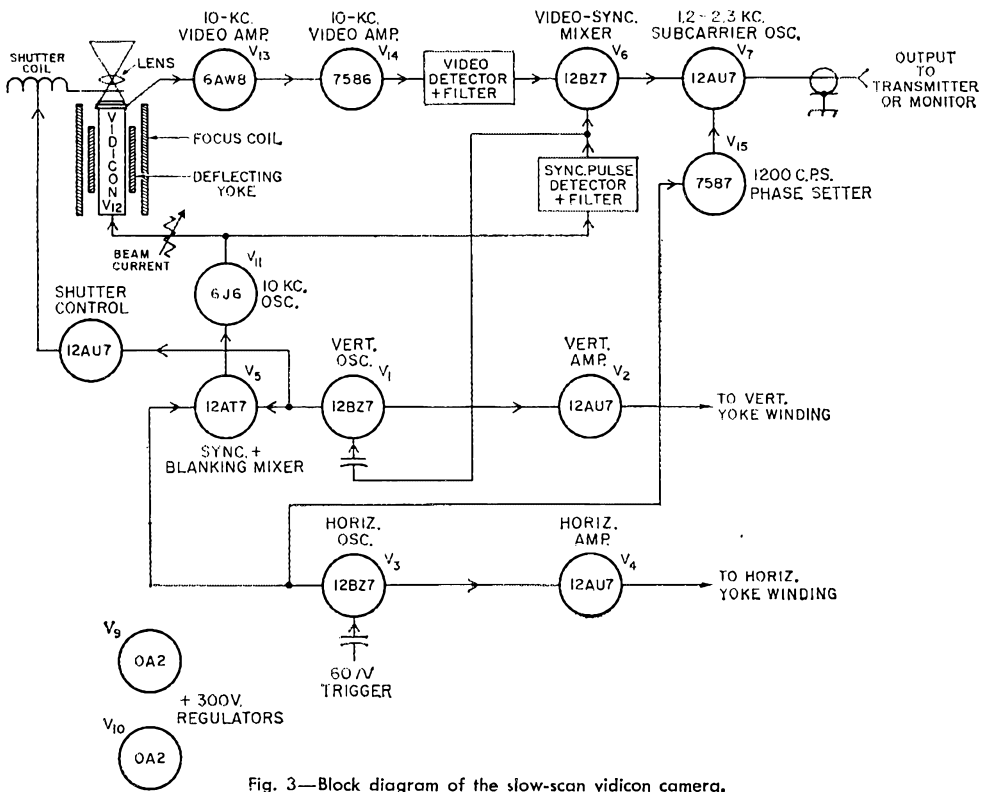


Fig. 3—Block diagram of the slow-scan vidicon camera.

audio preamp except for coupling and cathode bypass capacitors, which are kept small to keep 60-cycle amplification low. Since the vidicon beam current is chopped at a 10-ke. rate the output current contains two spectra: the desired 10-ke. carrier with video sidebands that are amplified in the video amplifier, and an undesired d.c.-to-approximately-1-ke. video signal that is attenuated by the small coupling capacitors. After amplification by V_{13} and V_{14} , this modulated 10-ke. signal is rectified by CR_2 and CR_3 , filtered to remove 20-ke. ripple, and fed to the video-sync mixer, V_{6A} . The s.c.f.m. multi-vibrator, V_7 , oscillates at a frequency determined by the voltage at the plates of V_{6A} and V_{6H} . The sync-frequency pot, R_6 , is adjusted to produce a 1200-c.p.s. output when V_{6B} conducts heavily during sync pulses. The black-frequency and white-frequency controls, R_4 and R_5 , are set to limit the black excursion to 1500 c.p.s. and the white excursion to 2300 c.p.s. maximum. Proper video balance between black, white, and intermediate shades of grey is determined by the light level, lens "f" opening and contrast-control setting.

Without V_{15} the phase of the 1200-c.p.s. synchronizing waveform would be random with respect to the horizontal sweep. This would cause "jitter" in the synchronization of a directly-triggered monitor horizontal-sweep circuit because of the small number of subcarrier cycles per cycle of modulating (video) signal.

V_{15} sets the phase of the subcarrier oscillator to 0 or 180 degrees at the start of each horizontal retrace, thus eliminating the jitter problem. (One consequence of this is that the last cycle of video may be artificially shortened, resulting in the effect noted at the right hand edge of the photos in Fig. 1. The monitor discriminator interprets shortened cycles as a higher subcarrier frequency; i.e., whiter.) The 600 ohm/600 ohm transformer, T_2 , is necessary only if one wishes to feed a balanced audio line such as a telephone circuit.

Shutter Control

V_8 is a monostable multivibrator triggered by the vertical retrace pulse. Conduction of V_{8A} (hence opening of the shutter) is initiated by a positive-going retrace pulse at pin 7 of V_{8A} . The duration of the "shutter open" period is determined by the $R_{16}-C_6$ time constant. The values shown produce an "open" period of about $\frac{1}{2}$ second. This time may be reduced by reducing the resistance of R_{16} .

A center-off toggle switch was used for S_1 . When S_1 is thrown to the "open" position, C_7 provides the high surge current necessary to open the shutter, while the steady drain through R_{17} is sufficient to keep it open. Shutter mechanisms will be discussed in detail in Part II of this article.

Power Supply

Focus coil current of approximately 20.5 ma.

VIDICON

10-KC. VIDEO AMP

VIDEO/SYNC MIXER

SUBCARRIER OSC.

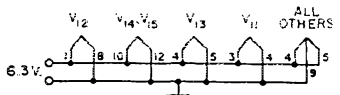
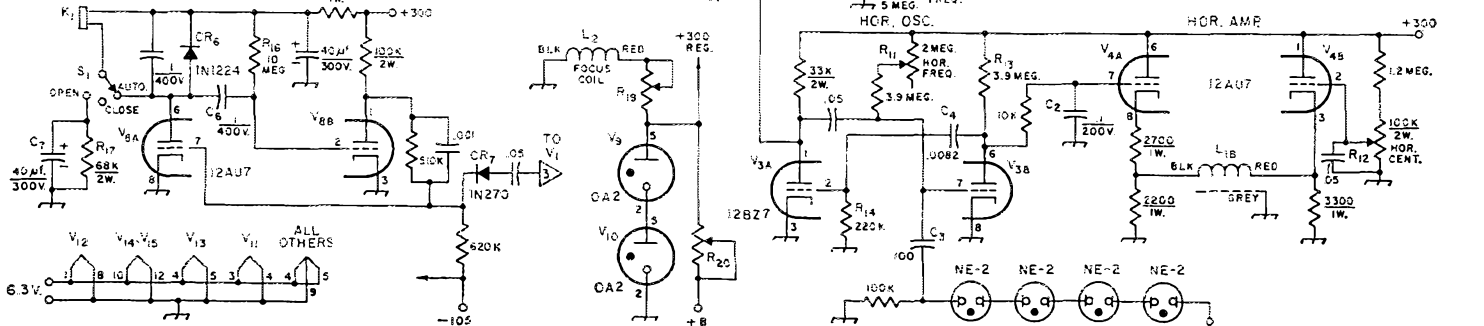
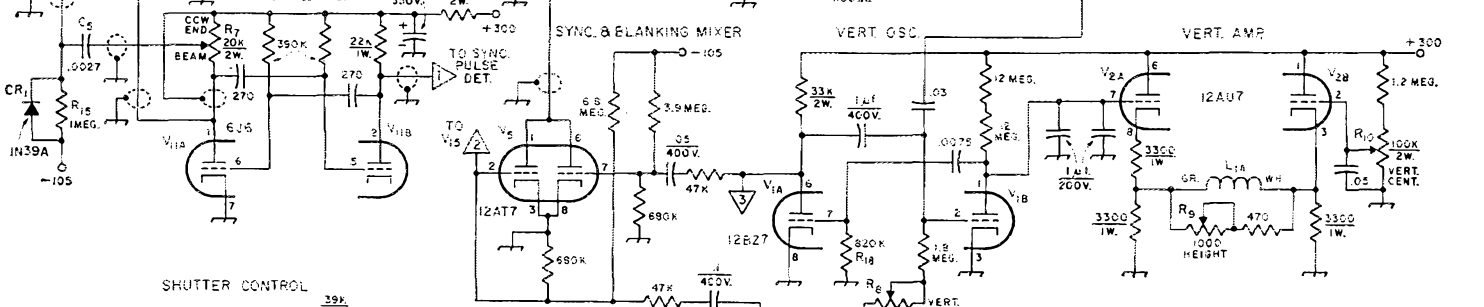
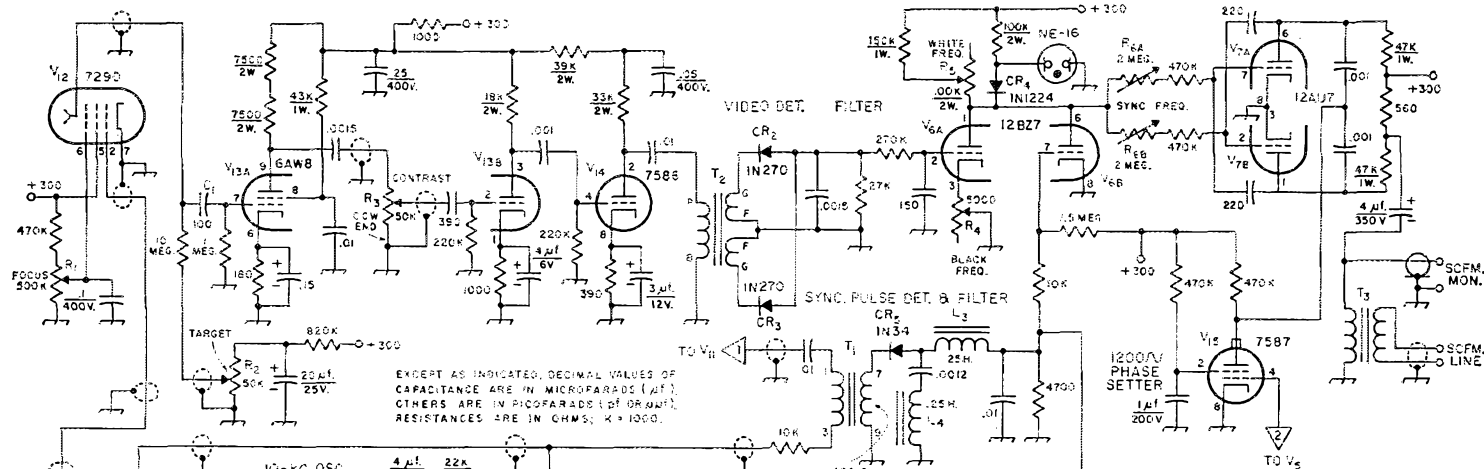


Fig. 4—Circuit diagram of the vidicon slow-scan camera. Component designations not listed below are for text reference. Unless otherwise specified, capacitors are 400- or 500-volt d.c. ceramic, paper, or mica (type not critical), except those with polarity indicated, which are electrolytic. All resistors are 1/2-watt composition unless otherwise specified.

- K₁—Potter & Brumfield type PW5LS, modified as shown in Part II.
 L_{1A}—100-mh. vert. winding of deflection yoke.
 L_{1B}—50-mh. horiz. winding of deflection yoke.
 L₂—385-ohm focus coil.
 (Above coils available from Cleveland Electronics, Inc., 1974 East 61st St., Cleveland 3, Ohio, Yoke and Focus Coil Kit VK-300.)
 R₁, R₂, R₃, R₄, R₅, R₆, R₇—Composition control, linear taper.
 R₈—Composition control, audio taper.
 R₉, R₁₀, R₁₁, R₁₂—2-watt control, linear taper.
 R₁₃—Dual 2-megohm control, linear taper.
 R₁₄—Voltage-dropping resistor to give focus-coil current of 20.5 ma. Wattage rating of resistor should be chosen to be several times the actual power dissipated (for maximum focus-current stability).
 R₂₀—Adjustable resistor of adequate wattage rating, set to give current of about 25 ma., through V₉ and V₁₀, with camera operating properly.
 S₁—Rotary, 1 pole, 3 positions; or s.p.d.t. toggle with neutral center, such as Arrow-Hart & Hegeman 82022-HP.
 T₁—Audio transformer, 22K to 600 ohms; type TFI1A19 (available from Arrow Electronics, Inc., 900 Broad Hollow Rd., Farmingdale, N. Y.)
 T₂—Audio, 1.5K single plate to 80K p.p. grids (UTC type A-19. Less expensive transformers such as the Stancor A-53-C should be satisfactory).
 T₃—1:1 audio transformer (Knight 64G174 or equivalent). Vidicon socket is Cinch-Jones type 7VT (Allied Radio catalog No. 41H349).

Part Substitution

Having read this far, you have possibly already given some thought to cutting costs. Unfortunately, the major components do not have ready substitutes. The 7290, and other related tubes also manufactured by Westinghouse, are the only vidicons that will perform as described with low dark current at this scan rate, and low lag when shuttered. Most vidicons will not perform at all. The deflection yoke is higher than normal impedance (many turns of fine wire) and building a good one requires know-how and facilities not possessed by many.

Conventional miniature tubes can be substituted for the nuvistors. A 6CL6 with suppressor grounded can be used instead of the 7587, if space permits. One half of a 6BQ7 should be a satisfactory substitute for the 7586. A less-expensive relay can be used to drive the shutter, as will be described in Part II. Several other possible substitutions are indicated in the parts list.

One general comment: Since precision tolerance components were not used, in the interest of keeping the cost down, an occasional slight juggling of resistor and capacitor values may be necessary. Armed with a thorough understanding of the principles of operation, and the waveforms to be given in Part III, this should present no problem.

QST

Strays



The East Shore V.H.F. Radio Club (Ohio) provided communications for a sports car rally which was run in order to raise funds for the benefit of some blind children. The group provided spot communications at various check points on 6 meters. Shown above at the starting line are K8AOE (left) and Rallymaster Lingofelt.

is required if the vidicon is to focus with the focus control, R₁, set at +75 volts (midrange). Focus-coil (L₂) resistance is about 385 ohms, thus any well-filtered (and preferably regulated) supply putting out over 8 volts and having the required current capability could be used with a suitable series dropping resistor. The black focus coil lead should be connected to the negative terminal of the supply. The series dropping resistor should be wire-wound and of higher than necessary wattage rating to minimize resistance change (and thus focus change) with warmup.

The -105-volt supply should be regulated if line voltage changes are expected.

V₉ and V₁₀ provide adequate regulation from an unregulated +400-volt d.c. supply. They may, of course, be eliminated if an electronically-regulated +300 volt supply is available.

Although primarily a report on measurements made on salt-water dummy loads, this article contains some highly useful information on the practical construction of this inexpensive type of test load.

Aqueous Dummy Loads

An Investigation of Their Properties

BY ALEXANDER P. MARION,* W2CUE

ALTHOUGH aqueous solutions have often been suggested for use as dummy loads for amateur transmitter testing, several questions have been left unanswered. What is the temperature coefficient? How flat is the load over a wide frequency range? The primary purpose of a dummy load is to convert r.f. power into a form of energy that will not be radiated any great distance. This energy is usually in the form of heat which increases the temperature of the dummy load. Therefore it can be appreciated that a high temperature coefficient will indicate a marked change in impedance value with power-output level.

The Electrodes

To answer these and other questions, some measurements were made under controlled laboratory conditions. The electrodes used in the experimental model were made of No. 14 wire taken from some type UF/2 underground feeder cable. This wire has a sturdy plastic covering that permits control of the exposed area of the electrodes. A 1 $\frac{3}{4}$ -inch length was soldered to the center terminal of an SO-239 coaxial receptacle, as shown in Fig. 1. One inch of insulation was stripped from the free end, and the bare portion was bent perpendicular to the insulated section. One end of a 5 $\frac{1}{4}$ -inch length of the same type of wire was soldered in one of the mounting holes of the receptacle. One and one half inches of insulation were removed from the opposite end, and the bared end bent at right angles. The bared portions of the two electrodes run parallel, 3 inches apart.

* Dept. of Chemistry, Queens College of The City University of New York, Flushing 67, New York, N. Y.

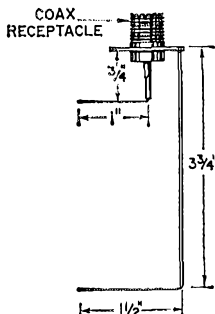


Fig. 1—Sketch showing dimensions of the electrodes used in the dummy load described by the author.

Measuring Equipment

These electrodes were immersed in experimental solutions contained in 250-milliliter electrolytic beakers. The temperature of the solution was controlled to an accuracy of better than 0.05 degree C. by immersing the beakers in a Fisher Isotemp bath.

Measurements of resistance and reactance were made with a General Radio type 1606A r.f. bridge, using a G.R. type 805D standard signal generator as a frequency source, and a National 190 receiver as a null detector. The load was connected to the bridge through a 14-inch length of RG-59/U coaxial cable. This bridge is designed to measure the resistive and reactive components of relatively low impedances by a series-substitution method. In making the measurements, appropriate precautions were taken to compensate or make allowance for significant stray capacitive and inductive reactances.

Solutions

The resistance of an aqueous load will vary with the electrode area in contact with the solution, the distance separating the electrodes, the shape of the container, and the nature, concentration, volume and temperature of the solution. Most of the measurements were made using solutions of sodium chloride (salt), although ammonium chloride (sal ammoniac) solutions were used in a few tests for comparison. A convenient way to adjust the resistance is to adjust the concentration of the solution while holding all other factors fixed. The graph of Fig. 2 shows typical variation in resistance with changes in concentration at a constant temperature and frequency. Both sodium chloride and ammonium chloride are obtainable in tablet form from druggists. This makes it easy to control the concentration in small increments and also to duplicate a desired concentration without resort to accurate chemical scales.

Measurement Results

Fig. 3 shows the variation in resistance measured with a change in frequency at different solution temperatures. Because of the unexpected shape of the ammonium-chloride curve, duplicate runs were made. The results were in agreement within the experimental error. Fig. 4 shows variations in reactance under similar conditions. It is obvious that the curves are not flat. However, it appears that the idea of a dummy load

A Practical Dummy

An aqueous dummy load for amateur use was constructed by mounting the assembly shown in Fig. 1 in the center of the cover of a 48-ounce Freccz-R-Jar, a cylindrical container $4\frac{1}{2}$ inches in diameter and $5\frac{1}{2}$ inches high, made of plastic which, it is claimed, can stand scalding water temperatures. The solution used in this model was made by dissolving three 1-gram tablets of U.S.P. sodium chloride in 42 ounces of distilled water. (Distilled water is essential if duplicate results are to be obtained, because the natural conductivity of tap water varies locally, and may also vary with the season in any given locality.) This volume of liquid keeps the level low enough to avoid a possible short circuit.

The measured resistance of this load was 71 ohms, and the capacitive reactance 4.3 ohms at 30.5 degrees C. on 7 Mc. The addition of another tablet reduced the effective resistance to 55 ohms, and the reactance became inductive to an extent of 2 ohms. The resistance-concentration dependence at 25 degrees C. on 14 Mc. is:

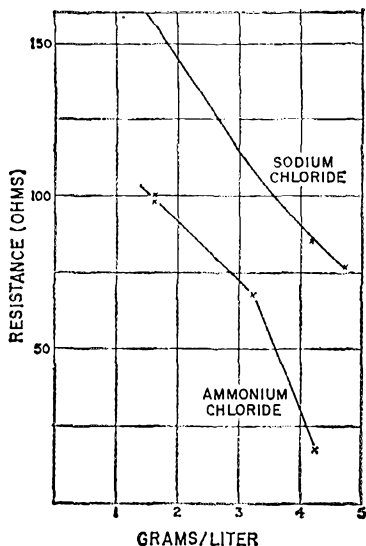


Fig. 2—Curves showing typical variation in resistance of aqueous solutions with changes in concentration at a constant frequency and temperature.

of this form is not entirely without merit, particularly if its use is restricted to the lower-frequency bands, or if the load is designed for one favorite band. It may be pointed out that the percentage change in resistance is less than that of a carbon resistor for the same frequency span.

A crude comparative check for radiation was made. The r.f. gain of the receiver, located about 3 feet away from the transmitter, was adjusted to give an S9 reading from the signal picked up from the multiplier stage. A reading was then taken with power applied to the final with the dummy load connected. With the commercial dummy, the S-meter reading increased to 7 db. over S9, while the reading was 12 db. above S9 with the home-brew load.

The author wishes to express his thanks to

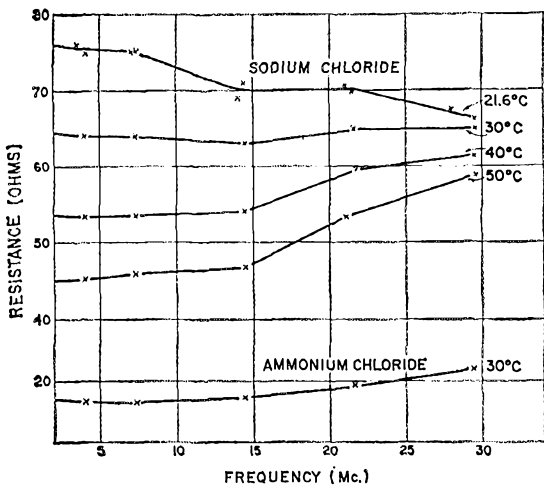


Fig. 3—Variation in resistance of aqueous solutions as a function of temperature and frequency.

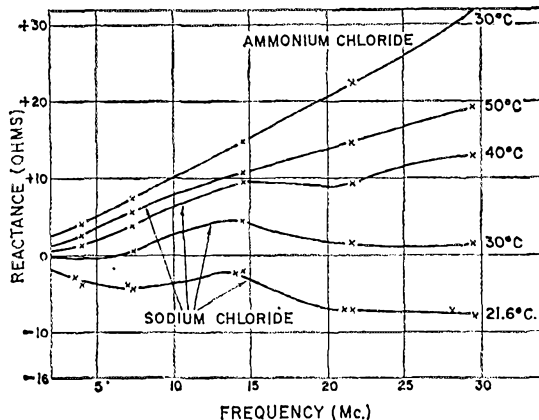


Fig. 4—Variation in reactance of aqueous solutions as a function of temperature and frequency.

1-Gram Tablets	Ohms Resistance	Ohms Reactance
2	80	-30
3	72	-13
4	62	-1.4
5	48	+6.3

This load gave a good account of itself when connected to a transmitter running at an input of 500 watts. It accepted power at the same dial settings as a commercial dummy load consisting of a tin-oxide-film resistor immersed in about a pint of organic liquid. It showed less temperature rise than the commercial model, undoubtedly because it contains nearly three times as much liquid to absorb the generated heat. Rough calculations indicate the temperature increase to be expected in the solution when connected to a 500-watt power source for 5 minutes is approximately 25 degrees C.

QST

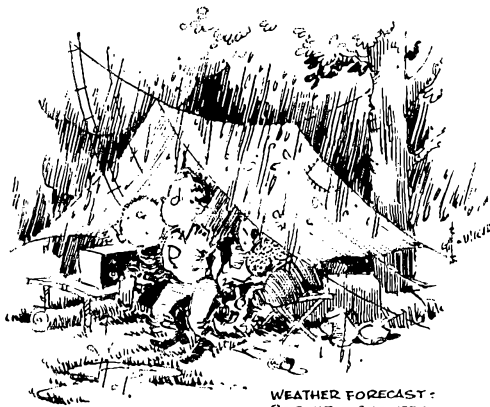
FIELD Day is superlatives. It is the only activity where we have no yardstick for measuring except "the most," so that descriptions that sound like exaggeration to the layman are commonplace to us. It is, in true Dickens wording, "The best of times and the worst of times."

There is no weather of any time of the year that can compare with that last weekend in June, and the Weather Bureau's official bulletins are only the merest hint of what we can expect. If it is to be hot, then it will be the hottest weekend on record with the humidity matching the high temperatures. "Possible showers, and some thunderstorm activity," means tie down the gear and pull the antennas because we are in for the granddaddy of all thunderstorms. It means a

Field Day is - - -

BY LOUISE RAMSEY MOREAU,*

W3WRE WB6BBO



WEATHER FORECAST:
POSSIBLE SHOWERS

night of taking them down, putting them up, and, a few hours later, a wild dash to get them down again. "Light showers and cooler," may cancel picnics and swimming, but for the veteran of these weekends it is a good sign that he better pull his winter coat out of the mothballs and dig up his heavy hunting boots, to automatically cut the order for soda pop and ice cream, and double the order for coffee. Name the weather and it is a sure bet that it will be there in record breaking superlatives on Field Day.

This is the weekend when Murphy is king and rules the elements, the ionosphere, and the equipment. The generator that starts 364 days of the year, and even starts on Field Day morning, won't even turn over once it arrives at the chosen site. But let someone be sent into town for

spare parts and you can be sure that as soon as they have gone it will work beautifully. Then there is the brand new Rolls Royce-class layout that comes right out of the box, is set up, tested, purrs like a happy cat, and promptly, as the first "CQ FD" rolls off the key, the receiver starts transmitting smoke signals. "Plan the antennas well in advance," the rules tell us. So everyone dreams up the ultimate in design all winter, and spends May and June making sure they will work. A final test, an hour or so before *the moment*, proves that they are perfect for working DX, but no one close enough for a Field Day score.

It is getting set with all the top contest operators who know every trick in the book, and equipment to match their skills, as well as the kind of weather we all dream about, and what happens? There is the aurora to end all auroras, so that these crack c.w. and phone men enjoy a bull session while the v.h.f. boys are logging them like shooting ducks in the bath tub. Or, it is the time that the ten-year-old Novice showed up to help. He was so starry-eyed and bushy-tailed that we could taste his eagerness, so we stuck him in a small tent with a two-meter transceiver and a couple of crystals. That was the night when thunderstorms forced every antenna down and activated a night-long session of coffee and rag chewing. After a couple of hours, the Novice, damp and triumphant, came into the big shelter with a log full of contacts and fuming like a wet kitten because, every time he got a contact with his high voice they'd ask him to "Please QSL for YLCC."

Field Day is personalities. The guy who asks the YL operators to dress up on Sunday afternoon so his YL can see that they are just like everybody else. It is the beginner, bringing his parents to meet the gang, and pointedly showing poppa the most expensive gear. Or, the c.w. man whose dog always comes, and always finds a skunk, and always comes dashing in to let everyone share his find with him. (At this point it is also a blessing that this, suddenly, not-so-proud owner is on c.w.) It is the guy who lends his equipment every year, but never operates, just stands in the background saying over and over again, "Listen to that skip," to everyone who passes him. Or, the Club statistician checking logs, and fussing over the lack of certain sections, and the official worrier with his hourly: has anyone sent a participation message?

Most of all it is sounds. Those last few moments before H-hour, when, we, waiting like all the others, tune across the bands and hear absolutely nothing. Then, as the second hand sweeps across the hour, they explode into "CQ FD" six layers deep. Rapid c.w. repeating and repeating: 5-7-9; 5-8-9; 4-4-9, GL 73, and the voices of the men at the mikes in a steady murmur. The sudden flurry of talk as a new arrival comes in asking "How's it going? How are we doing?" Or an exultant "He was a 3-3-9, but I got that tough Section." The steady chatter of the generator

* 2081½ Lewis St., Altadena, California.

(Continued on page 172)

• *Beginner and Novice*

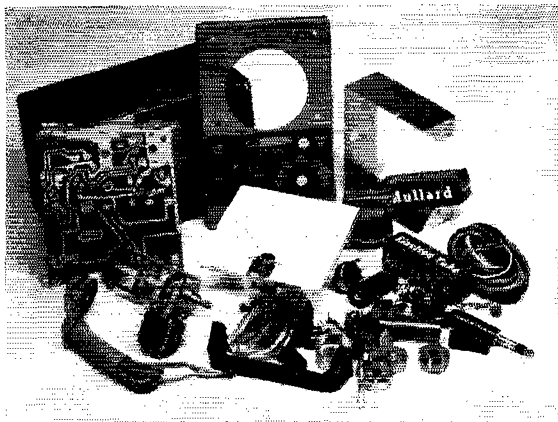


Fig. 1—This is what a typical kit looks like when un-packed. Just a little work and time and you'll have a finished instrument.

Kit Building—

What's Involved

BY LEWIS G. MCCOY,* WIICP

WHEN getting started in ham radio there are several approaches you can take to make up your station. You can buy new or used commercial gear, build your own from articles in handbooks or magazines, or build the equipment from commercial kits. We will not go into a long dissertation on the advantages or disadvantages of these three paths to a station. However, while a beginner can purchase ready-built gear and use handbooks to study radio theory, a great deal is lost if he doesn't build some equipment himself. Aside from the knowledge gained, constructing your own equipment can be fun—plus the pride of having built it yourself.

If you don't want to tackle a piece of gear from a description given in a magazine article, don't overlook the kit market. There are kits available these days for practically every conceivable type of gear that could be used in an amateur station. However, if you are just getting exposed to amateur radio you may not know what is involved in kit construction. In this article we'll show you what to expect, and will pass along some dos and don'ts for the neophyte.

Probably the first question you ask yourself, as a newcomer, is whether you have the ability

* Beginner and Novice Editor

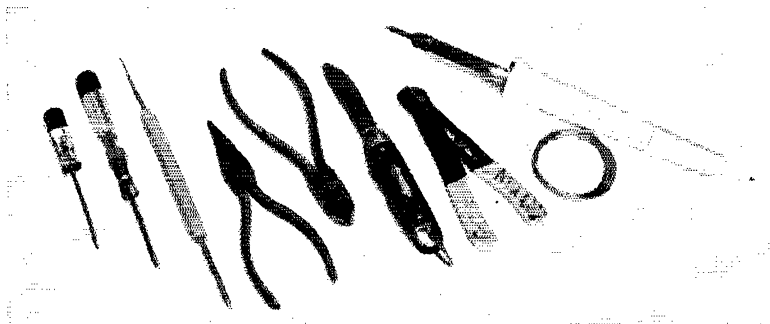
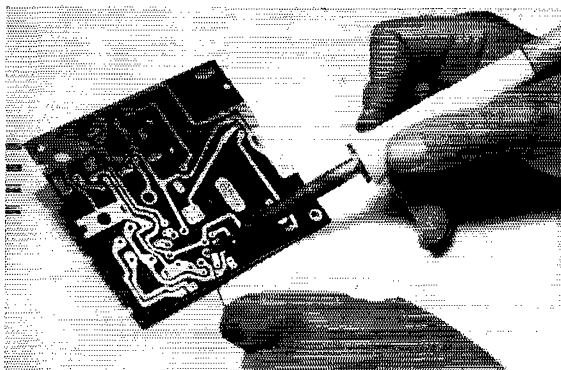


Fig. 2—These are the basic tools needed to put a kit together. The soldering iron is the most important item, as explained in the text. The tool next to the screwdrivers is called a soldering aid. One end of the tool is a probe and the other end a fork. This tool is very handy for dressing wires around terminals prior to soldering.

Fig. 3—Particular care should be exercised when wiring printed circuit boards. Don't use any more solder than necessary; and it is a good idea to look over each connection with a magnifying glass before installing the board into the unit.



to construct a piece of gear from a kit and make it work satisfactorily. Let us reassure you. If you can read and follow simple directions, it's a cinch. Like learning anything, though, it is better to start off with a simple piece of equipment rather than a complicated piece of gear.

For example, a good kit to start with would be a test multimeter, such as a vacuum-tube voltmeter. You'll be needing a test meter in your shack, and this type of kit can be put together in a few hours' wiring time and is a relatively simple unit. Fig. 1 shows such a kit, in this case a Heathkit Model IM-11 vacuum-tube voltmeter. In some of the more elaborate receivers or transmitters certain sections may be already completed when you receive the kit, but in these simpler kits all the work is left up to you.

Tools Required

You'll need a few tools for kit construction. Your investment in them won't be wasted after the kit is completed, because you'll find that from time to time they'll be put to good use around the shack. Fig. 2 shows the essential tools required. You'll need a pair of wire strippers, wire cutters, gas pliers, long-nose pliers, two screwdrivers ($\frac{1}{4}$ - and $\frac{1}{8}$ -inch blades), a pocket knife, and a soldering iron. The pocket knife is used for scraping insulation off wires. Another handy tool is a $\frac{1}{4}$ -inch hex nut driver; however, you can get by without it.

Many of the kits these days make use of printed circuit boards in their construction. To do a good job of wiring with printed boards you must be careful in your choice of a soldering iron. There are two basic types of irons available, the constant-heat type, which stays hot and is ready for use at any instant after reaching full temperature, and the soldering "gun." With a gun, you press the trigger and the soldering tip heats up rapidly, but only stays hot as long as the trigger is depressed. In wiring circuit boards the gun is hard to handle, and a much better job can be done with the pencil-type iron shown in Fig. 3. Don't misunderstand — soldering guns are excellent for many purposes. However, for kit wiring, the pencil-type iron is easier to handle and is always hot and ready for use.

A good deal of the wiring in kits will be printed-circuit work, or at least will involve small com-

ponents. If you already have an iron but the tip is too large for this type of work, there is a simple way to make use of the iron. A length of No. 10 or No. 12 solid copper wire can be tightly wound around the existing tip, with the end of the wire extended to form a new tip. The wire end can be filed flat on two sides, and when heated and tinned will serve for delicate soldering jobs.

When the Kit Arrives

Your first job after the kit arrives is to familiarize yourself with all the parts. Before unpacking the kit, take out the instruction book and find the parts list. Many kit manufacturers include drawings of parts that it might be difficult for a beginner to identify. Once you have looked over the parts list your next step is to sort out all the parts. The partitions in muffin tins or egg cartons make excellent storage places for small hardware and components. Also, if the top is cut from a small corrugated box, the box can be set up and the leads of resistors and capacitors stuck into the corrugated openings. Although such sorting may take a little time at the start, it is much better and saves a lot of time in the end, as compared with having all the parts piled into one box.

One thing you'll want to learn, and now is as good a time as any, is the color code used to identify the values of components, particularly resistors. Table I is the color code for resistors

Color	Significant Figure	Decimal Multiplier	Tolerance Per Cent
Black	0	—	—
Brown	1	10	1
Red	2	100	2
Orange	3	1,000	3
Yellow	4	10,000	4
Green	5	100,000	5
Blue	6	1,000,000	6
Violet	7	10,000,000	7
Gray	8	100,000,000	8
White	9	1,000,000,000	9
Gold	—	—	5
Silver	—	—	10
No color	—	—	20

or capacitors and Fig. 4 shows how it is used. The first three bands of colors on a resistor determine its value and the fourth band the tolerance. If there is no fourth band, the tolerance is 20 per cent. For example, suppose a resistor had three color bands, red, violet, and brown, in that order. The first band, the one nearest the end of the resistor, is the first significant figure and the band next to it the second significant figure. The third band is always the decimal multiplier. The first band would be 2, the second band 7, and the third band 10. The value of the resistor would be 27 times 10, or 270 ohms.

The color code for capacitors is similar to that for resistors. Fig. 4 shows some of the more common types of capacitors. The two types that are slightly different as to the order in which the color bars appear are those at C and D. In this case, the color dot or bar at the end of the capacitor is the temperature-coefficient figure. The value arrived at from the color code on a capacitor is always in picofarads. For example, black-brown-red would be 1000 pf., or 0.001 μ f. Most kit instruction books will give both the value and the color code when they refer to a color-coded component in a construction step.

Soldering

Once you get all the parts sorted and you have studied the instruction book to familiarize yourself with the unit, you are *almost* ready to start putting it together. We say almost because the one point where most kit builders goof is in their soldering. Kit manufacturers find that the largest number of mistakes in kit wiring comes from poorly soldered connections.

First, you must have a clean tip on your soldering iron and the tip should be tinned. To tin the tip, get the tip hot enough to melt the solder, file it bright, and flow a small amount of solder and flux on the tip. Then wipe it clean. The tip will have a bright silvered appearance when properly tinned. It should be pointed out that there are two types of solder commonly available, acid or resin core. It is very important that you use resin core solder in radio work, *not* acid core. The acid-core solder makes a corrosive electrical connection, so be sure you specify resin core when buying solder.

Many kit manufacturers supply solder with their kits. If so, be sure to use the solder furnished, because it may be a *special type particularly* suited for the unit you are wiring.

Be sure that any connections to be soldered are clean. Many beginners make the mistake of trying to solder enamel-covered wire without removing the enamel. Use your pocket knife to scrape off any enamel before soldering. In the actual process of soldering, apply the tip of the iron to the connection point (the "work") and allow it to heat up until the work itself is hot enough to melt the solder. Don't apply the solder to the tip. The solder should be applied to the *work*. If the work doesn't get hot enough to make the solder flow smoothly, you will end up with a "cold" soldered connection. A cold soldered joint has a dull appearance and is not a good electrical connection. Also, you don't need big gobs of solder to do the job; use just enough to make a connection between the leads being soldered. Before starting on your kit, spend a little time practicing your soldering.

As you use your iron, you'll find the tip will get dirty. Whenever it starts to lose its bright appearance, wipe it off with a rag. After long periods of use the tip may get pitted and scaly. In this event, file or sandpaper the tip to remove the scale and then tin it again.

Wiring the Kit

As we said earlier, if you can read and follow directions, you can build the kit without any problems. However, when we say, "Follow directions," we mean just that. You'll find that the kit instruction books will have pictorial drawings showing the arrangement of components and the wires. Be sure to follow the wiring layout faithfully. You may think you can "pretty up" the wiring, but in doing so you may end up with a completed unit that doesn't work properly. Your arrangement might be neater—but you could run into undesirable coupling between circuits, because you didn't follow directions.

It Doesn't Work

Maybe one thing that has kept you from building kits is the fear that after you've completed

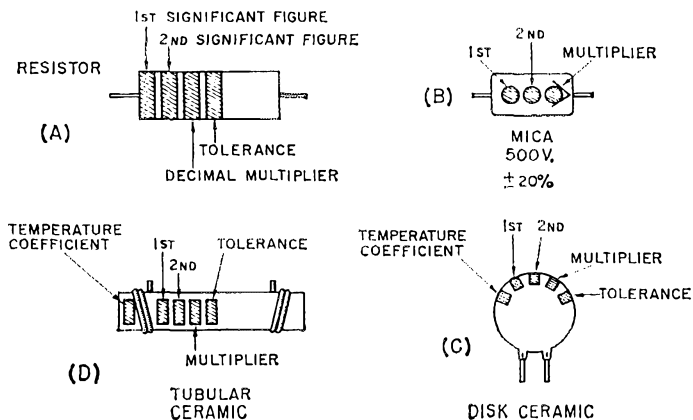


Fig. 4—This drawing shows the manner in which color bars or dots are used for determining the component value.

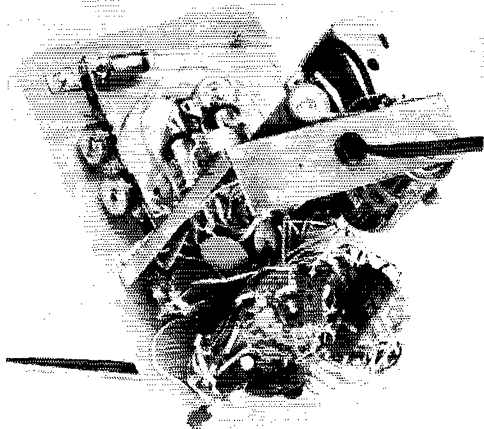
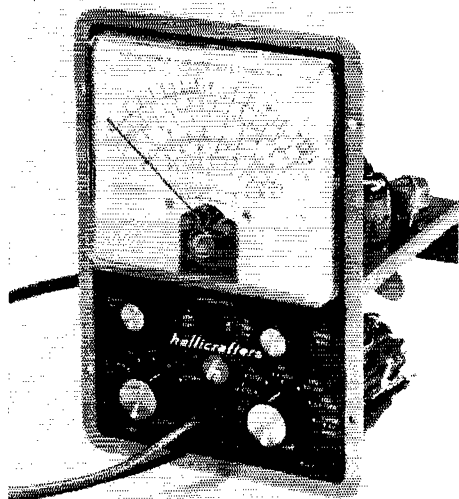


Fig. 5—Here is another v.t.v.m. kit, the Hallicrafters HM-1. This completed unit will give you an idea of the kind of work you can accomplish at home—and save money in the process.



the unit it won't work. This is, of course, possible. Even though kit manufacturers make every effort through quality control to furnish you with good components, a bad egg now and then slips through. Also, you can make wiring errors even though you carefully follow directions.

However, the instruction books are always complete with trouble-shooting data. They furnish step-by-step checking procedures. And even if careful checking doesn't turn up the error there is no reason to panic. Kit manufacturers realize

that people can make mistakes, so part of the manufacturer's setup is devoted to trouble-shooting, either by mail or by sending the equipment in. When you write the manufacturer, be sure to include all the symptoms you have encountered with the kit. The more information you furnish him, the easier it is for him to pinpoint your troubles. If all else fails, you can send the unit to the manufacturer, who will put the unit in working order for a minimum fee.

Ask almost anyone who has ever wired a kit and he'll tell you that he got a lot of fun and satisfaction out of it. Also, by wiring your own, you can save a lot of money. QST

— It's Whoopee Six — Isosoles — ahhh — Square — errr — Quadrilaterals —

BY JOHN G. TROSTER,* W6ISQ

ST2AR ST2AR . . . this is W6ISQ. William 6 Ida Sugar Queen."

" . . . the W6 Ida something Queen . . . call again . . ."

"ST2AR here is Whiskey Six India Sierra Kay-bee."

" . . . I'm listening for W6 Ida . . . Queen. All others QRX."

"ST2AR . . . this is Wilmington Sixer Italy . . . Springfield . . . ahhh . . . Quintuplets . . . go."

" . . . sorry, I don't copy W6 Ida Queen. Please try later. QRZed ST2AR."

"ST2AR this is William Six . . . Six like Sierra India Xray . . . and ahhh . . . Indo-

nesia . . . Siam . . . Quicksilver."

"W6SIX . . . you're 3 by 4 here . . . go."

"ST2AR . . . no no no . . . my call is Wisconsin Sixer 'I' like Indians, 'S' like in Shooting, and 'Q' like in Quail . . . go."

"The W6 station portable in Wisconsin . . . too many stations calling. Please give your call again. The W6 in Wisconsin."

"Oh my . . . ST2AR . . . it's Wellington Six Six Six Idaho . . . Spain . . . Qatar . . . that's 'I' like ahhhh Israel . . . 'S' like Sebastapol . . . and 'Q' like . . . say . . . Quetzalcoatl . . . go go go."

"I copy a W6 Israel Sebastapol . . . you're 3 by 4. Your call again and will the station in Idaho please stand by. I'll get to everybody in time."

*45 Laurel Ave., Atherton, Calif.

"Yes yes . . . that's me, that's me . . . W6 "I" Illinois . . . "S" like SisBoomBah . . . and . . . hmmm . . . ahhh "Q" like Quiet everybody else. You're 5 and 7 here. Over over over."

"Sorry, I don't copy the W6 Israel Sebastapol . . . try again later. Now the W6 . . . was it SisBoomBah — W6SBB? You're 4 by 5. Give me your call again."

"No nooo . . . ST2AR it's Whammy Six Indiana . . . ahhh . . . Sesquicentennial . . . oh my . . . "Q" like . . . err . . . Quality . . . go."

"Very sorry. Don't copy W6SBB question mark. Please call later. QRZed?"

"ST2AR from W6ISQ . . . like . . . ahhh . . . I Smell Queerly."

"Ohhhhh . . . W6 Ida Sugar Queen. Believe I heard you in there before. You're 4 by 5. Go."

"Oh boy, oh boy . . . ST2AR this is W6 Indianapolis . . . Sardinia . . . Quinine. Thanks OM. You're 5 by 7. Go."

"W6ISQ W6ISQ . . . this is ST2AR . . . too much QRM . . . please repeat . . . and will the Indianapolis station please QRX."

"ST2AR this is Wyoming Sixer Ipswich Saratoga . . . ah . . . Queezy. You're report is 5 by 7 . . . 5 by 7 . . . copy ok? ST2AR this is Wonderful Six Istanbul . . . ehllh Saskatchewan . . . and ahhh . . . Quataban . . . go go."

"W6 Ida Sugar Queen. Very sorry, OM. Didn't hear you return. Please try later. Now the station in Saskatchewan . . ."

"Nooooo . . . not Saskatchewan . . . it's me . . . Whoopee Six "I" like Ichabod . . . ahhh "S" like Superman . . . and "Q" like . . . hmmm . . . Quixotic . . ." QST



California — The Northern California DX Club will hold their July open meeting at Lou's Village, in San Jose on July 20. Reservations and information from Joe Reisert, WA6TGY, 2614 Media Way, San Jose.

Illinois — The Six Meter Club of Chicago will hold its 8th Annual Picnic and Hamfest Sunday, August 1, at Picnic Grove, Frankfort, Illinois, on U. S. Route 45, 1 mile north of Route 30, 5 miles south of Route 6. Advance registration is \$1.50, at the gate \$2.00. Write Val Hellwig, K9ZVV, 3420 South 60th Court, Cicero, Illinois 60650.

Indiana — The Second Annual Shady Acres Ranch Hamfest, sponsored by the Clinton County VHF Radio Club of Frankfort, Indiana, will be held June 13, rain or shine. Preregistration fee is \$1.00. Information and registration from Donald Massey, W9URS, 151 East Main St., Ross-ville, Indiana.

Kentucky — The annual Mo-Ark-Ky Hamfest, sponsored by the Paducah Amateur Radio Club, will be held on Sunday, July 11, at Noble Park Community House, in Paducah, Kentucky. This will be an all-day affair with a big noon meal. There will be no registration fee. For further information contact U. C. Morris, W4KCI, 3628 Gregory, Paducah, Kentucky.

Missouri — The Hambutchers Net will hold their annual picnic this year in the City Park area at Warsaw, Missouri, June 20. Details can be obtained from John Knaak, 16 Maple Lane, Macon, Missouri.

Missouri — The Mid-Mo Amateur Radio Club will host the Missouri Net Picnic/Hamfest this year at the Memorial Park in Jefferson City, Missouri on June 6. For more information write Roy E. Lilley, K0JJS, 1204 Edgewood Drive, Jefferson City, Missouri.

Montana — The Hams of Wolf Point will host the 12th annual North East Montana Ham Picnic on June 20. Additional information from Betty Ferguson, W7BDF, Wolf Point, Montana.

Nebraska — The Tri-City Amateur Radio Club's annual Picnic/Hamfest will be held on June 20 at Scottsbluff's Riverside Park. Write Mrs. J. W. Fairfield, K9VTC, 2406 Ave. B, Scottsbluff, Nebraska 69361.

Nebraska — The Pine Ridge Amateur Radio Club will hold their annual Hamfest at the State Park, South of Chadron, Nebraska on Sunday, June 6. Amateurs in the Tri-State area of Western Nebraska, Eastern Wyoming, and Southwestern South Dakota are invited. Details from Stanley Stumpf, Route 2, Box 76, Chadron, Nebraska 69337.

New Brunswick — The International Picnic/Hamfest, sponsored by the St. Croix Valley Radio Club, will be held July 4 at the Canadian Legion Bldg., St. Stephen, New Brunswick. Those interested can obtain further information from VE1CL, P.O. Box 366, St. Stephen, New Brunswick, Canada.

New York — The 7th Annual Penn-York Hamfest will be held at Morrison's Restaurant, Big Flatts, New York (between Elmira and Corning, New York), June 19, at 12 noon. Preregistration is \$4.50, \$6.00 at the door. Write Earl J. Foster, W3BKF, Rd #2, Gillett, Pa.

Ohio — The Northeast-Ohio VHF Group will hold the 10th Annual Hamfest and Picnic on Fathers day, Sunday, June 20, at Maca Park, two miles east of Tallmadge, Ohio, on State Route 18. Mobile check in on 50.5 Mc. For further details contact W8IXZ, 364 Clinton Ave., Akron, Ohio 44319.

Ohio — The Lancaster and Fairfield County Amateur Radio Club is holding its Swap and Shop Affair on Sunday, June 20, from 9:00 A.M. to 4:00 P.M. at the Fairfield County Fairgrounds in Lancaster, Ohio. Write Jerome Ford, K8ZBA, P.O. Box 3, Lancaster, Ohio for more information.

Pennsylvania — The 7th Annual Penn-York Hamfest will be held at Morrison's Restaurant, Big Flatts, New York (between Elmira and Corning, New York), June 19, at 12 noon. Preregistration is \$4.50, \$6.00 at the gate. Write Earl J. Foster, W3BKF, Rd #2, Gillett, Pa.

Saskatchewan — The Canadian Western Hamfest will be held July 2, 3, and 4 at the Bessborough Hotel in Saskatoon, Saskatchewan, Canada. Lots of activities are planned including a banquet and feast at Harveys Cumberland House complete with entertainment and square dancing, winding up with caberet style dancing. Get your tickets early. Write Hamfest Manager, Box 801, Saskatoon, Saskatchewan, Canada.

Texas — The Belton Amateur Radio Club is having their Second Annual Hamfest on Sunday, June 20, on the shores of Lake Belton in central Texas. There will be exhibits of ham gear, contests and mobile talk-in on 3940 kc. Registration will be \$1.50. Contact W5UPO, 1500 North Beal, Belton, Texas.

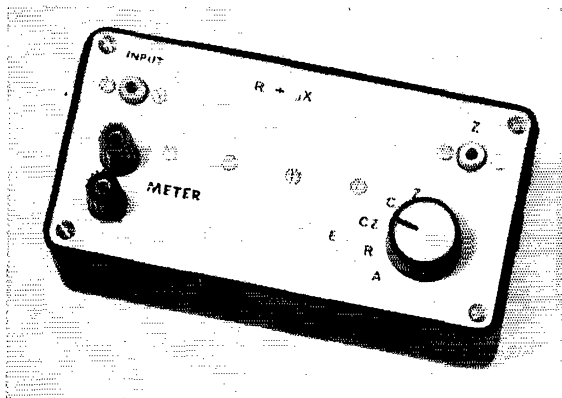
Texas — The Permian Basin Amateur Radio Club is holding its Fifth Annual Hamfest/Swapfest on Sunday, June 6, at the Ector County Coliseum Barn A, 42nd and Andrews Highway, Odessa, Texas. Registration is \$2.00 at the door. Highlights include an auction, ARRL speakers, Mars and RACES meetings, movies for the kids, special ladies activities and a barbecue. For further information write PBARC, P.O. Box 1406, Odessa, Texas.

Vermont — The annual International Field Day (Hamfest), sponsored by the Burlington Amateur Radio Club will be held July 4 at the Champlain Valley Fairground in Essex Junction, Vermont. Registration is \$2.50 in advance, \$3.00 at the gate. For further information wire E. Bert Berteau, W1HRG, 333 Dorset St., S. Burlington, Vermont.

Washington — The Northwest Chapter of the Quarter Century Wireless Association will hold their annual summer meeting in Seattle, Washington this year on the week end of June 12 and 13, at the Lakeshore Inn Motel. All old timers are welcome. For further information and reservations contact W. P. Gilbert, W7QA, 4060 S. Myrtle St., Seattle, Washington 98118.

Wyoming — The Wyoming Hamfest for 1965 will be held on Casper mountain on July 3 and 4. Write K7IAY, 1615 South Oak St., Casper, Wyoming.

Panel view of the impedance-measuring network unit, showing the input and output jacks in the upper corners, the v.t.v.m. terminals at the left, and the volt-meter switch at the right. The aluminum panel measures 3 by 5 inches. The enclosure may be of metal or plastic.



Amateur Measurement of $R + jX$

Inexpensive Method of Determining Complex Impedances

BY DOYLE STRANGLUND,* W8CGD

SINCE someone once said, "It's easier to get a bigger signal with a better antenna than with more power," the topic has been a favorite in amateur thoughts and conversations in every variation imaginable. However, nearly every type of antenna, except a dipole (used at its resonant frequency, and high off the ground) presents a problem in matching and feeding. There is no shortage of material to read on how authors have matched and fed everything from needles and noodles to wet string, using absolutely foolproof systems that worked every time — for them. With the advent of TVI, the popularity of coaxial transmission lines rose rapidly and, along with it, came the problem of matching impedances.

Most amateurs associate a high s.w.r. with loss in the coaxial line. This concern may or may not be justified, depending on the frequency of operation, and the length of the line. However, there is another consideration which may be of equal or even greater importance in practice. When a transmission line is terminated in an impedance other than its characteristic impedance, the impedance offered to the transmitter at the input end of the line may be quite different from either the line characteristic impedance, or the impedance in which the line is terminated. In such a case, the line acts like an impedance transformer, and the impedance presented to the transmitter may be a value with which the output circuit of the transmitter is unable to cope. In other words, "The rig won't load."

Impedance mismatches can be handled more intelligently if the values of the impedances to be matched are known. The purpose of this article is to show the amateur how he, with available materials and a straightforward technique, can make impedance measurements previously impossible without expensive equipment.

The Smith Chart

The Smith Chart is a marvellously handy device for simplifying transmission-line calculations to a minimum of math. These charts are available in most college book stores for a few cents. The material in this article will be based on 50-ohm cable, so Smith Charts with "50" at the center will be most easily used. If unobtainable, or if 75-ohm cable is to be used, get the charts that are normalized — with 1.0 at the center. Admittance charts, with 20 mmo at the center, are designed to be used with admittance bridges. They are similar, but would require conversion to ohmic values to fit the thinking in this article.

A very good presentation of the use of the Smith Chart is an article by K6CRT¹ which appeared in an earlier issue of *QST*. The reader is urged to refer to this article if he is not familiar with the Chart manipulation. The subject has also been treated more recently by W7RGL.²

To make use of the Smith Chart and make complete measurements of the r.f. impedance at any point on a transmission line, either a slotted line or an impedance bridge must be used. With the slotted line, the voltage inside a portion of the transmission line is actually measured. The points of maximum and minimum voltage are carefully determined, and the ratio of these two voltages determines the s.w.r. This s.w.r. circle is drawn on the Smith Chart. Since the maximum and minimum voltage points are at the places where the line impedance appears purely resistive, these two values then appear where the s.w.r. circle crosses the vertical resistance axis of the chart. By measuring the line length, converting to wavelengths, and rotating around the s.w.r. circle on the chart, the impedance at any point on the line can be found. However, below

¹ Cholewsky, "Some Amateur Applications of the Smith Chart," *QST*, January, 1960.

² Amis, "Antenna Impedance Matching," *CQ*, December, 1963.

* Design Engineer, Heath Company, St. Joseph, Michigan.

50 Mc., the length of the slotted line becomes unwieldy, and it is difficult to construct such a line to the precision necessary for accurate work.

Impedance Bridges

Impedance bridges, as the alternative, present problems that appear to be equally formidable: available commercial laboratory units are expensive and seldom appear on the used or surplus market. They require auxiliary equipment, such as generators, standards, and null detectors, which are also expensive. The wide variety of s.w.r. bridges and directional couplers on the market would indicate with varying accuracy the s.w.r. circles to be drawn on the Smith Chart, but they lack one thing: They will not indicate where around the circle one would be at any time. The simple resistive antenna "impedance" bridges appear to have utility, but they will not null to zero unless they are measuring pure resistances. At any point along a line, except at a voltage maximum or minimum, no null can be obtained that means anything.

Amateur antenna measurements usually fall into an s.w.r. range of less than 5 to 1, low-impedance cable is used, and extreme accuracy is not required. Most amateurs would substitute a little time for lots of money, and following is a system that uses the ubiquitous junk box to obtain satisfying results.

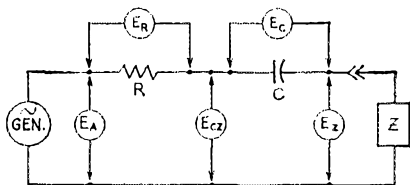


Fig. 1—Block diagram of impedance-measuring system, showing the various voltages of interest.

System of Measurement

The block diagram, Fig. 1, illustrates the way the measurements are made. A signal source, at the operating frequency, supplies a small voltage to the unknown impedance, Z , through a resistor, R , and a capacitor, C . The voltage across each element is measured. The applied voltage from the generator is E_A , the drop across the resistor is E_R , across the capacitor is E_C , and the voltage across the unknown is E_Z . Also measured is the voltage across the series capacitor and the unknown. This is E_{CZ} .

To make sense out of this group of voltages, they are shown as vectors in the diagram of Fig. 2. This diagram can be easily constructed with only a ruler and compass. It eliminates the trigonometry needed for a mathematical solution, and offers accuracy well within the needs of this work.

Starting at the origin in Fig. 2, the line E_R is drawn to the right for a length proportional to the voltage E_R . This line is the "standard," or reference, setting the scale for the remaining lines. It is convenient to make this voltage, and the

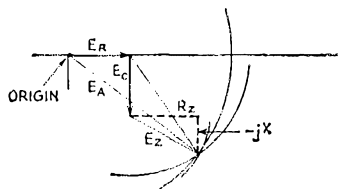


Fig. 2—Vector diagram illustrating the method of determining the resistive and reactive components of a complex load from the voltage readings of Fig. 1.

units of measurement, scaled to 50 units. Then all the remaining lines can be read off as ohms directly on completion. At the end of E_R , the line E_C is drawn straight down, using the scale established when drawing E_R . Next, a circle is drawn with the center at the origin, and with a radius corresponding to the applied voltage, E_A . Another circle is drawn with the center at the junction of E_R and E_C , with a radius corresponding to the voltage across the capacitor and unknown, E_{CZ} . Then, the last voltage, that across the unknown, E_Z , is used to draw a circle with the center at the bottom end of E_C . These three circles intersect at a common point, with the co-ordinates of the impedance connected to the generator. However, the impedance connected to the generator includes the series resistor and capacitor, so their contribution must be removed to find the impedance of the unknown. A look at the diagram will show that the unknown impedance can be described by the x and y components of E_Z . These values can be found by constructing a line horizontally to the right from the bottom end of E_C , and another vertically through the E_Z -circle-intersection point to meet the first. Measuring these lines will give the values of resistance and reactance of the unknown impedance.

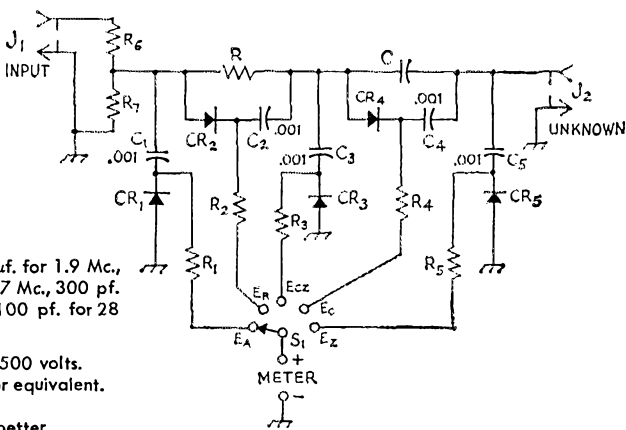
Does this sound a bit familiar? It should to many, for this same technique is used at power-line frequencies in a.c.-circuit classes.

To answer a couple of questions now: "Why use a fixed resistor and capacitor as standards, instead of a variable bridge?" That is just what makes an impedance bridge cost so much — it is difficult to calibrate inductors or capacitors to represent reactance without frequency sensitivity. Next, "What is the reason for the capacitor in series with the resistor?" It is to resolve the ambiguity which would exist without it. Without the fixed vertical offset of the capacitive voltage E_C , the circles of the applied voltage, E_A , and the unknown, E_Z , would intersect at two points. While the resistive component of E_Z would appear correctly, the reactive portion would be without direction, since it could go to either intersection, and there would be no way to determine whether the unknown was capacitive or inductive.

Voltage Measurement.

To use this system in practice, a means of measuring the various voltages is needed. Since

Fig. 3—Circuit of the impedance-measuring network.



C—Silver mica: Suitable values are 0.002 μf . for 1.9 Mc., 0.001 μf . for 3.9 Mc., 500 pf. for 7 Mc., 300 pf. for 14 Mc., 200 pf. for 21 Mc., 100 pf. for 28 Mc. through 50 Mc. See text.

C₁—C₅, inc.—0.001- μf . disk ceramic, 20%, 500 volts.

CR₁—CR₅ inc.—Germanium diode, 1N191 or equivalent.

J₁, J₂—Phono jack.

R—51 ohms, $\frac{1}{2}$ or 1 watt, carbon, 5% or better.

R₁—R₅ inc.—Resistances should be as nearly equal as possible, but the common value may be anything from 1 megohm to 5 megohms.

R₆—Five 220-ohm 2-watt carbon resistors in parallel.

R₇—10 ohms, 2 watts, carbon.

S₁—Single section, single-pole, 5-position rotary switch, phenolic or ceramic.

the voltages across the capacitor and resistor are floating above ground, an ordinary r.f. probe and v.t.v.m. having a grounded chassis return will not work. Therefore, five probe circuits are built into the measuring unit of Fig. 3, and a switch selects them as desired.

In Fig. 3, the series resistor and capacitor are R and C . The five voltmeter probes are C_1 , CR_1 , and R_1 , through C_5 , CR_5 , and R_5 . Each of these is connected across the points needed to obtain the voltage desired. The probes measure the peak values of voltage, and require a high-resistance meter. Use a d.c. v.t.v.m. with an input resistance in the megohms and ranges of one to five volts, full-scale. Resistors R_6 and R_7 are used to provide a load and voltage divider when using a transmitter as the signal source. The transmitter should be adjusted for an output of about 10 watts. These resistors can be eliminated if a signal generator is available with about three volts output at low impedance. If a signal generator is used, a d.c. return must be made at the input end of R so the probes will work. Use a resistor or r.f. choke across the input if the generator has an output blocking capacitor.

Construction

Constructional details are not especially critical. Mount the components on terminal strips to obtain a short, direct line from the INPUT to UNKNOWN jacks, and be sure to connect the probe circuits so that the diodes and capacitors have short leads. The resistors in the probe circuits are for isolation, and the connection between the diode and resistor should be short to avoid capacitive pickup. The lead at the switch end may be long without harm. If possible, match these resistors as closely as possible; any value between one megohm and five megohms will do, so long as they are alike. The grounded end of R_7 should go directly to the ground terminal of the INPUT jack to avoid heavy ground currents

that would disturb the other circuits. Capacitor C should be a high-quality mica unit. Its value is not critical, but it should have 25 to 50 ohms of reactance at the frequency in use. Suitable values for the amateur bands are listed under Fig. 3. To minimize lead length, it is better to solder the capacitor leads rather than to use terminals.

Measurement Procedure

The following procedure should be observed, at least until familiarity is attained, to assure reliable results. A few trial runs using known resistors connected with short leads to the UNKNOWN jack will help to get the procedure down pat, and to check the results.

1. Check that the right value of C is used for the frequency. Connect the transmitter to the INPUT jack, the antenna or unknown to the UNKNOWN jack, and the v.t.v.m. to the METER terminals.
2. Adjust the signal level to give two or three volts for E_A , and watch a bit to see that it stays constant.
3. Check E_R , and adjust the signal level for either:
 - a. 0.5 volts. Read this as "50", thus converting all readings to ohms to agree with the 50-ohm center of the Smith Chart. (If desired, set to a "5" or "50" reading on any voltage scale. For instance, with the v.t.v.m. on the 5-volt range, set to "50" on the 150-volt scale.)
 - b. When using a Smith Chart with 1.0 at the center, set E_R to 1.0 volt, and read all the voltages directly in normalized values.
4. Quickly record the readings for all five probes, so the input voltage will be constant for all five readings.
5. Mark an origin point on a sheet of paper. Draw a horizontal line to the right from the

origin, of a length corresponding to E_R (for the normalized charts, make this line 1.0 inches long; for the 50-ohm charts, 50 millimeters works fine). Label this line E_R . (See Fig. 4.)

6. At the right-hand end of E_R , draw a vertical line down from E_R of a length corresponding to E_C . Use the same units of length as for E_R . Label this line E_C .
7. With the origin as the center, draw a circle with a radius corresponding to E_A . Label it E_A .
8. With the junction of E_R and E_C as the center, and with a radius corresponding to E_{Cz} , draw a circle. Label it E_{Cz} .
9. With the bottom end of E_C as the center, and a radius corresponding to E_z , draw a circle and label it E_z .
10. The three circles should intersect in a common point. If they do not, there is an error in measurement of either voltage or length.
11. Draw a horizontal line through the bottom end of E_C to the right past the circle intersection point. Label this line R_z .
12. Draw a line vertically through the circle intersection point to intersect the R_z line. The circle intersection will be either above or below the R_z -line intersection point. If it is above, label the line $+jX$; if below, label the line $-jX$.
13. Measure the lengths of R_z and jX , and these will be the values of the components of the unknown impedance. Positive jX will indicate inductive reactance, and negative jX will indicate capacitive reactance. These values will be in the terms of the Smith Chart, and this completes the measurement.

This may seem lengthy, but it actually takes only a few minutes to go through the whole process and is much less painful than paying for an

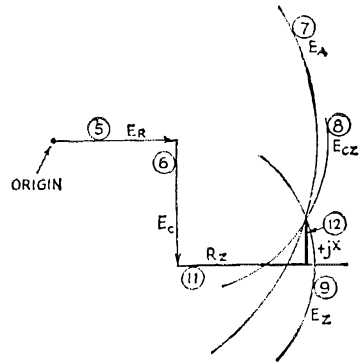
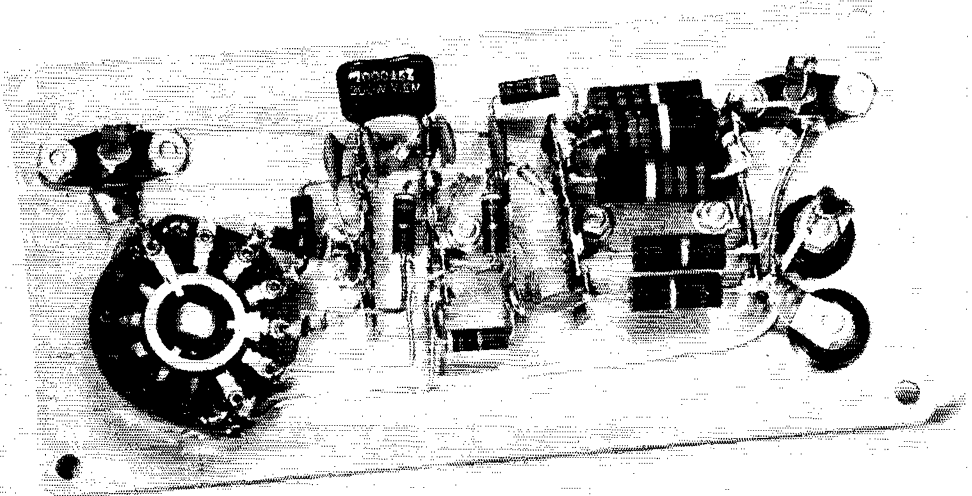


Fig. 4—Voltage-diagram construction. Circled numbers refer to numbered steps in the procedure outlined in the text.

impedance bridge!

This system has some limitations regarding frequency. It will do pretty well at 50 Mc., but lead inductances and stray capacitances introduce error. At s.w.r.s above 3:1, the angles of the diagram may get rather narrow, introducing error in measurement. At voltage readings below about a quarter of a volt, the diodes in the probes will tend to give a square-law reading not consistent with higher readings. Assuming that E_C is at right angles to E_R ignores the resistance in the series capacitor, which should be small. (This could be corrected by adding another probe to read the voltage across R and C , and plotting all three sides of this triangle.) These limitations may concern the purist, but for the ham who takes the trouble to learn the Smith Chart, this technique presents a quick and cheap way to measure $R + jX$, otherwise impossible.

QST-



Internal view of the impedance-measuring unit. Resistors and capacitors are supported on tie-point strips.

The enthusiastic young radio amateur looked inquiringly in the open door of the Oscar HQ. "Is this where the Oscar tracking operation will take place?", he asked eagerly. "I'd like to help track a satellite!"

The weary Oscar worker brushed his hair from his eyes with a grimy hand and replied, "Well, fine! You can start by taking this broom and sweeping the floor. Then, we have a 1500-foot roll of cable to be sorted and laced, and these heavy desks have to be carried upstairs. After that, you can help carry that five-hundred-pound roll of coaxial cable up the hill to the tower. After that . . ." The young amateur gulped, and looked unhappily about him at the chaos. "Sure, sure," he replied. "I'll be happy to help. I'll try to get back next week." And he disappeared forever.

Oscar III and W6EE

BY WILLIAM I. ORR,* W6SAI

THE air inside the garage was frigid and the cement floor was *very* cold. Don Norgaard, W6VMH, stamped his feet in a vain attempt to restore circulation. He looked grimly at the tiny electric heater in the corner of the cluttered work room. It was totally ineffective in removing the night chill and had lost the battle of holding the room at a reasonable temperature. Above Don's head, gently swinging at the end of a frayed section of rope hung the strange, silvery, rectangular object that had been the center of his attention for months. A casual observer could have guessed the device was some kind of electronic apparatus by the meters on the top side, by the ganglia of cables that protruded from it, and unfailingly, by the four spike antennas that were mounted to its surfaces. It seemed devoid of life in the cold air.

On the workbench in front of W6VMH reposed a battered v.h.f. signal generator amid a miscellaneous gathering of wires, cables, small

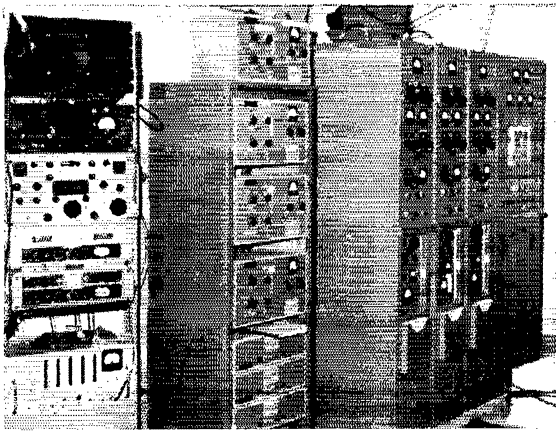
* Project Oscar, Inc.
Foothill College, Los Altos Hills, Calif.

parts, batteries, defunct transistors and tools. The floor at his feet was littered with small parts and bits of solder. To Don's right was a brace of 2-meter receivers, operating, but balanced precariously on top of other electronic test equipment. The washing machine and clothes dryer at the rear of the work area were nearly hidden by other v.h.f. equipment. A field-strength meter sat atop the Volkswagen in the far side of the garage.

Ed Hilton, W6VKP, and Lance Ginner, K6GSJ, swung their arms and moved about to keep warm, and waited for Don to speak. There was a long pause, during which one of the 2-meter receivers poured out a torrent of gibberish into the cold air, interrupted regularly by "HI," transmitted in code. Finally, after an eon, Don sighed heavily. "This project has taken over two years worth of spare time, and I already feel ten years older. . . ." He gestured towards W6VKP, the owner of the garage workroom. "Oscar III is as ready as it ever will be, in view of the limited time we have left to work on it. This box of gear hanging on the end of the rope represents

about eight thousand hours of time and effort by crazy hams who had a crazy idea, and were crazy enough not to give up." He reached for the master switch on the work bench. "Well, I give up," he said. He swept off the control switch and the captive satellite and the receivers subsided into silence. Don wrapped his jacket about himself to defeat the cold and spoke decisively. "I think we would have been wiser to spend *more* time building a heater for Hilton's garage and *less* time working on a space satellite. I suggest we QRT and get to bed. I think I have a touch of pneumonia. Moreover, it's tomorrow morning already!"





Bob Walton, W6CYL, wiped the perspiration from his face on the sleeve of his shirt and slowly straightened up in front of the 20-meter transmitter of W6JEE. The small room was stifling, and smelled of hot rosin, grease, sweat, a sandwich forgotten in the wastepaper basket, hot steel, and stale tobacco smoke. In the corner of the room, three RTTY printers chattered madly away, debating the relative merits of RY RY RY, SG SG SG, and QUICK BROWN FOX. The half-horsepower blower of the transmitter power supply poured a steady stream of moist, warm air in the room, and filled every corner with a steady 120-cycle whine, nearly drowning out the 2125-cycle tone of an audio oscillator, running unattended in a rack full of complex gear. Two telephones rang intermittently, but no one paid the slightest attention. Chuck Cook, W6SCR, buried in the vitals of the 80-, 40- and 20-meter c.w. transmitters let out a howl of anguish, "Hey! Who stole the 872A that I swiped from W6ASH in the next room?" he queried. Bob glanced at his wristwatch and noted it was nearly 1000 GMT. Ignoring Chuck, he said, almost to himself, "My family expected me home by midnight." Chuck looked up from his inelegant position under the transmitter console and spoke unhappily, "This 20-meter transmitter is still blowing fuses. We may have to use dynamite on it."

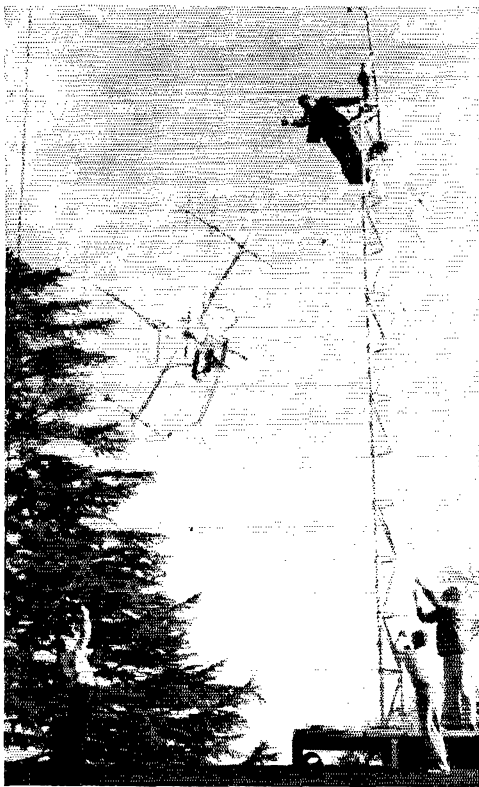
W6CYL fished in a rat's nest of analyzers, RTTY tape, defunct tubes and unidentifiable objects on the control table and tossed a packet of fuses in the general direction of W6SCR. He looked across the room at Bob Weithrecht, W6NRM, who stood arms akimbo, in front of an oscilloscope, armed with a screwdriver and a steaming soldering iron. The 'scope glared back defiantly, flaunting a green, zany image that twitched spasmodically in time with one of the RTTY printers.

Chuck crawled out from beneath the transmitter rack and gazed about him. "I think we're spending too much time on installation and not enough time shoveling out this place," he announced. "If we're not on the air by 4 A.M., I vote we go home and get to bed *early* for a change.

A little *more* time spent on a ventilation system would be a big help, too."

A roar of sound resembling a blast furnace engulfed Bill Eitel, W6UF, as he opened the upstairs door of the Oscar building and stepped from darkness into the harsh glare of a string of bare bulbs. W6UF balanced the 75S-3 receiver on his hip as Bill Orr, W6SAI, and "Chuck" Towns, K6LFH, carefully strung a 40-meter radial around him out the door, and into the night. Behind them, unheeded, a tape recorder chanted, "one, two, three, testing. This is W6JEE, W6-Echo, Echo testing. . . ." Coaxial cables wrapped around the sideband gear in the background like dark serpents, coiling and writhing out the window. A compact WWV receiver sang its monotonous tune in the tracking rack and somebody on 2 meters was delivering a windy monologue from the speaker of the tracking receiver. Oblivious of the racket, Jack Walbert, K6UAA, and Gregory Tobin, W6CCN, were enmeshed in the complexities of the tracking system antenna and receivers. Somebody on 80-meter s.s.b. suddenly started to call W6JEE in an impatient voice as the intercom to the c.w./RTTY room below buzzed impatiently. W6SAI swung himself gingerly through the window, lowering himself from the tracking table to the floor, trailing a control cable behind him. At the same time, a tremendous crash shook the building, and a fine rain of plaster dust filtered down from the ceiling, landing atop the equipment. It landed on W6UF and the receiver he was placing on the tracking table. Bill looked about him and winced. "Perhaps we should have taken a bit of time from satellite work and used it to soundproof this room," he mused. "This place sounds like Times Square at midnight on New Year's eve." He started to look about him for the coaxial plugs he had placed down a moment before as K6UAA shouldered his way farther behind the tracking console. . . .





At the apex of the 30-foot tracking tower poised atop the building, above the clamor of the last-minute activities, Walt Read, W6ASH, swore gently to himself as the beam rotator slipped from his grasp and plunged with a resounding thump to the roof platform. Hanging from the top of the tower by his safety belt, Walt peered down into the night, shielding his eyes from the light of a bulb dangling at the end of a long extension cord. An ungainly tracking antenna swung from a rope, half-way up the steel tower. "O.K. gang, easy does it," Walt called in a soft voice to the shadowy figures on the roof below him. "That's it . . . up she comes!" He reached down to grasp the rotator which came to rest, neatly scraping the skin off his right leg.

Walt looked at the Dali-esque scene below him and listened to the uproar emanating from the building, half hidden in the night. "Well," he thought. "All this effort will be worthwhile if Oscar III works!" He paused and swung the rotor over his head into position. "Perhaps we should have spent *more* time on the satellite and *less* time on the tracking station and communications equipment!"

Now, at last, in the light of the warm morning sun, the building stood silent. The RTTY was mute and the loudspeakers were turned down. The 'scope on the WWV receiver wavered in silence and the assembled amateurs sat, each wrapped in his own thoughts. The Tracking and Control Station, W6EE, was finally in order. All

that remained was to receive the exciting information that Oscar III was in orbit and working. The telephone, ready to bring word from the radio amateurs standing by at remote tracking locations, was silent. The suspense seemed intolerable, and words were exchanged in monosyllabic whispers. The GMT clock on the wall hummed softly to itself, telling no secrets to the anxious radio amateurs awaiting hopeful word of the forthcoming orbit. Suddenly, like an explosion, the telephone rang. . . .

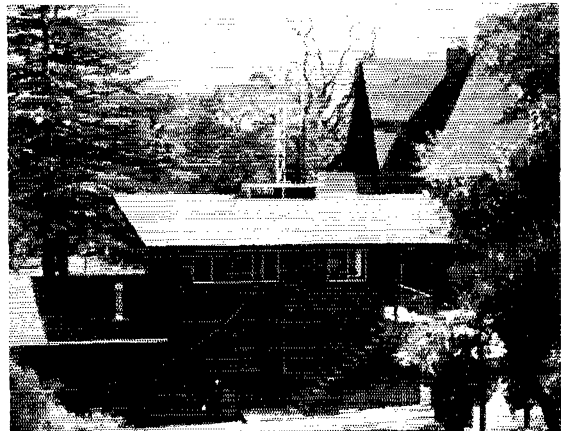
The Tracking and Control Station, W6EE

Project Oscar control station W6EE served a dual purpose. First, it was instrumental in disseminating orbital information necessary for users of Oscar III, and; second, it gathered operational information about the operation of the satellite and collected the various telemetry and "calls heard" reports.

Starting during the early summer of 1964, schedules were generated with various Oscar Coordinating Stations in all parts of the world. These schedules were run on 7 Mc. by W6ASH from his own station until W6EE was activated, early in February, 1965.

It was decided that W6EE would broadcast orbital predictions for Oscar III on 80, 40 and 20 meters via c.w., RTTY and s.s.b. transmissions. The station was accordingly designed to accomplish this mission. W6EE was housed in a two-story building (formerly an old carriage house!) on the campus of Foothill College, Los Altos Hills, California. Special 220-volt and 3-phase power lines were run to the building to accommodate the numerous transmitters, and the college graciously permitted the erection of a 70-foot steel tower atop a nearby hill to support the stacked 20- and 40-meter rotary beams. A supplementary 30-foot tower atop the Oscar building supported the 144 Mc. tracking antenna.

The top floor of the two-story Oscar building was occupied by the sideband equipments. Complete kilowatt s.s.b. installations were generously loaned to Project Oscar by the Collins Radio Co., the Hallcrafters Co., and the Hammarlund



Co. Each station was operated on one amateur band, and was fixed-tuned on a chosen frequency. The three transmitters were operated by a central control console so that all could be driven from a single microphone, or from a tape recorder containing the pre-recorded prediction messages.

The ground floor of the Oscar building held the c.w. and RTTY gear. Three separate transmitters were used, one each for 80, 40 and 20 meters. Loaned to the project by AF MARS members, the transmitters were powered by a single 2000 volt, 3-phase power supply. Separate RTTY exciters were used for each band, and a Collins 310-B exciter served as a driver for the c.w. transmissions.

A corner of the ground floor of the Oscar building held the c.w. control room and the four R-391/URR receivers, loaned to the project by Army MARS. The c.w. tapes were punched by W6ASH in this room, and transmitted by means of a Bohme automatic keyer. Included in this area was a standby v.f.o. and the antenna control console.

Assembly of the W6EE station and check-out took most of 1964. Reliability was a prime necessity and the equipment was tested and reworked until it provided 24-hour-a-day performance. It is a tribute to the sideband gear, and also to the composite c.w. and RTTY equipment, that outage was an absolute minimum, and that when W6EE was off the air because of equipment troubles, it amounted to only the replacement of a fuse, or a defunct tube. When W6EE hit-the-air on March 9, 1965 it operated with little equipment trouble until the conclusion of the Oscar III mission. Success of the prediction broadcasts is of course due to the devoted crew of operators who manned the gear during all schedules.

Three operator shifts were employed, one for



each mode of transmission. W6EE suffered a near-mortal blow during the week of March 21-26, when most of the operators left for New York City to attend the IEEE show. Replacement operators were hastily recruited, however, and most of the prediction broadcasts were maintained.

The operators of W6EE wish to thank those many amateurs who cooperated in this effort and to express apologies to the many standbys that W6EE could not QSO because of pressing schedules. QST

NEW BOOKS

GE Silicon Controlled Rectifier Hobby Manual, by General Electric Application Engineering Center, Rectifier Components Department, West Genesee St., Auburn, New York. 5½ by 8½ inches, 70 pages, illustrated. Price, \$1.00.

Perplexed by the growing numbers of solid-state devices? General Electric's handbook is written for a person in just this situation—the hobby-minded who wish to experiment with the latest inventions in the electronics field. A discussion of how semiconductor devices work introduces the book, explaining the operation of silicon rectifiers, transistors, zener diodes, light-activated switches, and silicon controlled rectifiers. Simple language is used and important points illustrated with diagrams. Simple circuits to be constructed at home are included to show the operation of the devices discussed. One important chapter on the care of semiconductors should be read before any experiments are undertaken. The amateur should know about voltages, currents, heatsinks, mounting, and soldering, or he runs the chance of ruining a valuable semiconductor. The rest of the handbook is devoted to construction projects for the home, hamshack, and workshop. These projects include light dimmers, power supplies, motor speed

controls, lamp flashers, and light-operated devices. All the projects use the GE Experimenter Line of semiconductors that are available from local dealers.

RCA Receiving Tube Manual, Technical Series RC-23, by Electronic Components and Devices, Radio Corporation of America, Harrison, New Jersey. 609 pages, including index, 5¾ by 8 inches, paper cover. Price, \$1.25.

If you are looking for information on a tube, this RCA book has been revised to make things easier. The Technical Data Section covers all the current RCA receiving tubes, and a fifty-page tabulation provides easy reference on discontinued types. The manual has been restyled and a new format and type face have been used to make the page easier on the eye. Maintenance technicians will find information on picture tubes for black-and-white and color receivers.

Popular features of past editions have been retained, including tube-base data, resistance-coupled amplifier information, and the Circuits Section for constructors. The book may be obtained from RCA tube distributors or directly from the Commercial Engineering Section.

—WTKLK

Audio Frequency-Shift Keying for RTTY

Its Applications in the Amateur Radioteletype Transmitter

BY IRVIN M. HOFF,* K8DKC

AUDIO-shift keying, which is introduced into the microphone jack of a transmitter, was first used on the v.h.f. bands, where many types of emission not permitted on the lower frequencies are legal. It was almost a necessity, since the carrier stability on those bands with older a.m. transmitters was not of the order needed for carrier frequency-shift keying. Use of audio f.s.k. with carrier offers an inherent tuning advantage — if the second or third station in a group is a few cycles (or even a kilocycle or two) off frequency, it will not matter. Thus a.f.s.k. with carrier compares to f.s.k. (of the carrier itself) in the way that tuning an a.m. signal compares with tuning s.s.b.: inexpensive equipment and novice operators can normally get excellent results.

It was natural, then, for owners of expensive s.s.b. transmitters to adapt some of the a.f.s.k. keyers to the microphone input circuits of their transmitters, rather than dig into the v.f.o. or p.t.o. circuits. The system does appeal to many who have no desire to alter or modify expensive equipment in any way.

However, we should like to point out the seriousness of such a move. When a.f.s.k. is used for RTTY with an s.s.b. transmitter *the carrier suppression becomes important, and the unwanted sideband suppression becomes a significant item.* You are using, on c.w. frequencies, a type of system that differs from normal carrier transmission, and distortion products that would cause "flat-topping" and "splatter" change the picture completely.

It should be obvious to anyone only vaguely familiar with s.s.b. transmitter theory that even if the carrier is suppressed, there is *some* carrier still transmitted. Even if the unwanted sideband is suppressed, there is *some* sideband still transmitted. Even the best transmitters with excellent means to suppress the carrier and the unwanted sideband will have *some* of them remaining. If signal conditions are good, these undesired frequencies might easily interfere with adjacent channel reception. An exact statement regarding this very thing was published by the FCC in Docket 15267, released July 7, 1964:

"Amateur licensees contemplating the use of audio tones via single-sideband suppressed carrier

transmitters for the generation of A1 and/or F1 emissions are cautioned that any radiation of the carrier or suppressed sideband frequencies at an intensity sufficient to cause interference in receiving equipment of good engineering design constitutes spurious radiation in violation of Section 97.73."

It might be supposed that this applies principally to the quality of the s.s.b. transmitter and that the a.f.s.k. unit itself could be assumed to be flawless. However, such is not likely to be the case. Many inexpensive and simple a.f.s.k. units have been designed, and hardly a month goes by but that some amateur publication prints a description of such a device — intended mostly for use in connection with s.s.b. transmitters. K3NIO ran exhaustive tests on many of these, using laboratory facilities available to but a few amateurs, and found that none of the units tested would meet the FCC minimum specifications when used with s.s.b. transmitters. Many of them were incapable of generating an acceptable-looking audio sine wave, and all had undesirable keying transients when RTTY keying was applied. All units tested exhibited audio harmonic generation, with no means provided to suppress these undesired harmonics. All used LC switching, which was the reason for the keying transients.

Various authors have proposed the use of two oscillators with some form of switching between them as a possible solution. The signal generated by this method is not really f.s.k. but rather what might be called "double a.m." Again, undesirable keying transients are generated that would not occur with a suitably designed frequency-shift oscillator. The reasons for this are beyond the scope of the present paper, and the subject is mentioned at this time simply to counter suggestions which have been made that such a system probably would solve the usual problems of the normal a.f.s.k. unit, where only one frequency-shifted oscillator is used.

Many individuals use a.f.s.k. units with "non-standard" tones — other than 2125 and 2975 — with their s.s.b. transmitters. The tones often used in this event are 1275 c.p.s. for mark and 2125 for space. When the carrier is suppressed the receiving station gets the effect of normal carrier-shift f.s.k., but back at the transmitter undesirable things are occurring. The second harmonic

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

Audio f.s.k., originally applied in the v.h.f. bands where tone-modulated keying is permissible, has come into use on the lower frequencies because it appears to be an "easy" way to get f.s.k. with an s.s.b. transmitter. There are inherent dangers, in terms of meeting the purity-of-emissions requirements of the FCC regulations.

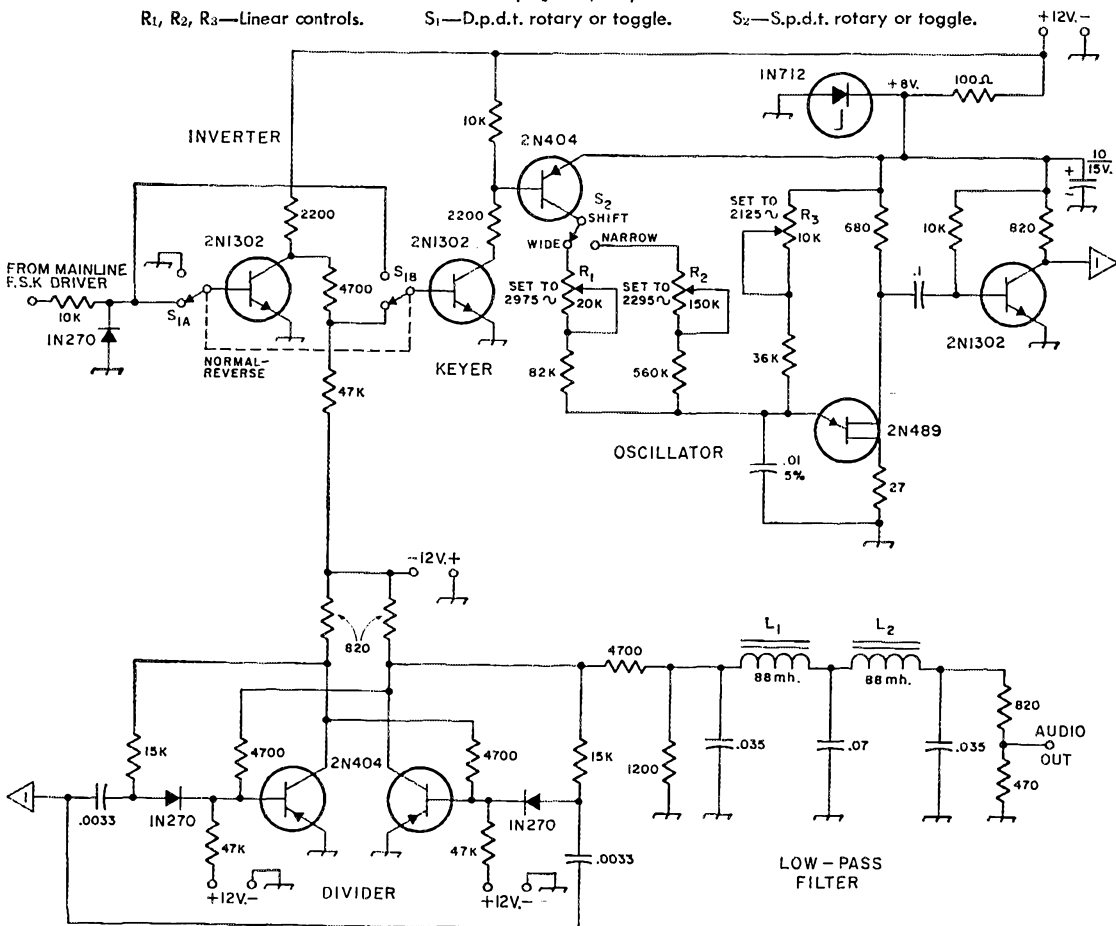
from buying his product for s.s.b. transmitters, unless it will be used with transmitters having mechanical filters which do a good job of taking out harmonics that are generated by the a.f.s.k. unit. Other types of s.s.b. transmitters generally are able to pass at least 2550 c.p.s. only too well to make them suitable for use of 1275/2125 tones. At the same time, they usually do not pass 2975 quite well enough for good results when using 2125/2975 tones.

For those who are interested in putting normal a.m. transmitters on v.h.f. (of course, f.m. transmitters also work well with a.f.s.k. input to the microphone circuit on these bands), or who are willing to take the required precautions with s.s.b. transmitters, K3NIO has designed an excellent a.f.s.k. unit using standard tones. This circuit, shown in Fig. 1, has many outstanding features. It uses a unijunction transistor as the heart of the oscillator section. It uses RC rather than LC switching, and thus no undesirable keying transients result. It has a reverse switch so that it can be conveniently used

of 1275 is only 2550, and this is not far removed from 2125. Since most a.f.s.k. circuits offered to amateurs are rich in harmonic generation, this could and frequently does lead to discouraging results, unless an outstanding transmitter with good rejection of tones above perhaps 2300 c.p.s. is employed. In fact, one manufacturer of a.f.s.k. units for amateurs tends to discourage anybody

Fig. 1—Audio frequency-shift keying generator (K3NIO). Capacitances are in μf .; capacitors with polarity indicated are electrolytic; others are paper. Resistances are in ohms (K = 1000); fixed resistors are $\frac{1}{2}$ -watt composition. Two 12-volt power sources are used. Input terminal connects to the driver section (at junction of R_4 and R_5) in the circuit on page 19, May 1965 QST.

R_1, R_2, R_3 —Linear controls. S_1 —D.p.d.t. rotary or toggle. S_2 —S.p.d.t. rotary or toggle.



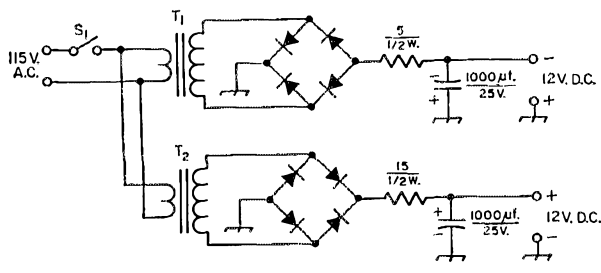
on s.s.b. transmitters where, because of peculiarities of the particular station setup, the operator might prefer to use the upper sideband rather than the lower sideband and still have normal transmission. It uses Zener-regulated voltage on the oscillator stage for maximum stability and retention of shift. It has separate controls for each tone used so that exact frequencies can be matched accurately and quickly. It has an extra control to set narrow shift for those wanting preset narrow-shift capability, such as 170 c.p.s. The oscillator operates at twice the desired frequency and a "flip-flop" frequency-divider arrangement is used to eliminate generation of even harmonics so that those odd harmonics remaining can easily be filtered out before being introduced into the transmitter. It uses a special filter to eliminate the remaining odd-frequency harmonics and to limit normal keying transients to the bandwidth of the filter, and is believed to be the first unit offered to amateurs that takes harmonic generation into consideration.

This a.f.s.k. generator readily can be driven directly from the Mainline f.s.k. driver shown in Fig. 6 in the preceding article.¹ No attempt should be made to change the audio tones to other than the 2125-2975 tones offered (with 2295 available for 170-c.p.s. shift).

The output is about 0.5 volt and will readily match any microphone input system. A 500-ohm potentiometer could be used in place of the 470-ohm output resistor to obtain adjustable output, but this merely adds to the number of controls if it is not specifically needed. The output impedance is quite low, and thus this unit could readily be adapted to sending audio tones on a telephone line, if needed for remote control or whatever purpose might come to mind. Fig. 2 shows a suitable power-supply circuit.

Even though the generator shown in Fig. 10 represents an excellent a.f.s.k. system without the problems inherent to nearly every other a.f.s.k. unit, again we should like to discourage the use of such a device on 10 through 80 meters with s.s.b. transmitters unless suitable sideband and carrier suppression is assured. Certainly, s.s.b. transmitters with steep-skirted mechanical or crystal filters are required. Phasing-type transmitters are out of the question. The simple keyer circuit in Fig. 6 of the May article can be added in moments, and gives superior results with no worry about possible spurious radiation or adjacent-channel interference.

¹ Hoff, "Transmitting Radioteletype", *QST*, May 1965.



Audio Tape Recorders for RTTY

Comments have been heard over the air regarding use of audio tape recorders on s.s.b. transmitters. Since the recording probably would be taken directly from a receiver and then played over the transmitter, it is entirely possible that other undesired tones, such as nearby signals and static bursts, might be played. Also, any wow or flutter would cause the signal to sound as though it were coming from a very poor transmitter. However, the main reason for mentioning the subject at all is that one slow typist was actually contemplating using such a device with Variac control to change the speed of the recorder and make it sound as though he was a better typist. This might seem logical to someone who did not realize that as the speed was varied the relative shift would vary proportionately, and would no longer be 850 c.p.s. However, the worst problem that would be encountered would be the change in the pulse length from the standard 22 milliseconds. If the tape recorder speed were changed an appreciable extent, severe timing errors could result. All in all, the use of a tape recorder would need to be limited to normal-speed operation, if used at all.

High-Powered Transmitters

The use of s.s.b. has introduced powerful linear amplifiers which can easily run the legal input of 1000 watts. Owners of such amplifiers are cautioned against their indiscriminate use on RTTY, since many of them cannot be run with continuous carrier at their s.s.b. ratings. It should also be pointed out that should a.f.s.k. generators be used with s.s.b. excitors, the linear amplifier will greatly increase the seriousness of any minor problems caused by such an arrangement, so if the signal was marginal before, it might be entirely unacceptable after being boosted to one kilowatt.

For normal operation, the use of powerful amplifiers, of course, adds strength to a signal and helps the operator maintain satisfactory contacts. However, individuals contemplating purchase of an amplifier for RTTY purposes would do well first to inquire of the manufacturer as to its suitability for continuous-carrier operation.

Use of Transceivers for RTTY

A large number of transceivers are now being sold, principally for s.s.b. use. Some of these will not operate in the c.w. bands, but most will. Many of them are not suited for use with RTTY from a number of standpoints, the most important of which would be their inability to operate with continuous carrier for any length of time. Other important problems are tied in with the

Fig. 2—Power-supply circuit for the a.f.s.k. generator. Capacitors are electrolytic. Resistances are in ohms; resistors are composition. Diodes may be any silicon type having a p.i.v. rating of 50 volts or more (1N2069 suitable). S₁—S.p.s.t. toggle.

T₁, T₂—12-volt filament transformers.

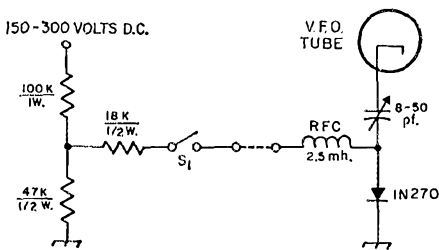


Fig. 3—Carrier-shift circuit for establishing mark frequency in an s.s.b. transceiver. This is used in conjunction with the Mainline keyer. S_1 is operated simultaneously with the transmit switch as described in the text, and may be integral with the transmit-receive switch.

fact that the carrier cannot be offset the 2125 cycles needed for good RTTY operation; most of these units do not transmit well on 2975 cycles, nor does the receiver receive well on that frequency. Many owners have felt it necessary (out of failure to find any other system that seems satisfactory, perhaps) to use a.f.s.k. into the microphone input jack. The audio tones are usually 1275/2125, with the attendant problems mentioned earlier in the article. The receiver is then adjusted to the incoming signal so those same tones are received and appropriate filters are then used in the demodulator. Since very few published demodulator designs include information on using 1275/2125 filters, the owners of such equipment either do not get on RTTY or wind up buying expensive commercial demodulators.

There are methods by which transceivers that are capable of continuous-carrier operation can easily be used on RTTY, but the means by which this is possible is a little more complex than for an independent transmitter. The easiest thing would be to buy another converter crystal so that the standard tones of 2125/2975 could be passed both in transmitting and receiving. Some transmitters must be placed in the upper-sideband position in order to have carrier introduced easily, while others transmit on the lower sideband. This makes no particular difference, as a switch can be thrown in the demodulator for correct copy, and the diode in the keyer can be reversed to give normal transmission. A switch can be placed at some convenient place in the unit to introduce the additional crystal when needed.

Another problem in some transceivers is the audio sidetone which is available in the c.w. position so the operator can hear his keying. For RTTY, this usually must be disconnected; otherwise, it can become most distracting.

The major remaining problem concerns the fact that in a transceiver the receiver and transmitter are locked to the same oscillator frequency. For carrier-shift RTTY this becomes a major difficulty, since it is customary to tune the transmitter so that an audio tone of 2125 mark will result when received. Thus on a transceiver some means of changing the transmitter frequency by an amount equal to the mark value of

the demodulator is required. No such system has been offered prior to this article, to the best of our knowledge. However, Fig. 3 shows one excellent possibility that should at last make RTTY transceiver operation satisfactory. Another standard keyer is added to the cathode of the v.f.o. or p.t.o. This keyer is operated by the transmit switch and gets its voltage from any power supply in the demodulator or transmitter other than the regular f.s.k. supply. Then when the transmit switch is operated, it (1) puts the transmitter on the air, (2) mutes the keyer-tube grid so the operator can type, and (3) automatically shifts the carrier frequency off to one side the necessary amount for correct transmission. The switch shown in Fig. 3 would be arranged to be either open for transmit or closed for transmit, whichever gives correct operation with the particular transmitter used; in one case it will lower the transmitter frequency from that of the receiver and in the other case it will raise it.

This circuit, when used in connection with the Mainline f.s.k. system shown in Fig. 6 of the May article, will provide an accurate, simple and inexpensive means of achieving excellent results from transceiver equipment without resorting to a.f.s.k. with its inherent problems.

In general, it can be said that transceivers probably will be somewhat unsatisfactory in RTTY service unless the considerations outlined above have been met.

Summary

Most articles on f.s.k. systems necessarily limit themselves to only one type of transmitter and thus leave many readers wondering what to do with their particular equipment. In this article we have attempted to cover all the current transmitter types and offer workable solutions to putting each on RTTY with a minimum of effort. Only part of the information may be of interest to a specific reader, and we hope that the article has not become confusing as a result. If it has, just remember that the Mainline f.s.k. system can be quickly adapted to any transmitter, and will offer maximum convenience and optimum results based on the current state of the art. Comments intended for specific variations that other readers might need can be largely disregarded, although they contribute to general understanding of the over-all problem.

Owners of expensive transmitters need not be at all concerned about adding one or more of the simple keyers in Fig. 6 of the preceding article to their v.f.o. units. These little keyers are merely hooked to some existing screw or bolt in the vicinity of the v.f.o., and the only connection to the transmitter is made via a wire hooked around the cathode pin of the v.f.o. tube, which is then replaced in its socket.

Although some writers have glorified the ease and simplicity of using a.f.s.k. units on s.s.b. transmitters, the reader is cautioned against taking the "easy way out," since neither the FCC nor your fellow amateur really approves of

(Continued on page 166)

FCC Amateur Station Inspections

BY FRANK M. KRATOKVIL*, W3BA

THE INSPECTION of Amateur Radio stations is a duty which falls within the purview of the Field Offices Division, Field Engineering Bureau, and is conducted through 24 district and four sub-offices. Many inspections have been made, of course, of amateur stations in the past. The attempt in this particular series of inspections was to collect and tabulate information which would show the present state of the art in Amateur Radio, and to determine if more

* Chief, Field Engineering Bureau, FCC.



W3BA

emphasis in enforcement, by inspections, appears necessary.

The inspections were to be performed in a situation where interference complaints against the station were not active. The 24 Engineers in Charge were asked to inspect a reasonable number of amateur stations, selected at random, to determine the nature of the equipment used, how it conformed to the regulations, whether or not operation was in keeping with the rules and what the public image of the amateur station might be as viewed from the amateur's own standpoint. During the months of January and February a total of 200 amateur stations were inspected in the United States. The information developed is not only of interest to the Commission but may be of interest to amateurs and amateur organizations. It should be pointed out that the inspection of 200 stations is a necessarily limited survey.

At first the Engineers in Charge tried a random selection based on their card records. It was soon found that a large number of amateurs were not active or available and the random scheme of selection at the office proved ineffective. The method was changed to selecting amateur stations from among those actually heard operating on the air. We thought there might develop a composite picture of an amateur station, but when the results were tabulated it did not seem to fit. There just is no "average" amateur.

The areas of factual information developed are listed in the adjacent tabulation.

Although 200 amateur stations were inspected, only 14 violation notices were issued, or 7%. This is quite different from the other licensed services, which frequently average over 50%. Of course, our monitoring system citations are not a part of this article or statistics. They will run to a higher percentage, and will be presented in another article on amateur operation.

You will note one flattering item under number 3 --- 76% of the stations inspected were found to be in good condition and 20% additional were passable. This is indeed a high percentage for "sudden" inspections.

The concern of many amateur organizations in connection with the large amount of manufactured gear that is employed seems to have been verified with the finding that at least 78% of the transmitters were manufactured ones. The vast bulk of the receivers were of commercial manufacture. It is quite evident that amateurs are constructing less and buying more but this in turn reflects the healthy economic condition of the country.

In summary, from an inspectional standpoint, amateur radio stations look very good.

Inspection Survey
(200 Amateur Stations)

1. Class of License:	Antenna coupler	24%
Extra	Low-pass filter	52%
Advanced	10. Percentage of amateurs who have operated in the 50-54 Mc/s band during the past 12 months	25%
General	11. Percentage of amateurs causing TVI to their own TV receiver	17%
Conditional *	12. Percentage of amateurs who, during the past 12 months, have received complaints that their transmissions were causing TVI	20%
Novice	13. Percentage of amateurs who resolved TVI complaint to the satisfaction of the complainant	86%
Technician	14. Where the amateur received a complaint that his transmissions were causing TVI, it was subsequently found that the interference originated in:	
2. Emission:	Amateur transmitter	18%
A-1	TV receiver	82%
A-3	15. Where the amateur's transmissions were alleged to cause TVI, the matter was resolved by installation of a high-pass filter in 52% of the cases.	
A-3A or A3J	16. Fifty-two per cent of the amateurs have available a high-pass filter for trial installation in the event of TVI.	
F1 or F3	17. Amateurs willing to arrange for a trial installation of a high-pass filter	97%
3. Overall condition of equipment:	18. Manifestations of public interest shown by amateurs in resolving TVI:	
Good	(a) Regularly checks with neighbors	54%
Fair	(b) Does nothing	32%
Poor	(c) Gives name and telephone number, or provides, at no cost high-pass filter, if needed or restricts operation	14%
4. Station is installed in:		
Single family house		
Multi-family house or apartment		
Note: Survey made in large cities and suburbs		
5. Power generally used (input):		
1 to 100 watts		33%
101 to 250 watts		33%
251 to 500 watts		12%
501 to 1000 watts		22%
6. Transmitter was:		
Commercially made		78%
Constructed by amateur		22%
7. Antenna was:		
Commercially made		55%
Constructed by Amateur		45%
8. Antenna was:		
Fixed in azimuth		48%
Rotatable (beam)		52%
9. Station uses:		

* Most conditionals are still living in the old conditional territory (beyond 75 miles)

Strays

An amateur radio station, with the call K2RI, will be operating from a booth set up during the Rotary's 56th International Convention in Atlantic City, New Jersey, May 30 through June 3. Rotarians attending the convention may send personal messages and greetings to fellow Rotarians in other parts of the World.

On June 19, at 2000 GMT, the Ft. Wainwright 49'ers Amateur Radio Club, KI7EFT, will begin their Midnight Sun Field Day activities which will run until June 20 at 2000 GMT. The location is a mountain pass several miles north of Fairbanks and within 150 miles of the Arctic Circle. Bands of operation will be: 80 meters, c.w.; 75 meters, s.s.b.; 10, 15 and 20 meters, s.s.b.; and 2 meters, phone. The club's special new QSL cards will be sent to those contacting the station.

The Black Hills Amateur Radio Club, Rapid City, South Dakota will hold its second annual Mount Rushmore QSO Party on July 18 and 25. The station, W0BLK, will operate on all bands from 75 through 6 meters, from daylight to dark each day. A distinctive Mount Rushmore QSL will be sent to each contact.

Stolen Equipment

Sometime around the 1st of April, 1965, a G-76 transceiver (serial number 10134), Astatic microphone, speaker system, and mobile antenna, were stolen from the 1964 Chrysler 300 4-door sedan of W0IHS. Anyone with information concerning the equipment should notify Ralph E. Sims, W0IHS, 2910 Snyder, Cheyenne, Wyo. 82001.

Happenings of the Month

ARRL Asks Lower Fees

Massachusetts Call-Sign Plates

Local Legal Matters

ARRL ASKS LOWER FEES

The League has taken advantage of a Notice of Proposed Rulemaking, Docket 15881, in which FCC proposed minor changes in fee schedules, to ask that fees for all amateur applications be reduced to \$2 (except that special-call fees under Section 97.51 be reduced from \$20 to \$4). The filing points out that amateur applications declined last year, that some applications may be required as a result of incentive licensing, and that renewals of commercial licenses are already \$2.

The League also points out that the \$20 fee for a special call and the \$4 for a special events station license, such as K3BSA at the Boy Scout Jamborees and K2US and K2YV at the World's Fair, have imposed a severe burden upon some amateur groups desiring to establish demonstration stations at fairs, expositions and the like. Funds available to such groups are already extremely limited in most cases without the added burden of license fees.

By extension the same argument applies to club stations; the ARRL petition asks that these, too, be exempt from fees. The League also supports FCC's own proposal that no fees be charged for reciprocal operating permits.

MASSACHUSETTS CALL-SIGN PLATES

A highlight of the banquet at the New England Division Convention in Swampscott, Massachusetts, was the announcement that the state would issue call letter license plates to amateurs beginning in January, 1966. The administrative action was reported to the cheering crowd by Major General Richard McLaughlin, Registrar of Motor Vehicles for the Commonwealth. He was introduced by John J. McCarthy, K1EMO, Deputy Governor and Administrator of Finance. Governor John Volpe had been scheduled to address the convention, but was shaken up in a helicopter accident, and had to cancel his weekend engagements. Pat Volpe, W1LEL, a brother of the governor, was a member of the convention committee, and introduced K1EMO. The victory came after several years of effort by the Federation of Eastern Massachusetts Amateur Radio Associations and other groups in the state. Only Kentucky and New Jersey now remain without call-letter license plates in the U. S.

LOCAL LEGAL MATTERS

At page 79 of *QST* for August, 1964 we mentioned that Peter McManus, K3DSF, had won a suit instituted by neighbors, trying to enforce

a restrictive covenant against radio and television "aerials." We have now received word that an appeal by the neighbors of the decision has been dropped. Thus, K3DSF is free to enjoy his rig with the outside antenna.

Incidentally, copies of the decision are available to other amateurs involved in restrictive covenant matters. It is to be noted, however, that the covenant in this case was adjudged faulty; amateurs may not always expect the courts to set aside such arrangements. Thus, any amateur planning to buy a house should read all the fine print before concluding the agreement to buy.

Another recent case underscores this point. Mace Warner, W0JRQ, of Lakewood, Colorado, was brought to court by neighbors alleging that in erecting an antenna tower he was violating a restrictive covenant of the Meadowlark subdivision, that he had created a nuisance by construction of a radio tower which is hazardous and unsightly and that he had violated the zoning ordinances of the county. The court ruled that the creation of a nuisance was not established by the evidence, that W0JRQ was within his rights in operating his station, and that no permits were required by the county so Mr. Warner had not violated any county ordinance. However, the district judge ruled that the restrictive covenant was legal and binding, and gave Mr. Warner sixty days in which to comply with the covenant, which restricts antenna heights to ten feet above the roof of any structure.

The Court of Common Pleas for Lancaster County, Pennsylvania has ruled against William E. Hough, Jr., W3HJ, in a restrictive covenant case, but exceptions to the initial decision have been filed.

FAIRBANKS, ALASKA EXAMINATIONS

The FCC has changed Fairbanks, Alaska, from an annual to a semi-annual examination point. Thus, applicants for the standard amateur license who reside within 175 miles airline distance of Fairbanks will henceforth have to appear for General Class examinations at an FCC examining point rather than obtaining the Conditional Class license after examination by a volunteer.

RECIPROCAL OPERATING

Ecuador and the United States have exchanged notes permitting the amateurs of one country to operate their amateur radio stations in the territory of the other. The United States

had previously signed agreements under Public Law 88-313 with Bolivia, Costa Rica, and the Dominican Republic. A separate treaty between the U. S. and Canada for reciprocal operating continues in force.

Negotiations continue and additional agreements will be announced when reported to the League.

CITIZENS RULE CHANGES

Last summer FCC adopted sweeping changes in the Citizens Band rules to make clear what sort of operations were intended in that band, to forbid other kinds of operations and to give more-complete guidelines for each. The rules were to have gone into effect late in the year, but were placed in abeyance upon receipt of petitions for reconsideration from manufacturers, distributors and CB clubs. Earlier this spring, FCC again approved of the changes, essentially as published last summer, and ordered them into effect on April 26, 1965.

Lafayette Radio then petitioned the Federal Court of Appeals for the Second District at



Governor Otto Kerner has proclaimed August 2 to 8 as Amateur Radio Week in Illinois, concluding on the day of the Hamfesters' hamfest in Santa Fe Park, WA9EOC, State Senator Morgan M. Finley, W9QKE and ARRL Director W9HPG examine the proclamation.

New York, asking that the new rules be set aside and that the FCC be enjoined from enforcing them on April 26. The court upheld the changes of the rules, and refused to order a stay in the effective date. Thus, the new rules forbidding the exchange of technical information, of casual communications of a hobby nature, and of communications in excess of five minutes continuously between stations licensed to different individuals until the conclusion of a five minute waiting period have now gone into effect. Amateurs who are also CB licensees should obtain a copy of the new rules and observe them to the letter. Requests go to the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.

Ask for Volume 6 of the FCC rules, and enclose a check or money order for \$1.25.

MINUTES OF EXECUTIVE COMMITTEE MEETING

No. 303

April 5, 1965

Pursuant to due notice, the Executive Committee of The American Radio Relay League, Inc., met at the Kirkwood Hotel, Des Moines, Iowa, at 9:03 A.M., April 5, 1965. Present: President Herbert Hoover, Jr., in the chair; First Vice President W. M. Groves; General Manager John Huutoou; Directors Charles G. Compton, Robert W. Denniston and Noel B. Eaton; Communications Manager F. E. Handy, General Counsel Robert M. Booth, Jr., Director Gilbert L. Crossley, and James E. Hacke, Jr., of the Stanford Research Institute were also present.

On motion of Mr. Eaton, approval was unanimously GRANTED for the holding of a West Virginia State Convention at Jackson's Mill on July 3-4, 1965; a Rocky Mountain Division Convention at Denver, Colorado, July 17-18, 1965; a Hawaii State Convention at Honolulu on July 17-18, 1965; and a Roanoke Division Convention at Natural Bridge, Va., on May 28-29, 1966.

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

- Anderson Radio Club Anderson, S. C.
- Bayside High School Amateur Radio Club Bayside, N. Y.
- Canisteo Valley Amateur Radio Club Hornell, N. Y.
- Covichian Valley Radio Club Hornell, N. Y.
- Duncan, V. I., B. C., Canada
- Cromwell Amateur Radio Society Cromwell, Conn.
- East Jefferson High School Radio Club Metairie, La.
- Flatbush Radio Club Brooklyn, N. Y.
- Guernsey Co. Amateur Radio Club Guernsey Co., Ohio
- The Lanierland Amateur Radio Club Gainesville, Ga.
- L.E.R.A. Amateur Radio Club
- Vandenberg Air Force Base, Calif.
- Liberal Amateur Radio Club Liberal, Kansas
- Lompoc Amateur Radio Club Lompoc, Calif.
- The Loyola Academy High School Amateur Radio Club Wilmette, Ill.
- Loyola High School Amateur Radio Club Los Angeles, Calif.
- Mahoney Amateur Radio Society of St. Joseph's College Philadelphia, Pa.
- Malden Amateur Radio Association, Inc. Malden, Mass.
- Nevada County Amateur Radio Club Grass Valley, Calif.
- New Rochelle High School Amateur Radio Club New Rochelle, N. Y.
- Newton High School Amateur Radio Club Newton, Iowa
- North High School Amateur Radio Club Eastlake, Ohio
- 6N2 Amateur Radio Council of Western New York Cheektowaga, N. Y.
- South Waterloo Amateur Radio Club Galt, Ont., Canada
- Southern Berkshires Amateur Radio Club Sharon, Conn.
- State St. Junior High Amateur Radio Club Alliance, Ohio
- University of Rhode Island Amateur Radio Club Kingston, R. I.

(Continued on page 170)

1965 ARRL Field Day Rules

Annual Test for Emergency-Powered Stations, June 26-27

FIELD Day is all things to all hams. For some it's the semi-official windup of a busy operating season while for others it signifies the start of their summer operating schedule. Many find it the prime operating event of the year, a highly competitive test under field conditions. This is the opportunity for groups to demonstrate emergency preparedness of a fashion that awakens public awareness of the vital role played by our amateur radio service in time of need. More than ever, consideration should be given to the type of operation that might develop in a real emergency, when the time element would restrict advance preparations. Following this 1965 test of portables, discuss with your club ways you feel could improve the 1966 affair, whether by special "Spirit of FD" multipliers to groups using truly hand-carried equipment, set up no more than three hours in advance, discouragement of use of existing permanent structures, etc. (see p. 110, this issue).

Here are examples to assist score calculations:

Example 1

Assume a 25-watt rig wholly on batteries, not originating or relaying any messages, and not having more than two operators.

40 points (40 stations worked)
 $\times 3$ (power below 30 watts)

 120
 $\times 3$ (all radio equipment independent of commercial mains)

 360
 $\times 1.5$ (if Class B or C and everything on batteries)

 540 claimed score

Example 2

Same as Example 1 but one Field Day Message to the SEC or SCMI is originated and passed in good form.

65 points (10 QSOs + 25 points for FD message)
 65×9 ($3 \times 3 =$ power multiplier multiplied by independence-of-mains multiplier)

 585
 $\times 1.5$ (everything on batteries)

 877.5 claimed score

(Copies of all messages originated and relayed must accompany Field Day reports.)

Example 3

The Podunk Hollow Radio Club (or any group of three or more licensed operators) portable at its FD site, operates two transmitters simultaneously. Each rig runs 75 watts input and batteries or generators furnish power. One message is started in good form (25 points), 1 is received and relayed onward (2 points), and 230 stations are contacted.

257 points (230 QSOs + 25 + 2)
 $\times 2$ (power input over 30 and under 150 watts)

 514
 $\times 3$ (all gear independent of mains)

 1542 claimed score

(No battery multiplier for either clubs or groups.)

Mobiles are a vital part of Field Day too, and clubs should strive get all member-owned mobile units on the air during Field Day

FIELD DAY TIMETABLE

Time	Start	End
	June 26	June 27
GMT	2100	2400

(Operate no more than 24 consecutive hours out of the total 27-hour period)

and report their mobile scores for the mobile aggregate scores to appear in the final results. Mobile units are the key to any emergency work.

Log forms and summary sheets are now available on request from ARRL, 225 Main Street, Newington, Connecticut 06111. Your best bet is to send for some — the sooner the better. You may also use the summary on the next page, or prepare a facsimile. All reports should include starting and ending time of operation, bands used, dates and contact times in GMT, calls of stations worked, signal reports sent and received, and locations of stations worked, as well as power sources and inputs, location and call of station, number of transmitters in simultaneous operation, number of persons participating, club name (if any), and score computations. Do not send your original FCC log as an entry. Results must be postmarked no later than July 26 for QST listing.

Portable stations are reminded to be sure they comply with FCC regs in signing portable. C.w. stations follow their calls with a slant bar followed by the numeral of the area in which they are operating; phone stations follow their calls with their geographical location. See Sec. 97.87(b), of the amateur rules for details.

Check these FD rules, which follow below, very carefully; a scan of last year's FD results (December, 1964, QST) may give you some hints.

Rules

1. Eligibility: The Field Day is open to all radio amateurs in the sections listed on page 6 of this issue of QST.

2. Object: For portable and mobile stations to work as many stations as possible; for home stations to work as many portable and mobile stations as possible.

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

4. Entry Classification: All entries will be classified according to number of transmitters in simultaneous operation. They will be further classified as follows: "A," club or nonclub group portable stations; "B," unit or individual portable stations; "C," mobile stations; "D," home stations operating from emergency power; "E," stations operating from commercial power sources. Thus a club or group running three transmitters simultaneously will be in the 3A classification, or a mobile station with one transmitter will be in the 1C classification.

Portable stations are those installed temporarily, for FD purposes, at sites away from customary fixed-station locations. Portable equipment or units must be placed under one call and the control of one license, for one entry. All control locations for equipment operating under one call must lie within a 1000-foot-diameter circle.

Group participation is that portable-station work accomplished by three or more licensed operators.

Unit or individual participation is that portable-station work accomplished by either one or two licensed operators.

Mobile stations are complete installations including power source and antenna, mounted in or on vehicles and capable of being used while in normal motion. If they utilize antenna supports not normal or suitable for use during motion, installations must be classified as portable instead of mobile. Each mobile entry call must be different from any other FD station participating.

Home station participation is that work by fixed amateur stations not operating portable or mobile.

A transmitter used to contact one or more stations may not subsequently be used under any other call during the Field Day period (with the exception of family stations where more than one call is assigned to one location by FCC).

5. Field Day Period: All contacts must be made during the period indicated elsewhere in this announcement. An entry may be operated no more than 24 consecutive hours of the 27 hours available.

6. Bands: Each phone and c.w. band is regarded as a separate band. A2, radio-teletype and frequency-shift keying are grouped with A1, in the bands where they are allowed. All forms of voice transmission will be grouped with A3, in the bands where they are allowed. (In Canada the respective phone bands apply.)

The use of more than one transmitter at one time in the same band is not allowed.

7. Exchanges: Signal reports and ARRL section (or specific location) must be exchanged in proof of contact.

8. Valid Contacts: In Class A, B and C, a valid contact is a complete exchange with any amateur station. In Classes D and E, a valid contact is a completed exchange with any station in Class A, B or C. Crossband contacts are not allowed. Contacts may be made in motion or from any location(s). A station may be worked more than once only if the additional contacts are made on different bands.

9. Field Day Message: A Field Day Message is one originated by a Class A, B, or C station and addressed to the SEC or SCM (see address in QST, p. 6) stating the number of operators, the field location, and the number of ARRL members at the Field Day station. Only one Field Day Message may be originated.

10. Scoring:
Message Credit: Credit for handling messages may be obtained only as follows: 25 points for originating one Field Day Message to SEC or SCM. In addition, each Field Day Message received for relay will score 1 point when received by radio and 1 point when sent onward by radio. No FD Message may pass through the same station twice. There will be a deduction of 10 points for omission of handling data or for defects in form. Copies of all messages originated and relayed must accompany Field Day reports.

Multipliers:

Power: Output-stage plate input 30 watts or less: 3. Output-stage plate input between 30 and 150 watts: 2. Output-stage plate input between 150 and 1000 watts: 1. The plate input of a

grounded-grid amplifier is its plate input plus the plate input to the driver stage.

Independence-of-Mains: All radio equipment independent of commercial power source: 3. All radio equipment not independent of commercial power: 1.

Battery Power: (applies to Class B and C only) 1.5. The battery capacity or size shall in all cases be adequate to permit one hour's continuous operation of the station. Charging batteries from commercial mains while batteries are connected to transmitter or receiver voids the "independence-of-mains" and "battery power" multipliers.

Multipliers do not apply to Class D and E entries.

Final Score: The final score equals the total "points" multiplied by the "power multiplier" multiplied by the "independence-of-mains" multiplier (multiplied by the "battery power" multiplier, if applicable.) Where different multipliers apply during the Field Day period, points are multiplied by the multiplier in effect at the time the points were earned.

11. Club Aggregate-Mobile Scores: Entries under Class C may be combined to form a "Club Aggregate-Mobile Score." The club name must be noted on the individual reports, and the club secretary must submit a claimed aggregate score. Credits to the extent supported by the reports submitted to ARRL will be allowed. Only bona fide members of the club, residing in the club territory, may contribute to the aggregate-mobile club listing.

12. Reporting: Mail reports or entries on or before July 26. Reports must show starting and ending time of FD operating period, bands used, dates and contact times in GMT, calls of stations worked, signal reports sent and received, and ARRL sections or locations of stations worked. Reports must also show power inputs and sources of power, number of transmitters in simultaneous operation, location of station, number of persons participating, class of entry, and score computations.

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ARRL FIELD DAY SUMMARY

STATION CALL..... FD LOCATION.....
 (Indicate / where applicable)

CLASS OF ENTRY (check only one)

- A. Club or group portable.
- B. Unit or individual portable.
- C. Mobile
- D. Home -- Emergency power.
- E. Home -- Commercial power.

ENTER NUMBER OF
 TRANSMITTERS IN
 SIMULTANEOUS OPERATION
 IN THIS BOX:

If club entry, name of club.....

If Class B entry, call(s) of operator(s).....

Number of people participating at this station.....

Period of FD operation: Starting time..... Ending time.....

POWER SOURCE (check)

- Generator.
- Commercial Mains.
- Battery.
- Other.

Description of power source (generator type etc.).....

Bands	Nr. stns. worked	Multiplier	Score	Transmitter	Input
2.5 Mc. CW		X			
3.5 Mc. A3		X			
7 Mc. CW		X			
7 Mc. A3		X			
14 Mc. CW		X			
14 Mc. A3		X			
		X			
		X			
FD message points	2	X			
TOTALS	1	X =	CLAIMED SCORE	Enter total number of stations worked here (should equal box 1 minus box 2)	

This certifies that the station whose call appears above was operated in accordance with the current Field Day rules and that, to the best of my knowledge, the points and score as set forth in the above summary are correct and true.

.....
 (Date)

.....
 (Signature of club secretary or licensee of station whose activities covered in this FD entry)

Amateur Radio and the Public Interest

BY IVAN H LOUCKS,* W3GD

SEVERAL months ago, in fact in October of 1963, I had occasion to speak to an assemblage of my fellow hams and old-timers at a meeting of the Quarter Century Wireless Association in New York City. In that talk,¹ as an active amateur also representing the Federal Communications Commission, I pointed out that it is the duty of the Commission to regulate all radio services in the United States, to license stations and to provide them with frequencies on which to operate, on the basis of its findings to the public interest, convenience and necessity involved in the operation of such stations. In that talk I also mentioned that many persons seem to confuse their own personal interests or convenience with that of the public at large. I gave as an example the small but vocal minority within the Citizens Radio Service whose only purpose in that service seems to be to use it as a plaything, and who patently disregard the needs of others for a cheap and easy means of transmitting necessary communications by radio. Furthermore, I pointed out that this fatal attitude seems, from my point of view, to be creeping over into the Amateur Radio Service. Unfortunately, nothing has happened since to change my mind.

As I have also previously pointed out, the justification for the very existence of the Amateur Radio Service is contained in five basic principles, which are so well expressed in Section 97.1 of the Commission's rules that I will now read them to you. I quote:

- "(a) Recognition and enhancement of the value of the amateur service to the public as a voluntary non-commercial communication service, particularly with respect to providing emergency communications.
- "(b) Continuation and extension of the amateur's proven ability to contribute to the advancement of the radio art.
- "(c) Encouragement and improvement of the Amateur Radio Service through rules which provide for advancing skills in both the communication and technical phases of the art.
- "(d) Expansion of the existing reservoir within the Amateur Radio Service of trained operators, technicians, and electronics experts.
- "(e) Continuation and extension of the amateur's unique ability to enhance international good will."

My previous discussion of the first of these principles, that of providing communication facilities in emergencies, has been so widely printed, quoted and misquoted, cussed and discussed, that it needs no repetition. Suffice to say that I am aware of the valuable public service which has been rendered by many amateur operators and stations in emergencies; from Florida hurricanes and midwest tornados to Alaska earthquakes, from Mississippi River and west coast floods to explosions or fires which

render normal communications facilities inadequate. The amateurs who have so ably assisted in these cases deserve our heartiest and sincerest praise. They were prepared and have done their share in proving the worth of the Amateur Radio Service. Although many of us may never have occasion to provide emergency communications as such, yet we must all do our share if we want the Amateur Radio Service to hold its position (and its frequencies) in the world of today. We cannot afford to sit back and "let George do it." Let us look at another of the points in the Basis and Purpose of amateur radio to see what else we can possibly do to help justify the service. If we qualify under one we are perhaps doing our share; at least we are not simply going along for the ride.

Paragraph (c) of the rule section which I have just quoted emphasizes the promotion of advancing skills in both the communication and technical phases of the art of means of those rules. This, of course, contemplates that amateurs (not necessarily all amateurs) are expected to advance their operating and technical skills and abilities at least in step with the general advancements in the radio art. The Commission, it says, is expected to make rules which will promote those advancements. This means, therefore, that the Commission should provide, by rules, an incentive for amateurs to improve their skills, and this brings us to the thought uppermost in your minds, namely, the "Incentive Licensing" proposals. I will leave it to others to discuss the pros and cons of the various parts of the Commission's proposal in its Notice of Proposed Rule Making known as Docket No. 15928. I would like to spend the remainder of the time allotted to me here today to discuss the "why" and not the "how" of the proposal.

If I can remember correctly, back in the early



W3GD

* Chief, Amateur and Citizens Radio Division, FCC.

¹ QST, December 1963, page 82.

At the New England Division Convention in late April, the Chief of the Amateur and Citizens Division of FCC spoke frankly on the background and philosophy of the Commission's proposals to upgrade the amateur license structure. His message deserves careful consideration by every amateur.

1920s when I was first licensed as a radio amateur, there were three classes of amateur licenses, and each had its special limitations or special operating privileges. At the bottom of the ladder, in the position now held by our Conditional Class license, was the Amateur Second Class, later called the Temporary Amateur. Telephony was permitted under this license only in the 175-, 85- and 5-meter phone bands. Next on the ladder was the Amateur First Class, later known only as the Amateur Class, which occupied the spot now held by the General Class. This also had limitations as to which phone bands could be used; it was necessary to pass a special examination and obtain an endorsement granting unlimited phone privileges before you could operate in all of the phone bands. The unlimited phone privileges were also granted, of course, to holders of the Amateur Extra First Class license. This license, like the Amateur Extra Class of more recent time, was primarily a prestige license with few holders because it carried no special operating privileges.

In the early 1930s, under the Federal Radio Commission, the amateur licenses were renamed but retained essentially the same operating privileges, except that the Amateur Extra First Class dropped from the scene. The Temporary Amateur became the Class C, the Amateur Class became the Class B, and the Amateur Class with phone endorsement became the Class A. The Amateur Extra First Class licenses, as they expired, were also renewed as Class A. As you all know, the Classes A, B, and C licenses were renamed as the Advanced, General, and Conditional Classes in the early 1950s, when the new Novice, Technician, and Amateur Extra Classes were established. Now, let us see what has happened to the examinations for these licenses — the degree of required operating and technical competence, if you please.

The old Amateur Second Class and the Temporary Amateur Class licenses were obtained on the basis of a certification by the prospective amateur that he was familiar with the federal and international regulations governing the operation of amateur stations and could copy international Morse code at the speed of ten words per minute. This became a "mail order" examination in the days of the Class C license, and has continued as such to the present time as the Conditional Class, but the scope of the examination has been progressively changed. The required code speed has been raised to thirteen words per minute, and the written examination now includes many technical as well as regulatory matters, to determine the applicant's knowledge of the essentials of good operating practice.

The old Amateur Class license which became the Class B and is now the General Class, was the lowest class of license which could be obtained on the basis of an examination given by a government Radio Inspector. Of course, it still is, with the exception of special cases of Technician Class examinations. It may be noted that the scope of the present day General, Conditional and Technician Class examinations is the same. The examinations are different, however, depending on whether the examination is "mail order" or Commission-supervised.

This brings me to the old Amateur Class license with the special phone endorsement, which became the Class A license and then the Advanced Class. In its day, the written examination for that phone endorsement was a tough one, but we would now consider it elementary. Similarly, the Class A examination included the advanced radiotelegraph and radiotelephone practice and theory of its day, which we would consider median at the present time. It was for that reason that the examinations for the Advanced, General, Conditional and Technician Classes of licenses were all combined in the mid-1950s, and the issuance of new Advanced Class licenses was discontinued. These examinations have been up-dated from time to time since then, of course, but they are still considered as establishing only minimum qualifications for regular and continued operation in the amateur bands. The only examination that calls for more than what are considered minimum qualifications, is that of the Amateur Extra Class. This, as you know, calls for a code test at twenty words per minute and includes a moderately tough technical examination. I will have more to say later on what I think are the reasons why so few have taken this examination.

Thirteen years ago, in 1952, there were only approximately 115,000 licensed amateur operators in the United States and its possessions. Today there are approximately 270,000 — the number has more than doubled. Thirteen years ago, also, the present classes of amateur licenses were set up. Let us see what has happened in the meantime. Here are the statistics from a recent count by the Commission's computer of the licenses outstanding and valid in the contiguous United States:

Amateur Extra Class	3,683
Advanced Class	39,928
General Class	101,217
Conditional Class	40,529
Technician Class	58,546
Novice Class	13,913

Please note these statistics. Out of 252,000 licensed amateurs here in what was once called the continental United States, less than 3700

held Amateur Extra Class licenses. The reasons for this small number, I think, are perfectly obvious. First, of course, is the fact that other than having a fancy piece of "wallpaper" to attest to the fact, there is no present advantage to holding that license. There is currently no special privilege accorded the holder of this license as there once was, in varying degrees, to the holders of all of the higher grades of licenses. To be brief, there is no incentive to prove your knowledge and ability, even though you could pass the examination. Among the 190,000 present holders of Advanced, General, and Conditional Class licenses, there must be at least 50,000 who could qualify for the Extra Class license if they so desired.

Second on my list of reasons for the low number of Amateur Extra Class license holders, in the opinion of a lot of us, is the regrettable fact that many of our amateurs have somehow or other qualified for a General or Conditional Class license and have then stopped learning amateur theory or practice and have lost their code ability by disuse. True, many of our would-be amateurs study the *Handbook* and other reference books in addition to the *License Manual*, and thus, come to a good understanding of radio theory and techniques, but many only study the *License Manual*, pass the examination, and then quit. They buy factory-assembled equipment and if anything goes wrong they call in the service man, or ship it back to the factory. How much help do you think these amateurs will be in a time of emergency when amateur radio is needed, the equipment fails for some reason, and the service man is somewhere else? As far as that goes, how much help do you think the amateur will be in that emergency if he has spent all of his on-the-air time rag chewing and knows neither proper message handling nor proper circuit or net discipline?

To go back to that paragraph (c) of the Basis and Purpose of Amateur Radio, the Commission has decided that rules changes are now required to better promote advancing skills in both the communication and the technical phases of the radio art on the part of a higher percentage of the amateur body. To accomplish this, a return will be made to the basic concept of amateur licensing which proved itself so well in the past but which was unfortunately overlooked in the early 1950s. Under that concept, each class of license will confer distinct and definite operating privileges, and the higher classes of licenses will confer more, or at least more desirable, operating privileges than the lower ones. Thus, an incentive will be presented to those amateurs who have not obtained the highest class of license, either to prove that they are now qualified or to proceed to obtain these qualifications.

This, in brief, is the reasoning behind the recent release by the Commission of its "incentive licensing" proposal, Docket No. 15928. I suspect that you have all heard of it and, if that is all, that you have probably heard a lot

of misinformation. Before you form your judgments, I beg of you, wait until you have read the entire Notice and have had time to study it. No one expects you to agree with everything in that proposal. In fact, I don't agree with every detail of it, myself. Just bear in mind that it is a Notice of Proposed Rule Making, not changes in the rules to be immediately put into effect. It is a composite of something like eleven different sets of ideas on the general subject which have been filed with the Commission as petitions requesting rule making. If you have ideas that you feel would better accomplish the desired objective you should file them with the Commission before the closing date of this Docket, which is July 15, 1965.

Before I close, I would like to emphasize something that has often been said by myself and many others of the Commission's staff. The Commission is not running a popularity contest on this or any other Notice of Proposed Rule Making which it releases. It is trying to obtain facts and ideas which will help it make rules or change rules so as to best serve the public interest, convenience, and necessity. If you disagree with the reasoning of the Commission, give it the benefit of your thinking. A clear concise, well thought out and presented explanation of why you think a given proposal is not good is worth a thousand postal cards which simply say "I don't like it." On the other hand, if you agree with the Commission's proposal or any part of it, a word to that effect and your reasons for agreeing will also be helpful. One of the main reasons for the issuance of such notices of proposed rule making is to give the Commission the opportunity to draw on the thinking and the experiences of the people most affected, to pick the brains of the experts in that particular field so that it can use their ideas to do its job better. Unfortunately, we find that those who agree with any proposal seldom take the pains to let us know. This frequently has the effect, I'm afraid, of leaving the Commission and its staff feeling that they must have been numbskulls to have come out with the idea in the first place.

In closing, I would like to thank you for your patience in listening to me ramble. It has been a pleasure as well as an occasional headache working with the amateur fraternity from the Commission's side of the fence, but that is about to come to an end. Since I am planning to retire from the Commission's staff before July first, you can see that I will soon be just another amateur on the outside looking in. By the time the issues in Docket No. 15928 are decided and in effect someone else will have taken my place while I will then be just another call in the book. I fully intend to keep up with the advances in amateur radio and to qualify for an Extra Class license, regardless of that decision. I'll see you on the air from some new QTH in the not too distant future if I have the good fortune to stay on this old earth a few years longer. 73 and 80.

QST

Noise Considerations in Receiver Design

In Two Parts — Part II

BY JAMES K. BOOMER,* W0VDC/8

Receiver Audio Output Measurements

For all practical purposes, the audio power output from a receiver with no signal input is made up of thermal agitation and shot noise, and can be assumed to have what is known as a Gaussian probability distribution. (This is not exactly true, since nonlinearities within the receiver modify the frequency distribution of the noise, but a Gaussian distribution is usually assumed.) It can be shown that impulse noise has the same frequency distribution as shot noise if the impulses are independent and occur randomly. The over-all result is essentially a Gaussian probability distribution of noise, a plot of which would be similar in shape to the curve of Fig. 1.

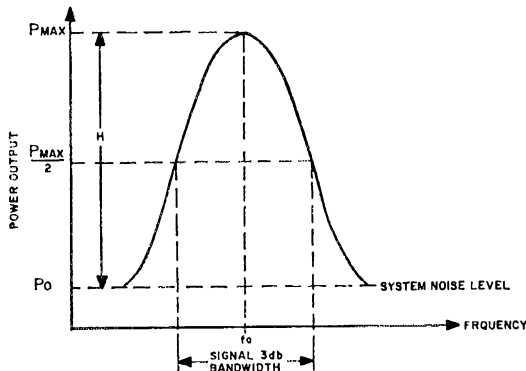


Fig. 1—Representative signal-bandwidth curve.

When a signal is introduced into the receiver the audio output power is the sum of the noise and signal powers. The audio output *voltage* then consists of noise and signal voltages added by the root-mean-square or r.m.s. method (square root of the sum of the squares). A question now arises concerning the reaction of audio output indicators to noise and various signals.

True-R.M.S.-Responding Meters

As the name implies, the true-r.m.s.-responding voltmeter is designed to read the true r.m.s. value of a signal—that is, the response is directly proportional to power. Ideally, such a meter would read the true r.m.s. value of any input signal regardless of its shape, whether

sinusoidal, triangular, impulse or whatever. However, any physically realizable instrument has a finite bandwidth, and thus limitations are imposed upon the accuracy with certain input signals. For example, there is a limit to the accuracy attainable with very narrow impulses. In practice, signal and noise output readings obtained from a communications receiver when using a good-quality true-r.m.s.-responding meter are accurate and can be relied upon.

A typical true-r.m.s.-responding voltmeter consists of a very stable a.c. amplifier followed by a special thermocouple system. The thermocouple system produces d.c. voltages proportional to the applied a.c. These d.c. voltages are amplified and applied to a d.c. meter. Since thermocouples are used, this type of voltmeter conforms to the definition of r.m.s., wherein equivalent heating is the criterion. The bandwidth of a typical true-r.m.s.-responding meter extends from about 10 c.p.s. to 10 Mc. or so. True-r.m.s.-responding voltmeters are expensive and are beyond the price range usually considered by most amateurs.

Average-Responding Voltmeters

The typical average-responding a.c. voltmeter uses a half- or full-wave rectifier system with no filtering in its output. The output is then pulsating d.c., and is proportional to the average value of the voltage. However, many average-responding meters are *calibrated* in r.m.s. based upon a sine wave.

The average-responding meter has a finite bandwidth and hence there is an accuracy limitation imposed on certain wave shapes. It is not uncommon to see high-quality average-responding voltmeters with bandwidths extending from 10 c.p.s. to 4 Mc. or so.

It can be shown that the average-responding meter will read about 1 db. below the true r.m.s. value on Gaussian noise, so for accurate receiver output readings, one must add 1 db. to the noise reading. It can also be shown that true-r.m.s.-responding and average-responding meters will read nearly the same on a sine wave in the presence of Gaussian noise. Hence, with the small correction just mentioned, output signal and noise readings taken with an average-responding meter can be relied upon. The maximum error on any practical wave shape with such a meter ranges from about 10 per cent high to 20 per cent low.

The conventional volt-ohm-milliammeter uses an average-responding meter having adequate frequency response for the type of measurement under discussion.

* Senior Research and Development Engineer, Military Equipment Development Department, The National Cash Register Company, Dayton, Ohio 45409. Home address: 2036 Lakeman Road, Bellbrook, Ohio. This article was prepared while the author was with the Collins Radio Company, Cedar Rapids, Iowa.

Peak-Responding and Peak-to-Peak-Responding Meters.

The main difference between an average-responding and a peak-responding voltmeter is that a filter is placed at the output of the rectifier in the peak-responding instrument. The vacuum-tube voltmeter is a familiar example. Most such meters are calibrated in r.m.s., peak, or peak-to-peak, based upon a sine wave.

When the input is sinusoidal, the instrument is accurate because it is calibrated in terms of a sine wave. However, when the input signal is nonsinusoidal, errors result. For example, a typical instrument will give the same reading on a series of narrow 10-volt impulses as it will on a 10-volt sine wave, and it is certain that the r.m.s. value of the impulses is less than that of the sine wave. Thus when the signals to be measured depart appreciably from a sinusoidal shape, the readings obtained on the meter cannot be relied upon.

The reading obtained from a peak-responding voltmeter on Gaussian noise depends primarily upon the instrument rectification efficiency, but is always greater than the true r.m.s. value of the noise. The author has found that most popular peak-responding and peak-to-peak responding meters read high by a factor of 2.5 to 3 on Gaussian noise. At best, the readings are only an approximation.

Noise Figure

Through the concept of "noise figure," the sensitivity of any receiver can be compared with that of an ideal (noiseless) receiver with the same noise bandwidth and input termination. In this way one can see how nearly ideal a receiver is with regard to internal noise.

Noise figure can be defined in several equally-correct ways.¹ For example, it can be defined as the ratio of the signal-to-noise ratio into a device to the signal-to-noise ratio out of the device. Expressed mathematically,

$$F = \frac{S_i/N_i}{S_o/N_o} \quad (5)$$

where F = noise figure and the subscripts i and o represent input and output, respectively.

The signal and noise quantities in Eq. (5) are in units of power (watts, milliwatts, etc.). Eq. (5) can be expressed in decibels as

$$F = 10 \log_{10} \left(\frac{S_i/N_i}{S_o/N_o} \right) \text{ db.} \quad (6)$$

Using this definition, it is seen that if a receiver is ideal, it adds no noise to a signal applied to its input, hence the signal-to-noise ratio at its output is the same as that at its input. Such an ideal receiver has a noise figure of 1, corresponding to

¹ IEEE noise factor (noise figure) definition: "The noise factor, at a specified input frequency, is defined as the ratio of 1) the total noise power per unit bandwidth at a corresponding output frequency available at the output port when the noise temperature of the input termination is standard (290 K) to 2) that portion of 1) engendered at the input frequency by the input termination."

zero decibels. On the other hand, if a receiver is not ideal it generates internal noise, and the signal-to-noise ratio at its output will be less than that at its input. As the internal noise in a receiver increases, its noise figure increases, indicating poorer sensitivity.

To illustrate the comparison of receivers using the concept of noise figure, a receiver with a noise figure of 4 (6 db.) degrades the signal-to-noise ratio of its input signals twice as much as a receiver with a noise figure of 2 (3 db.). Therefore, assuming equal noise bandwidths and a given input signal, the receiver with the 3-db. noise figure will provide a higher output signal-to-noise ratio (3 db. higher) than the receiver with the 6-db. noise figure.

It should be pointed out that maximum signal-to-noise ratio is realized in a receiver of given noise figure when the signal bandwidth is just wide enough to pass the required sideband information, and when the noise bandwidth equals the signal bandwidth.

Some authors prefer to identify the quantity represented by Eq. (5) as noise "factor" and the quantity represented by Eq. (6) as noise "figure," so that noise *factor* is always expressed as a power ratio and noise *figure* is always expressed in decibels. However, the two terms are often used interchangeably.

A relatively simple equation for the noise figure of a receiver, in terms of the individual stage gains and noise figures, is

$$F = F_1 + \frac{F_2 - 1}{G_1} + \frac{F_3 - 1}{G_1 G_2} + \dots + \frac{F_n - 1}{G_1 G_2 \dots G_n} \quad (7)$$

where F = Receiver noise figure (power ratio)
 $F_1 \dots F_n$ = Individual stage noise figures (power ratios)
 $G_1 \dots G_n$ = Individual stage gains (power ratios)

If the noise figure of a receiver exclusive of the first stage can be determined, the noise figure of the complete receiver is

$$F = F_1 + \frac{F_2 - 1}{G_1} \quad (8)$$

where F = Receiver noise figure (power ratio)
 F_1 = Noise figure of first stage
 F_2 = Noise figure of receiver exclusive of first stage
 G_1 = Power gain of the first stage

With Eq. (8) one can examine the effect of the first stage upon the receiver noise figure. If the gain of the first stage is made large with respect to the quantity $F_2 - 1$, the receiver noise figure is essentially determined by the noise figure of the first stage. In addition, if G_1 is large enough to make the second term in Eq. (8) very small with respect to F_1 , there is little to be gained by a further increase in first-stage gain. It is also apparent

that the noise figure of the receiver can never be better than that of the first stage. Finally, a pre-selector or preamplifier cannot improve the receiving-system noise figure unless it has a lower noise figure than the receiver to which it is connected.

If a receiver is designed so that its input impedance is matched to the antenna impedance, the minimum attainable noise figure is 2 (3 db.). This condition occurs when the only noise generated inside the receiver is the white noise from its input resistance. To attain a noise figure lower than 3 db., one must mismatch the antenna circuit. The minimum noise figure attainable by mismatching is called the "optimum" noise figure, and is obtained by adjusting the impedance transformation from the antenna to the input stage.

Fig. 2 shows the theoretical optimum noise figure vs. matched noise figure. If a receiver has a matched noise figure of 6 db. or higher, little can be gained by mismatching; however, as the matched noise figure approaches 3 db. the degree of improvement possible increases. If a receiver has a 3-db. matched noise figure (in a practical case, the matched noise figure will always be greater than 3 db., since some shot noise is always present in any physically realizable receiver), the attainable (optimum) noise figure is 0 db., but this corresponds to zero power transfer from the antenna. Thus, in any conceivable case, one would approach 0 db. asymptotically.

Relationship Between S/N , $(S + N)/N$ and Noise Figure

A common specification of receiver sensitivity is in terms of the number of microvolts into a 6-db. pad, or induced into an antenna, required to produce a 10-db. signal-plus-noise-to-noise ratio. There is a continuing desire to relate such a specification to noise figure. The nomograph shown in Fig. 3 allows comparison of noise figure and the 10-db. sensitivity specification for various system impedances and noise bandwidths. A temperature of 290 degrees Kelvin (62 degrees Fahrenheit) is assumed, and 30 per cent sine-wave modulation is assumed for a.m. receivers.

Noise Figure and $(S + N)/N$ Ratio of Matched And Mismatched Systems

Suppose that the antenna circuit of the receiver is adjusted for optimum noise figure. Under these conditions the signal-to-noise ratio out of the receiver is the highest attainable for a given signal-input level. Since a mismatch exists between the receiver antenna-input terminals and the antenna, standing waves exist on the transmission line between the antenna and the receiver. Under these conditions the signal and noise power available to the receiver from the antenna depend upon the electrical length of the line. The available signal power depends upon the complex transmission-line input impedance, when a reactive component exists, whereas the available noise power depends only upon the resistive component

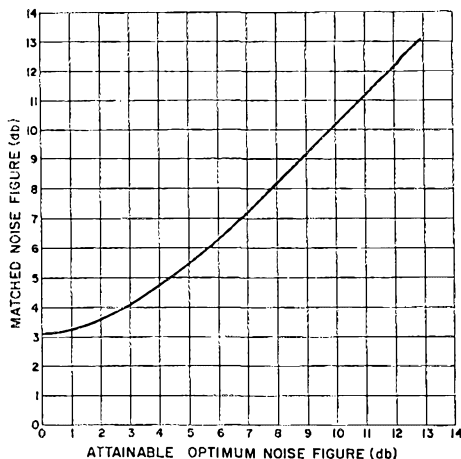


Fig. 2—Theoretical optimum noise figure that can be obtained when the matched noise figure is given.

of the transmission-line input impedance. The final result is a variation in input signal-to-noise ratio and noise figure with line length. The amount of this variation depends upon the attainable optimum noise figure and the degree of mismatch. The higher the s.w.r., the greater the variation.

If a system is to cover an appreciable frequency range and a reasonably-constant system noise figure is desired over this range, the degree of mismatch must be limited. At h.f., where external noise is nearly always predominant, little is gained by mismatching for optimum noise figure.

Measurement of Noise Figure

If one knows the noise bandwidth of a receiver and can determine the number of microvolts necessary into a 6-db. pad for a 10-db. signal-plus-noise-to-noise ratio, the noise figure can be obtained from the nomograph of Fig. 3. It is possible, however, to measure the noise figure of a receiver without having to determine the noise bandwidth or the signal-plus-noise-to-noise ratio for a given r.f. input. This is accomplished by means of a noise generator. Several recent articles^{2,3,4} have covered the construction and use of noise generators for the measurement of noise figure, and the reader is referred to them for details.

Conclusion

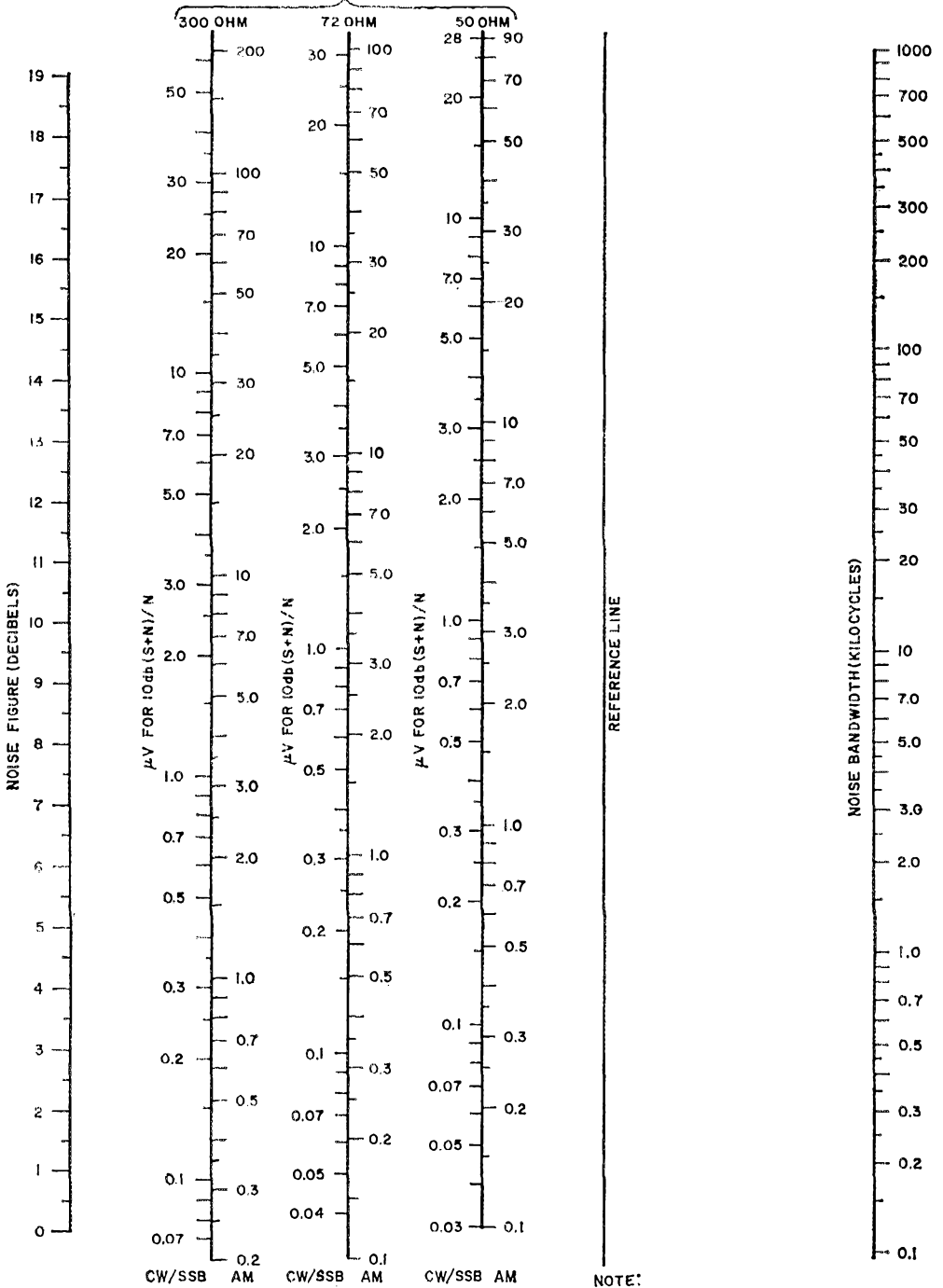
It has been shown that the performance of a receiver is affected by the presence of noise in one form or another, and furthermore, that care must be taken in measuring signal-plus-noise-to-noise ratio to ensure meaningful results. The measurement of only the signal-plus-noise-to-noise ratio

² Huie, "A V.H.F. Noise Generator" ("A Symposium on Noise"), *QST*, February, 1964.

³ Olson, "The Noise Diode Caper," *QST*, February, 1964.

⁴ Olson, Leberman, "Noise Generators for 420 Mc. and Up," *QST*, February, 1964.

ANTENNA IMPEDANCE



NOTE:
30% SINE WAVE MODULATION
ASSUMED FOR AM.

for a given r.f. signal-input level was seen not to provide enough information for sensitivity comparisons with other receivers: one must know the noise bandwidth and other conditions, such as type of signal — s.s.b., a.m., c.w., per cent modulation and other applicable data.

In addition, the significance of noise figure and its relationship to signal-to-noise ratio were illustrated. Finally, it was shown that for maximum signal-plus-noise-to-noise ratio from an a.m., c.w., or s.s.b. receiver of given noise figure, the noise bandwidth should equal the signal bandwidth and the signal bandwidth should be just

wide enough to pass the required sideband information.

Acknowledgment

The author wishes to thank C. P. Womack for his assistance in the preparation of this paper.

QST

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 Fink, *Television Engineering*, McGraw-Hill Book Co., 1952.

Fig. 3—Noise-figure nomogram. The following examples illustrate its use.

Example 1:

Given: Noise figure = 3 db.
 Impedance = 50 ohms
 Amplitude modulation
 Noise bandwidth = 5 kc.

Find: Microvolts for 10 db. $\frac{S + N}{N}$

Procedure: Lay a straightedge from 3 db. on the noise figure scale to 5 kc. on the noise bandwidth scale. From the point where the straightedge crosses the reference line, draw a line to the left perpendicular to the reference line and read the answer, 0.9 microvolt, on the a.m. microvolt scale (50-ohm impedance).

Example 2:

Given: Microvolts for 10 db. $\frac{S + N}{N} = 1$

Impedance = 300 ohms
 C.W. (or s.s.b.) receiver
 Noise bandwidth = 3 kc.

Find: Noise figure.

Procedure: Draw a line perpendicular to the reference line from 1 microvolt on the 300-ohm c.w./s.s.b. microvolt scale to intersect the reference line. Lay a straightedge across this intersection and 3 kc. on the noise bandwidth scale and read the answer, 8.5 db., where the straightedge intersects the noise-figure scale.

Example 3:

Given: Microvolts for 10 db. $\frac{S + N}{N} = 1.5$

Noise figure = 6 db.
 Amplitude modulation
 Impedance = 72 ohms

Find: Noise bandwidth.

Procedure: Draw a line perpendicular to the reference line from 1.5 microvolts on the 72-ohm a.m. microvolt scale to intersect the reference line. Lay a straightedge across this intersection and 6 db. on the noise-figure scale and read the answer, 5 kc., where the straightedge crosses the noise-bandwidth scale.

Strays

The Richmond (Virginia) Amateur Radio Club is sponsoring a station, W4ZA, that will operate from Tangier Island, Virginia. This island in upper Chesapeake Bay, has a population of about 900 people. For the past fifteen years there has been a recurrent problem of supplying medical care to these citizens. The club feels that such an operation from the island would publicize the need of medical care. Operation from the island will begin at 8:00 A.M. on June 19 on 80 through 2 meters, s.s.b. and c.w. The club will return to the mainland on June 20. Special QSL cards titled "Tangier-CARE: Search for a physician for Tangier Island" will be sent

to those who contact the station.

W6GNUN tips us off to a Government Printing Office Publication *Electrical Wiring* (Technical Manual No. 5-760, 50c) which, among other things, lists the statistics on line voltage in many overseas countries.

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



Hints and Kinks

For the Experimenters



PARTS STORAGE RACK

HERE'S an old idea but one that works quite nicely for storing resistors, capacitors, and other parts or hardware. My parts storage rack shown below contains eight shelves; each shelf holds 15 cans. I used dog-food cans which have been washed, with paper labels removed, and a single coat of inexpensive enamel applied. Each can is labeled to show its contents. The finished assembly hangs on the back of my workbench.

— James Ashe, W2DXH



RELAYLESS SCREEN-GRID KEYING CIRCUIT

The screen-grid keying circuit shown in Fig. 1 eliminates the relay usually associated with keying a 300-volt circuit. The old principle of transformer primary keying is used, but at a safe 6.3-volt level. L_1 and C_1 resonate at 120 cycles. I grabbed an old choke out of the junk box, metered the output (without C_2) for a minimum a.c. reading, and came up with something like 0.087 $\mu\text{f.}$ for C_1 . Then you use the minimum possible amount of C_2 to wash out the 240- and 480-cycle components. I found 0.5 $\mu\text{f.}$ about optimum for a 50-ma. load; less drain would require less capacitance.

If the waste of the unused 115-volt winding bothers you, it can always be used to light an "ON THE AIR" sign!

— Rod Newkirk, W9BRD

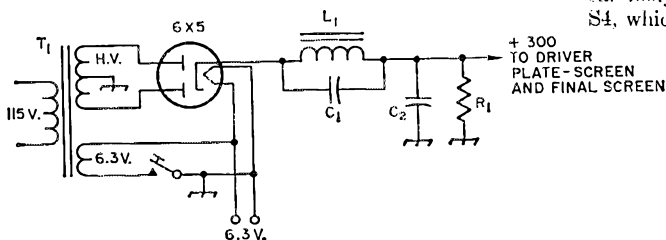


Fig. 1—A relayless screen-grid keying circuit, using primary-keying and resonant-filter principles.

R_1 —27,000 ohms.

T_1 —Small receiver transformer, 650-volt secondary.

C_1, C_2, L_1 —See text.

IMPROVED MODULATION FOR THE NOVEMBER QST TRANSISTOR RIG

THE writer and K3LQM recently completed printed-circuit versions of the transistor portable station for 50 Mc. described by W1HDQ in *QST* for November, 1964. If trouble is experienced with the crystal oscillator cutting off on negative modulation peaks, an idea that K3LQM came up with and shown in Fig. 2 should be helpful.

These units are working out very well, and we plan to get seven more built for ARRLC use.

— Milo H. Frey, K3MSG

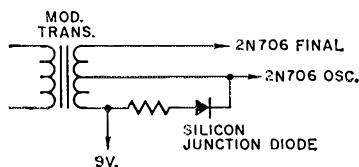


Fig. 2—K3LQM's circuit for improved oscillator performance.

MOBILE NOISE HINT

ATTENDING a recent hamfest we had occasion to visit with VE1JG, Jack Price. Jack showed us his mobile installation and what was surprising was the lack of noise, *without* any noise suppression built into the usual places. Jack had reasoned that if there was no noise on the receiver, antenna disconnected, motor running, a good portion of the noise with antenna connected came from the tail pipe carrying the noise to the back of the car near the antenna. By experimenting with metal bonding straps at various points along the muffler system, Jack cleaned up most of the noise.

Just recently, we had occasion to install a Hallicrafters SR-160 in a new Chevrolet Impala. On checking, we found the noise level read 80 or slightly higher on both 80 and 20 meters. The noise disappeared when the antenna was removed from the receiver. Remembering VE1JG's experience, we tried bonding the tail pipe to the car body. On both bands, the noise dropped to S4, which of course was a startling improvement.

— W1ICP

THE KWM-2 AND RANGER ON FIELD DAY

HERE is information from the top Class 1A group in last year's competition on modifying two popular transmitters for 30-watt operation. For the KWM-2, replace the 6146s with 2E26s, lower the final plate voltage to 400 volts (this can be accomplished by removing the 5R4 in the KWM-2 power supply and connecting a 400-volt unfiltered supply to Pin 8 of the 5R4 socket), and lowering the screen voltage. Break the connection between R115 (2200 ohms) and the junction of L13-L14, and connect as shown in Fig. 3. R_1 provides a screen-voltage adjustment, and should be set for 10-ma. static plate current.

The Ranger is modified by replacing the 6146 with a 2E26, and inserting a 10K-ohm resistor in series with the screen supply for the final tube. It may be placed at the 6146 socket. — *Lost Pines Radio Club, W5KPI*

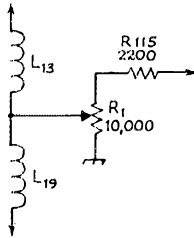


Fig. 3—Screen-voltage modification for the KWM-2. R_1 is a 10,000-ohm, 2-watt, linear-taper control.

ROTOR OPERATION FOR THE HANDI-CAPPED

IT is generally thought that a visually-handicapped operator must "make do" with a TV-type rotor of the automatic type, or some other makeshift arrangement to indicate beam direction. By simply removing the plastic face cover on the meter of the HAM-M or TR-44 rotors, the gifted touch of these amateurs can "read" directions with great accuracy. The meter pointer is quite rugged and safe to touch.

A four-inch square of plastic sheet can be fastened along the top edge of the control box with a glass-tape hinge to protect the meter movement from dust, or a plastic food bag can be dropped over the whole cabinet when not in use. — *Bill Ashby, K2TKN*

O-T SPECIAL

OLD-TIMERS who long for the music of a Morse sounder will find the circuit in Fig. 4 of in-

terest. The 6SN7 functions as a diode rectifier and clamp tube to give a voltage rise across the VR tube when an audio signal is applied. The VR tube conducts, activating K_1 , which keys the sounder. R_2 should be adjusted for best operation of the relay. (Those who do not wish to go inside their receivers may use an output transformer with the low-impedance side connected to the receiver terminals, and the high-impedance side substituted for R_1 . — *Editor.*)

— *Jack Proefrock, K6QEQ*

LABELING EQUIPMENT

EVERY amateur finds there are times when he wants to consult the schematic and specifications of equipment which he has constructed. Unless his memory is better than most people's he will not be able to remember which issue his project appeared in. The answer is to label the front panel of the project at the time of construction with a simple code which tells at a glance the source of the construction data. An example would be "Monimatch 56Q10," meaning the article appeared in the 10th number (October) of *QST* in 1956. Another is "Little Dipper 59H520," which refers to the 1959 *Handbook*, page 520. — *E. A. Salm, W5FFE*

PARASITIC SUPPRESSORS FOR FINAL AMPLIFIERS

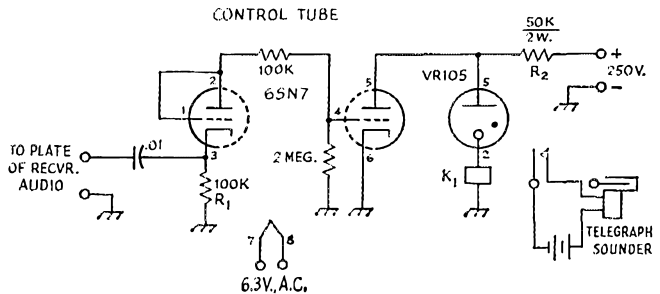
FOR several years I have been using the non-inductive resistors intended for use in the heater supply of series-string TV sets as the R component in parasitic suppressors. The bundles of 2-watt carbon resistors often used are hard to assemble and look messy; by the time they are assembled their outside diameter is rather large, and it takes something resembling a tank coil to get over the top of them.

On the other hand, noninductive resistors are available from TV suppliers and are a convenient size. Globar model FRT1 is rated at 100 ohms cold to 20 ohms hot, is about 2 inches long, 1/2-inch diameter, and has pigtail leads. The fact that these resistors change value as they heat in no way appears to detract from their effectiveness in parasitic suppressors. — *Fred L. Mason, KH6OR*

(Alert readers will note this system was used by WILLF in amplifiers for the '65 *Handbook*. Two General Cement type 25-918 resistors were used in series for a larger total resistance. — *Editor.*)

Fig. 4—Circuit diagram of the adapter for telegraph sounders.

K_1 —S.p.s.t. relay, 10,000-ohm coil.
 R_1, R_2 —Composition Resistors.



1965 ARRL National Convention

San Jose, California July 2-5

BY JEAN A. GMELIN,* W6ZRJ

HAVE you ever been to a real western style barbecue?

Want to take part in a home-brew equipment contest?

Would you like to compete in the 1965 National Convention Golf Tournament?

Do you have a v.h.f./u.h.f. antenna you would like to measure for gain and pattern?

How about finding out how to make your final amplifier run at 94% efficiency?

These are just some of the highlights from the 1965 ARRL National Convention program to be presented in San Jose, California on July 2, 3, 4, and 5.

Formal Barbecue Banquet

The highlight of the convention will be a semi-formal (suit or sport-jacket and tie) western style steak barbecue, featuring a 12-ounce New York cut steak, speakers, awards and entertainment. The barbecue will be in the Santa Clara Valley tradition, and will include all the trimmings. Past experience has shown the Associated Radio Clubs of Greater San Jose, the sponsoring organization, that people, particularly amateurs,

*Convention Vice-Chairman

like their dinner fresh and hot. So your steak will be cooked for you right on the spot; you can go up to the pits and pick out the steak of your choice from the many on the grill, and have it cooked to your own taste. Table settings and arrangements for the banquet will include seating by interest groups this year, an innovation for the ARC's conventions.

The barbecue banquet will be a semi-formal affair in presentation as well as dress, with live entertainment and the traditional speakers and awards announcements. W. A. Stevenson, W6LUC, Vice President, Lockheed Missiles and Space Co., will give the keynote address; his subject will be "The Roll of the Amateur in Defense Industry."

Home-Brew Equipment Contest

All types of amateur home-brew equipment may be entered in the National Convention Amateur Home-Brew Equipment contest. Gear must have been constructed by the persons who enter the contest and must be presented at the convention by 1 P.M., Saturday, July 3, at the convention headquarters.

Entries will be judged by the contest commit-



Pictured are some of the many antennas measured in an antenna test site at a recent California convention. A similar arrangement is scheduled for the 1965 National in San Jose July 2-5.

What You Need to Know

When: Friday through Monday, July 2, 3, 4 and 5.

Where: Hotel Sainte Claire, San Jose, California

What: 14th National ARRL Convention

Registration: Pre-registration deadline: June 1, 1965. Regular registration starts noon July 2.

Accommodations: Convention Hotel Ste. Claire, with singles, doubles and twins available, or your choice of any of two dozen fine motels in the San Jose area. For information on accommodations or registrations write ARCs, P.O. Box 6, San Jose, California 95103.

Cost: General registration fee of \$9.50 covers the main convention banquet and all regular convention meetings and events. Luncheons and breakfasts at special low convention rates will be extra.

Further Details, Write: ARCs, P.O. Box 6, San Jose, California 95103

CONVENTION FEATURES AND SPECIAL EVENTS

Contests: Code speed, homebrew construction, mobile judging, hidden transmitter hunts, special contests for YLs and XYLs.

Equipment Exhibit: The latest in design and operation of amateur gear, special ARRL booth, RTTY room, traffic and net room, DX room, antique wireless room and exhibit.

QSL Display: Send your QSL with your pre-registration for exhibit on the pre-registration QSL board, or bring your card along for the general board.

Operating Convention Station: W6UW will guide in mobiles and make general contacts. Contact the convention station to receive a special W6UW 14th ARRL National Convention QSL.

Sight-seeing Tours: Women's special convention tour of the "Valley of Heart's Delight"; see the world famous Winchester Mystery House, a real California wine cellar, an authentic California mission. Register early to be sure you are included.

Noise Figure Measurement Display: A display showing the latest techniques of measuring noise figures of receivers, open for conventioners to measure the noise figures of their own equipment. Bring your gear and make checks on noise figures and learn new techniques of improving this important factor in receiving equipment.

Golf Tournament: Interested amateurs are invited to take part in the National Convention Golf Tournament to be held on Friday afternoon on a scenic Santa Clara Valley fairway, with a special 14th National Convention trophy for the winner. Please note that reservations for tournament space should be in to the Golf Tournament Chairman as early as possible in order to line up premium space. If you would like to take part, write a special note to Golf Chairman, ARCs, P.O. Box 6, San Jose, California 95103.

tee and the top ten entries will be put on display at a special booth in the Convention Exhibit Room for the final period of the convention. Winners of top places will be given awards with a grand prize to the top entry.

A special contest room will be available to store entries and there will be a guard at the Convention Exhibit Room, so that all entries will be safe during the convention.

National Convention Golf Tournament

Hams who are also golf enthusiasts are invited to enter the National Convention Golf Tournament, to be held at the Almaden Country Club on Friday afternoon, July 2. Awards will include a trophy for both low gross and low net score. Here is your chance to compete with other radio amateurs on a different basis and to test your skill with woods and irons instead of a mike or key, as well as an opportunity to play one of the choice courses of the Santa Clara Valley. Amateurs interested in participating in the tournament should contact Al Gaetano, W6VZT, Golf Chairman, P.O. Box 6, San Jose, by June 15, if possible, in order to make necessary reservations for starting times. Those who must make last minute plans will also have an opportunity to play as extra starting times will be arranged.

Antenna Measuring Party

A main feature of the 1965 National Convention v.h.f./u.h.f. program will be the antenna measuring party to be held at the Santa Clara County Fairgrounds on Monday morning July 5. Antenna measuring gear will be set up on a special test-range site, with facilities for making accurate, near interference-free tests of antenna patterns. Most types of v.h.f./u.h.f. antennas can be handled in the test setup and amateurs interested in having their beams and other antennas tested for pattern and gain may receive detailed information by writing to Ken Holladay, K6HCP, Technical Program Chairman, P.O. Box 6, San Jose.

High Efficiency RF Amplifiers

Mr. Harold Vance, K2FF, of RCA, will present a main technical presentation on "How to Get 90-94% Efficiency in RF Amplifiers." We find such efficiency hard to believe, too, but in our contacts with Mr. Vance, he has told us that with proper design, such efficiency can be achieved. Here's your chance (and ours too) to find out how this can be done.

The program for the convention has created something of a problem for the Convention Committee in that there are so many good technical and operational presentations arranged that the Committee has had to work overtime to arrange space and times. As a result, the 1965 ARRL National will truly be a four-day affair, with three full days of technical and operational program and something for all amateurs and guests.

Speakers for the National Convention will include ARRL President Herbert Hoover, Jr., W6ZII; General Manager John Huntoon,

W1LVQ; Communications Manager, F. E. Handy, W1BDI; Technical Editor George Grammer, W1DF; V.H.F. Editor Edward P. Tilton, W1HDQ; and National Emergency Coordinator George Hart, W1NJM.

ARRL General Counsel Robert M. Booth, Jr., W3PS will be in attendance and will answer questions on legal matters affecting amateurs. The Executive Committee of the Board of Directors will hold its July meeting sometime during the Convention and other ARRL directors will also be present. William Grenfell, W4GF, Chief, Rules and Standards Branch, Amateur and Citizens Radio Division, FCC, will take part in the regular program and will answer questions relating to Commission matters and proposals. Mr. Grenfell is a well-known amateur as well as an FCC official and can give us interpretations in our own language.

C. D. Tuska, a co-founder of the ARRL, will speak before a special meeting of the Quarter Century Wireless Association and will give a regular convention presentation on the early days of the League. All amateurs, whether old-timer or Novice, are invited to hear this presentation on our early amateur history.

Every facet of amateur radio will be presented in the convention program, where the only problem will be selecting what to see rather than trying to find something to do! For program details see May *QST*.

Price for the convention, including main banquet and regular convention sessions, is \$9.50; make checks payable to Associated Radio Clubs. For further information and registration, write to Associated Radio Clubs, P.O. Box 6, San Jose, California. **QST**

Blow-to-Talk:

New Help for Bedridden Hams

THE STATION pictured below was operated entirely by air pressure by Murray Cochrane, W9CPL, until his recent death. The "blow-to-talk" circuitry, designed by K8BMS, could bring new ease of operation to bedridden amateurs everywhere.

Six surgical tubes are mounted in front of the operator. They are placed at angles most convenient for use. Tube No. 1, far left, is a spare for future use. Tube No. 2 terminates at a pressure switch of the type used to control water level in automatic washers. This switch activates a bistable d.p.d.t. relay, which controls the transmit-receive switch and indicating lamps of the Thor transceiver. Once the pressure switch is activated, the t.r. relay contact is "made," and the operator talks as long as he wishes. A second breath throws the relay back to the receive position.

Tube No. 3 controls antenna rotation. The first pressure starts clockwise rotation; release of pressure stops the beam and resets it for counterclockwise movement; and new pressure restarts the antenna in the opposite direction. The rotator is engaged until pressure is released.

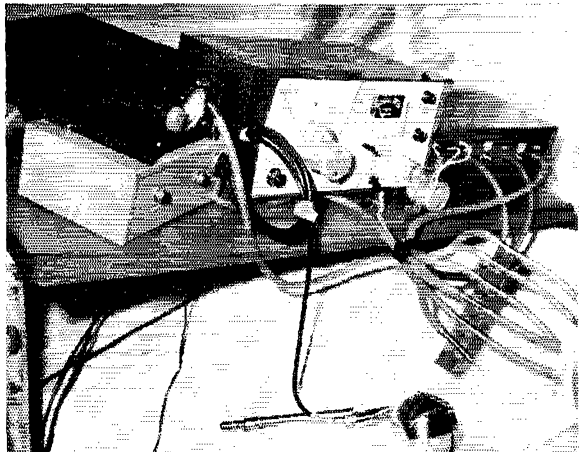
Tube No. 4 terminates at a switch which drives a servo motor attached to the Thor's main tuning capacitor shaft. The sequence is "blow, clockwise; stop; blow, counterclockwise." Tube No. 5 similarly drives the audio gain control. Tube No. 6 serves as a master control or "panic" switch.

The entire system uses ten relays, five pressure switches, and a.c. and d.c. low-voltage supplies for the relays and control motors.

The Clegg Thor is well-suited to this application because its tuning is not critical over approximately one-fourth of the six-meter band (as reported in "Recent Equipment," p. 50, July 1963 *QST*). W9CPL's rig was normally tuned up at 50.5 Mc., which allowed for operation across the first megacycle of the band with no retuning.

Roy G. Peters, K8STR, has indicated that he and K8BMS would be happy to help other hams who have need of blow-to-talk control. **QST**

The rig at W9CPL. Transceiver and control units mount on a fold-away bedside table for operator convenience. The surgical tubes activate controls for tuning, gain, beam direction, line power, and transmit and receive functions. The control units on each side of the Thor transceiver use ten relays, five pressure switches of the type used to regulate liquid levels in automatic washing machines, and associated low-voltage a.c. and d.c. supplies. Design was by K8BMS.



Write For Information



POOR JOE

BY STEVE M. FRIED,* K2PTS

HAVE YOU EVER written to a manufacturer or supplier for information and received a half-answer, or no answer at all? It's possible that the fault was *not* at the other end. Don't blame the other fellow until you've examined all the possibilities of your own letter.

All reputable manufacturers strive for top customer service, but the customer often makes this aim



REPUTABLE MANUFACTURERS STRIVE FOR TOP CUSTOMER SERVICE

difficult. Let's look at some of the simple rules which guarantee best results.

The most important things are *how your letter looks* (format) and *what's in the letter* (content).

* Communications Products, The Hammarlund Mfg. Company, 53 West 23rd Street, N.Y. 10, N.Y.

Manufacturers and distributors of ham gear are well aware of the fact that a satisfied customer is their best advertisement. That's why they're very anxious to satisfy the customer and keep him satisfied. But let's picture ol' Joe Hammarcollicrafter, a customer service man for one of the large radio companies. How is he going to answer letters with no return address? How will he analyze receiver problems if he doesn't know what model to talk about? And what good would it do for him to say "check it with a signal tracer" if the customer does not have and cannot get a signal tracer?

In this article, K2PTS tells hams how to help the manufacturer keep his customers satisfied—how to write for information.

Format

Always put your return address at the top of the letter. Do not write it on the envelope alone. In a large company's interoffice mail system, the letter and envelope are often separated, leaving the customer service man holding a piece of paper signed "John Smith." Who's he?

If a typewriter is available, use it! A typewritten letter is more effective than the nicest handwriting. A typewritten letter in proper business form will almost always get top priority, if only because it's easier on the eyes. If you must hand-write, however, print or write *neatly*. A sloppily written letter shows your indifference and may end up at the bottom of a large stack of correspondence.

A self-addressed stamped envelope is not necessary if you're writing to a company. If the answer will be a few words, or a sentence or two, a self-addressed postal card is handy; or you may indicate that you don't mind having the answer written across the bottom of your original letter. This does eliminate dictation and transcription time, sometimes two or three days during a busy season.

Content

When you write for information about a particular piece of equipment, be sure to say *what* it is. Specify the make and model or model number, the serial number, when and where it was purchased, and how it was purchased (new or used, cash sale, trade-in, or swap). These are cut-and-dried facts, not a long story, so state them briefly and early. They make a dandy opening sentence. In the same sentence or paragraph, be sure to say *what* you want. Are you writing for service information, a schematic diagram, voltage and current specs, or something else? Tell them.

In the next paragraph, say exactly what is wrong and what steps have been taken to rectify the situation. For example, a customer might write this about his receiver:

The receiver [he has already said what model, serial number, etc.] works well on all bands except 7-8 Mc., which is the third band range. Nothing is heard in this range except something that sounds like background noise. I have a transmitter which operates in this range, i.e., 40 meters. I use a coax switch and dipole antenna (sketch of the hookup enclosed). The tubes in my receiver all test "good" in a quality tube tester.

The above is a pretty fair description of the receiver malfunction. Many a customer service man would suggest from this that there is something wrong with the r.f. input, the front end, and that it has been affected by power feeding in from the transmitter. In all probability it would boil down to a burned out antenna coil.

The writer gave a detailed outline of what is wrong and what is *not* wrong ("it works well on all bands except 7-8 Mc., which is the third band range"). This customer has helped the manufacturer help him by including a detailed drawing of the transmitter-receiver-antenna switching system, as well as by saying that all tubes check "good."

When you write letters for information, do not bother with emotion and story. It will do no good to go into detail about how angry you are and that you've had bad dreams, and so on. That might come in a later letter, but for the time being just give them a chance to help you fix your gear. He may send a couple of aspirin tablets however, if you continue to tell him about your headaches. In short, keep it short. And to the point.

If you want to service the equipment yourself, be sure to tell the manufacturer the extent of your experience and what test equipment you have available. If you have any doubt about your ability, tell him what your knowledge amounts to and ask *him*



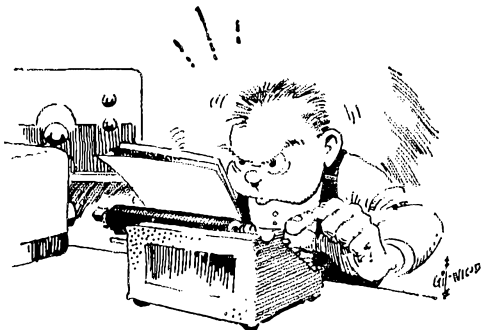
ask his opinion: he's spent thousands of dollars on development, engineering, and engineers.

Always try to address your letter to the proper department. If you have trouble with ham gear, contact the customer service department. A person's name within that department is helpful but unnecessary. Always keep a copy of the letter you have written. That way you can better understand his reply; and in case of an unsatisfactory reply, or no reply, you can forward copies of your original letter and a hovering letter of explanation to both sales manager and president of the company. (This action should only be taken when absolutely necessary).

After Writing the Letter

When the letter is written, go back and reread it. Better yet, have a friend go over it. Is it clear and to the point? Is it void of emotion and unnecessary detail? Have you supplied all the details of the situation? Did you give the name and number of the gear, along with the conditions of its purchase? Have you described the problem and the steps you've already taken to remedy it? Did you say what kind of information you want in your return letter? Can your friend understand the letter in all details? If he cannot, start again from scratch. If he can, send it. You've helped the manufacturer help you!

QST



NO USE BLOWING YOUR STACK IN A LETTER...IN THE FIRST ONE, ANYWAY

if *he* thinks you can trouble-shoot the gear in question. Remember, you might be fine on audio circuits, but what about sideband exciters? Do you have the proper tools and knowledge? It's best to check with the manufacturer (if the service manual doesn't tell you what is needed). Ask him before you try an alternate method of aligning or adjusting your equipment. If your method were recommended, it would be in the manual. Remember to

The Junk Box

BY J. T. MARTIN,* K4RVG

I SUPPOSE every ham worthy of the name has his own motley assortment of electronic components lying about his shack, or stashed away in some container which is commonly known in the fraternity as the junk box. Many of our number contend that it is quite possible to construct practically any kind of ham gear with only ingenuity, and parts from these boxes. After having done a considerable amount of research in this field, I am forced to take exception.

I have read numerous articles describing everything from transmitters to musical instruments which the writers allege can be built from cast-off parts, but after personally attempting the construction of several of them, I found myself

* Beaver Dam, Kentucky.

shopping for a goodly number of new parts, or chucking the entire mess back into the box. Come to think of it, I guess that's how I collected all that stuff in the first place.

I am forced to conclude from all this that either the authors of these junk-box fantasies have more elaborate boxes than mine, or else they choose their junk more carefully before throwing it into the box.

So I thought I'd just ask and see what *has* emerged from junk boxes. I have got the fellas at ARRL to agree to look at pictures of some of the gear that has been constructed 100 per cent from junk boxes (if there really are such things).

It has got to be *all* junk-box, now; no store-bought ringers. Send photos and info to QST, and mention what it is and does it work.

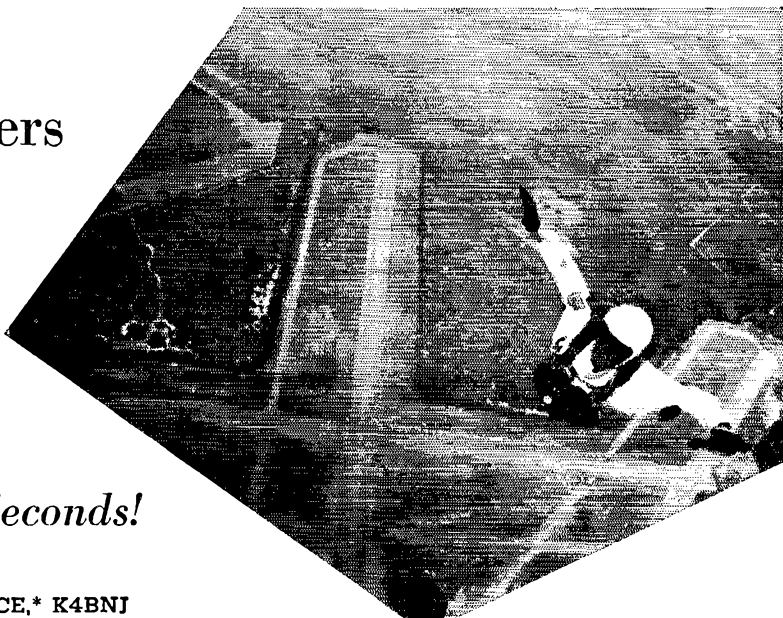
And then maybe QST will print the cream of the home-brew crop. Send 'em in — to them, not me — and let's get the *true* story about junk boxes!

QST

200 Meters

Down...

In Three Seconds!



BY H. C. PIERCE,* K4BNJ

THE First Annual Spaceport Invitational Parachute Meet, an authorized Parachute Club of America event, was held at Titusville-Cocoa Airport near Cape Canaveral (now Cape Kennedy), Florida, June 28-30, 1963. More than 5000 spectators gazed upward as skydivers from 26 states and the Bahama Islands sailed from the sky in more than 400 contest parachute jumps aiming at the center of a 100-foot target circle. Communications for the event were supplied by the Amateur Radio Club of Titusville, Florida.

In April, the Titusville club was asked by the local Junior Chamber of Commerce if we would supply communications for a week-end skydiving contest. While the Jaycees made necessary preliminary arrangements for the contest itself, the radio club began discussing ideas for the communications portion of the event.

Getting Ready

The Jaycees presented two specific requirements which we had to satisfy. First, a radio link to the FAA field office in Melbourne, Florida, about 50 miles south, would have to be available at all times. Second, a network of mobile vehicles

* 80 Lakeview Avenue, Titusville, Fla.

Skydiving has become a national sport, and parachuting contests are being held regularly throughout the country. Here's what happened when amateur radio went to a sky-diving contest. Details in this article can give you some ideas for your own club's community projects.

At the first annual Spaceport Invitational Parachute Meet near Cape Kennedy, Florida, divers tried to hit the tiny target circle at the bottom tip of our picture. Amateurs from Titusville and Melbourne provided communications for the event. (Graham/Gay photo)

and spotters operating within a five-mile radius of the airport would have to be able to communicate with a central control point for convenience and safety purposes. All mobiles would have to receive FAA clearance through this net before entering the runway areas. The two-meter band was chosen for both requirements because of low QRM and QRN levels, and because more mobile equipment was available there than on any other band.

Supplying communications for this event required long hours of planning. Many meetings were held with other groups. Bruce Hoover, K4KON; Walt Speake, W4SX1; and John Stephens, W4YXG, did coordinating of the project for the Titusville radio club, making sure our plans fitted into the plans of other groups. At Melbourne, Ted Woodbury, WA1DJ1, carried out similar work, and arranged for the ham installation at the FAA field office.

The planning stage passed quickly, and then check-out sessions were held and evaluated. Finally, the preparations were completed, and we were ready to go.

The Contest

Friday, the first day of the meet, was rained out, and events from this day were fitted into the schedules for Saturday and Sunday.

Saturday's and Sunday's events then had to

be much more tightly timed. We started operations at 6:15 A.M. each day with the first jumps at 7:15 A.M. The events ended at 6:00 P.M. on both days. All amateurs who turned out for the project put in six to twelve hours straight, which is a long time under the bright Florida sun.

Four fixed and six mobile units were used at the meet. The unit on the Melbourne link and the net control unit were powered by a gas-driven alternator. These units were in a van used as the meet control center which also housed a portable control-tower system brought in by FAA to control local air traffic at the airport during the meet. The remaining fixed units used commercial power. One was located at the airport entrance area, the other on the platform of a 50-foot beacon tower. (K4RLK spent two days up there under an umbrella relaxing in a lawn chair ready to report any jumper who landed outside the target area.) One of the mobile units was installed in a boat patrolling the Indian River about a half-mile from the jump area. Fortunately it never had to be used during the meet, but it was ready and available. The rest of the mobile units were in cars, trucks, or jeeps.

Lists of operators and calls to be used at each unit location were supplied to each amateur radio operator who helped on the project. Also, each was given a map of the area crosshatched with coordinate lines to aid in locating and rescuing any jumpers who landed in the rough



Author Chuck Pierce, K4BNJ, at the mike of one of the fixed units during the skydiving contest.

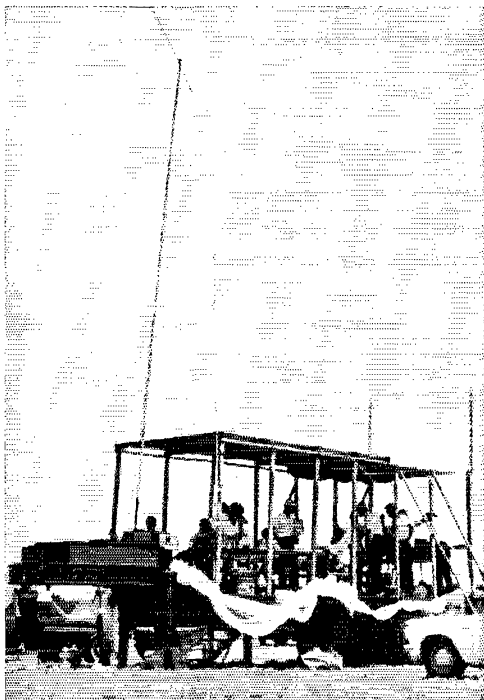
scrub woods and marsh which surround the airport.

Communications were maintained throughout the period, except during replacement of an alternator which failed, and when water got into some units during an afternoon thunderstorm. All units were repaired immediately by replacing tubes or, in two cases, cleaning and adjusting relays. In preliminary checkouts, some d.c. cables for mobiles had to be reworked with larger wire to reduce voltage loss in the cable and accompanying loss of receiver sensitivity and transmitter power. Whips mounted inside mobile vehicles did not allow good operating range. They were replaced with ground planes mounted outside.

At the FAA field office in Melbourne, Florida, WA4DHI established a portable station and, with the help of W4TL, K4YWC, WA4JDB, and WA4OVG, kept it in operation through the contest.

Equipment generally was integrated into a working system without difficulty, although narrow i.f.s in some units presented some problems since the crystals in all units were not exactly on the same frequency, and one unit with a superregenerative receiver caused some interference from radiated detector noise whenever it got too close to other units. Titusville amateurs who participated are W4BME, W4LSK, W4MKG, W4SX1, W4TRH, W4YXG, W4ZYM, WA4CVZ, WA4FVL, WA4GVG, K4BNJ, K4EOS, K4KON, K4NOG, K4RLK, K4RUW, K4SJC. Melbourne hams who participated are W4TL, K4YWC, WA4DHI, WA4JDB, WA4OVG.

QST



The meet control center was on this truck. Amateur equipment and antennas are on the left, FAA's portable "control-tower" system on the right, and contest officials and records keepers in the middle.

Strays

A1, K1QHP (of ET3USA) expects to sign FL8AK again from Djibouti, Africa, June 4-14. The frequencies to watch are 21,040 and 14,040 kc., c.w. and 21,250 and 14,250 kc., s.s.b. He may also try 3510 and 7010 kc., c.w. Send QSLs and s.a.s.e. to K7UCH.

A Variable-Level Receiver Muter

Simple Transistor Switch for Break-In Operation

BY GRANT C. SCHAFER,* WØDBO

The muting system described here by WØDBO works with grid-block-keyed transmitters. Although described specifically for the Heath Mohawk receiver, it is adaptable to many other types.

As c.w. proficiency increases, most hams begin casting about for better keys, electronic keyers, electronic t.r. switches, and the like. After I built my keyer, I decided that the electronic t.r. switch would be a desirable addition, and one was put together out of junk-box parts. The switch itself performed nicely on the first try, but immediately a serious problem presented itself. I wanted to use the receiver for monitoring my own signal without ruining my eardrums. This called for some sort of muting system, preferably one that would permit setting the monitoring level at any desired point.

My equipment consists principally of an Apache transmitter employing grid-block keying, and a Mohawk receiver. On standby, the receiver is muted by inserting additional cathode-biasing resistance in a return common to the r.f. stage, two i.f. stages, and the output audio stage, as shown in Fig. 1A. The standby switch merely shorts out this extra resistance in the receive position, restoring normal biasing voltages to the stages mentioned. External connections to the standby switch are available at Pins 1 and 6 of the accessory socket.

The first step in modifying this circuit for automatic muting was to replace the fixed resistor R_1 with a variable control, R_2 , as shown in Fig. 1B. The standby switch was removed, and the control installed on the panel in its place. Since muting of the audio was not necessary, the 330-ohm cathode resistor of the audio output stage was returned directly to ground.

The next step in the development was to devise an electronic switch that would short out R_2 to restore normal receiver gain when the trans-

mitter key was open, and "unshort" it when the key was closed. The circuit of this switch is included in Fig. 1B. The diode CR_1 is polarized so that it isolates the base of Q_1 from the negative blocking voltage appearing across the key terminals when the key is open. Thus the base of Q_1 is open and Q_1 will not conduct. The base of Q_2 , however, is biased forward by BT_1 , and Q_1 will conduct cathode current of the controlled stages. The output resistance of Q_2 under this condition will be so low compared to R_2 that it will constitute a virtual short across R_2 , and receiver gain will be normal.

When the key is closed, CR_1 is returned to ground through the key, and forward bias from BT_2 will be applied to the base of Q_1 via CR_1 . Q_1 will conduct, drawing collector current through

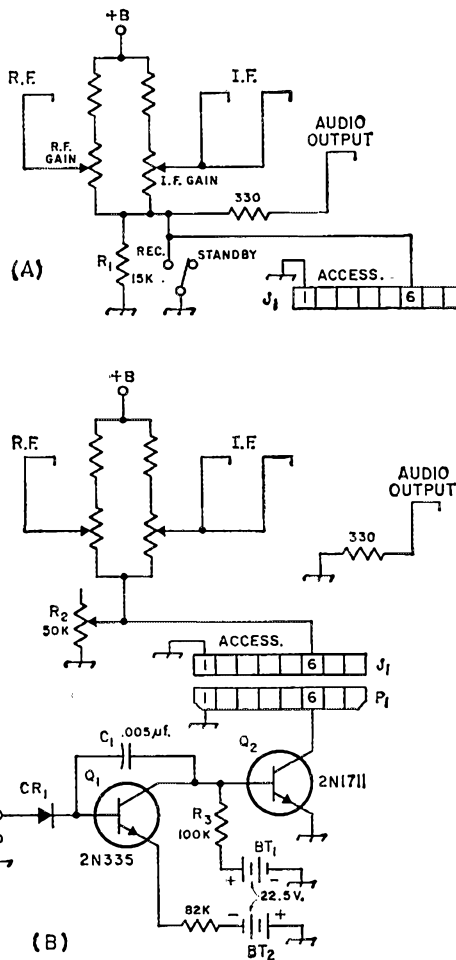


Fig. 1—Circuit of the transistor muter as applied to the Heath Mohawk receiver. A shows the original connections. B shows modification of the Mohawk wiring, and the circuit of the muter. The latter is applied to the receiver through the accessory receptacle, J_1 . Resistances are in ohms and fixed resistors are 1/2-watt composition.

C_1 —Ceramic.

CR_1 —See text.

P_1 —Octal plug.

R_2 —Linear-taper control.

Other component designations are for text-reference purposes.

R_3 . The resulting voltage drop across R_3 will reduce the forward bias on the base of Q_2 , and Q_2 will cease conduction, opening the short across R_2 and muting the receiver to the level set by R_2 .

C_1 was added to suppress a switching transient that generated a click in the headphones. The value shown is suitable for keying speeds up to about 35 w.p.m. At higher keying speeds, the value will have to be reduced if the muting circuit is to recover fast enough between dots and dashes to enable the operator to distinguish a breaking signal.

Construction and Adjustment

The greatest items of expense in the construction of this unit are, of course, the transistors. My unit was built from junk-box parts, but the cost for all new components would probably be about \$8.00, including batteries. Some experimenting may produce a less-expensive combination of transistors for this circuit. The 2N1711 was used because of its relatively-high voltage rating, its ability to function on a very small signal, and its very low leakage characteristics. The latter quality is very necessary; if there is too much leakage through Q_2 , the receiver will not be completely muted and the monitor-level control R_2 will not be fully operative. A 2N1613 is a slightly less expensive substitute for the 2N1711, and performs just as well. CR_1 can be any diode of low forward resistance and capable of handling the voltage at the key jack.

There is nothing critical about the layout of the few components in the muting circuit. The transistors should be placed where heat from other components cannot reach them.

The whole unit was built on a phenolic board, about 1 by 2 inches in size. Holes were drilled in

the board to provide a friction fit for the transistor cases.

Before connecting the muting circuit, the voltage between Pins 1 and 6 on the accessory socket should be checked with R_2 set at maximum resistance. The maximum collector-to-emitter voltage rating for the 2N1711 (Q_2) is 75 volts, and this should not be exceeded. In operation, R_2 is used at about mid range, so the voltage is considerably less than the permissible maximum. However, if it is desired, a maximum value can be selected for R_2 that will assure that the maximum of 75 volts will not be exceeded.

If battery voltages other than those shown are used, the proper values for the two resistances can be found most easily by experimentation with variable resistors. I use the 22½-volt batteries in my keyer to power the muting circuit. Different sources of power can be used, and the voltages are not at all critical if the resistances are changed accordingly. At one point I powered the circuit with 3 volts and it functioned properly. The battery drain is very modest. Under key-up and key-down conditions, the currents (using 22½-volt batteries) drawn from BT_1 are 0.4 and 0.5 ma., respectively; the current drawn from BT_2 varies from 0 to 0.6 ma. under the same conditions.

The muting circuit adds a good deal of versatility to c.w. break-in operation and monitoring through the receiver. In use, the monitored signal has a transparent quality about it in that incoming noise and signals can be heard between the monitored signals with no reduction of incoming signal strength.

This unit has added a great deal of pleasure and comfort to operating break-in on c.w. With a little experimentation and slight modification, it is usable with most receivers and with transmitters employing grid-block keying. QST

NEW BOOKS

103 Simple Transistor Projects, by Thomas Kneitel. Published by John F. Rider Publisher, Inc., Div. Hayden Publishing Company, Inc., 850 Third Ave., New York 22, N. Y. Cat. No. 313. 128 pages, illustrated, 6 by 9 inches, paper cover. Price, \$2.75.

The author calls his book a "cookbook of transistor projects," and the description is fitting for this collection of simple circuits for the electronic buffs. Just about everything that can be made from a couple of transistors and a battery is in these pages. In the introduction, general information is given on the use of transistors, heat sinks and soldering, terms associated with transistors, and where to find parts. An interest check list is a novel feature which indicates whether a project is for amateurs, citizen banders, SWLs, audiophiles, experimenters, or photographers. Among the projects for amateur receiving stations are a frequency standard, a noise limiter, 50-Mc. converter, beat-frequency oscillator, a WWV converter, and a pre-amplifier for 420-Mc. For transmitting there is a 144-Mc. beacon transmitter, an audio test oscillator, field-strength meter, 2- and 40-watt modulators 3.5-28-Mc. transmitters, a cathode modulator, a tunnel diode transmitter for 50 Mc., and a solar-powered transmitter.

Practice Problems in Electronics Calculations, by Alan Andrews. Published by Howard W. Sams & Co., Inc., 4300 W. 62nd St., Indianapolis 6, Indiana. Cat. No. MAH-1. 208 pages, including index, 5½ by 8½ inches paper cover. Price, \$3.95.

Many prospective license examinees find the mathematical calculations necessary for amateur exams a tough nut to crack. They either have forgotten or never learned the algebra required. Author Andrews has written this book for just such a person. A complete review of the basic algebraic operations is followed by an explanation of the basic units, from nanosecond to picofarad, used in electronics. The following chapters cover d.c. circuits, alternating current, a.c. circuits, power supplies, transmitters, and receivers, introducing the reader to the types of problems encountered in these fields with sample solutions. An average of forty practice problems for the reader to solve follows each chapter. Check answers can be found in the back. A chapter on measurements explains the operation of the basic instruments of electronic measurement and the calculations that go with their use. The book also includes a chapter on logarithms, their use, and a set of log tables.

— WILKIE

Antenna Behavior Over Real Earth

Vertical Radiation Patterns Based on Ground Constants

BY W. H. ANDERSON,* VE3AAZ

Patterns showing the vertical radiation characteristics of antennas usually are based on an assumed infinitely conducting earth. The actual performance under practical conditions may be quite different. Here is the result of a theoretical study using typical ground constants, with a comparison of vertical and horizontal antennas that may surprise those who have put faith in the "infinitely-conducting" earth assumption.

THEORETICAL antenna patterns are almost always prepared on the assumption that the earth has infinite conductivity. This simplifying assumption is demonstrably valid for real earth if:

1. The geometry of the signal path is such that the angle between the ray and ground is small — in other words, the paths of interest are not much above the horizon *and*

2. The radio signals are horizontally polarized.

The first stipulation is usually met, if we consider that communications to aircraft and to outer space are the exceptions rather than the rule.¹ The remaining problem is to evaluate the behavior of vertically polarized signals over in-

* 146 Deloraine Ave., Toronto 12, Ontario, Canada.

¹ The author is here considering long-distance propagation, particularly at 14 Mc. and higher. On 3.5 and 7 Mc. high-angle modes are quite common, the ground distance covered by ionospheric propagation often being less than 100 miles. — *Editor*.

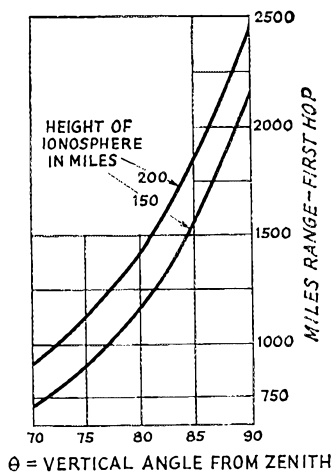


Fig. 1—Distance vs. vertical radiation angle for two ionosphere heights.

perfect earth. Graphical solutions, particularly as related to ground-based verticals on the broadcast band, are readily available. However, at shorter wavelengths where the antennas may be significantly above the earth, the mathematical procedures available are long and time-consuming. Fortunately, they are amenable to computer programming.

Earth, while obviously not perfectly conducting, is capable of many degrees of conductivity. The practice that is often followed is to designate a "poor" earth and a "good" earth so that the majority of practical cases will lie somewhere in between. See Table I. The engineers of local broadcast stations should be able to provide information on specific localities.

Table I

	Good	Poor	Reference
H.F.	$\epsilon = 10$ $g = 0.01$	$\epsilon = 4$ $g = 0.001$	<i>Ionospheric Radio Propagation</i> , National Bureau of Standards
V.H.F.	$\epsilon = 30$ $g = 0.02$	$\epsilon = 4$ $g = 0.001$	Bullington "Radio Propagation Above 30 Mcs." <i>Proc. I.R.E.</i> , October 1947.
ϵ is relative permittivity g is conductivity in mhos/meter			

The angle θ as it is employed in this study means the angle down from the zenith; thus $\theta = 85^\circ$ means $90^\circ - 85^\circ = 5^\circ$ above the horizontal plane. What is usually called "low-angle radiation" thus means " θ s that approach 90° ." Since the main mode of propagation at h.f. involves ionospheric reflection, it will be noted from Fig. 1 that while the distance between the two points on the earth's surface (the range) depends on the height of the ionosphere, it appears reasonable to consider θ throughout the interval 70° to 90° . Fig. 2 shows the distance from the antenna to the point where the signal bounces off the earth. For really low angles of radiation, it would seem quite impractical to try to control the conductivity by ground radials or counterpoises.

With several hundred computations in hand, it is a problem to display them compactly. As one of the possible alternatives, the following approach has been adopted: The vertical antenna used for comparison purposes is a full half-wavelength long and the pattern is, at least theoretically, independent of feed point. (The problems

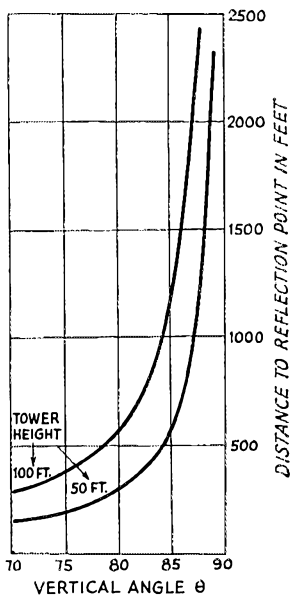


Fig. 2—Distance from antenna to point on the ground where the radiated energy is reflected, for antenna heights of 50 and 100 feet.

of maintaining balance with center feed would certainly not be trivial.) It may be objected that the grounded quarter-wave vertical would have been a more reasonable choice. However, this would not have permitted comparisons based on height since the quarter-wavelength antenna, as such, must be ground-based. Furthermore (and this may not be as widely appreciated as it should be) ground-plane type verticals resemble elevated half-wavelength dipoles in pattern. Fig. 3 shows the additional small factor that can be included if one desires to compare to a ground-based quarter-wave vertical.

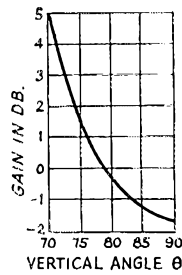


Fig. 3—Gain of a $\frac{1}{4}$ -wave vertical antenna over a $\frac{1}{2}$ -wave vertical antenna, both ground-based, as a function of radiation angle measured from the zenith.

The heights quoted are the center heights of the antenna. For a horizontal antenna, assumed level with ground, this is the unambiguous height of the antenna supports. The vertical antenna will have its upper tip one quarter wavelength higher than the quoted height. However, except on the lowest-frequency bands, this top half will be a whip of some sort so one can argue that this is a valid comparison of the mast heights. All references to antenna heights above 100 feet

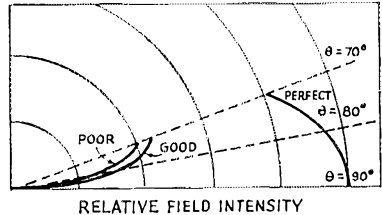


Fig. 4—Relative patterns of $\frac{1}{2}$ -wave vertical antennas at 14 Mc., ground-based, for various earths.

have been dropped so the charts to follow do not include, for instance, 3.5-Mc. antennas one wavelength and higher above ground.

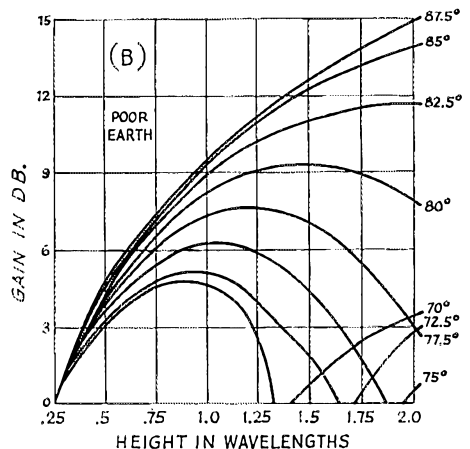
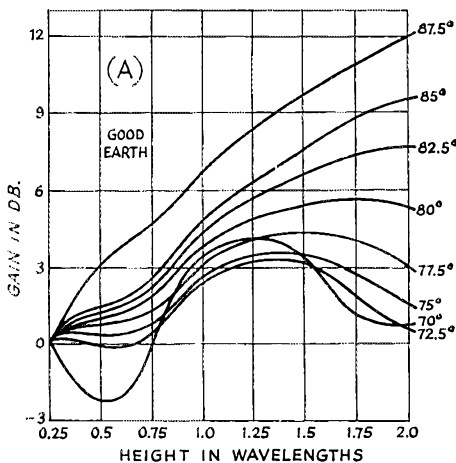


Fig. 5—Gain of a $\frac{1}{2}$ -wave vertical antenna at indicated height over the same antenna ground-based (center $\frac{1}{4}$ wavelength above ground).

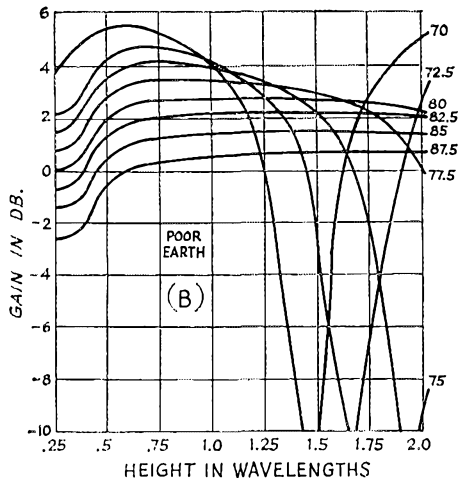
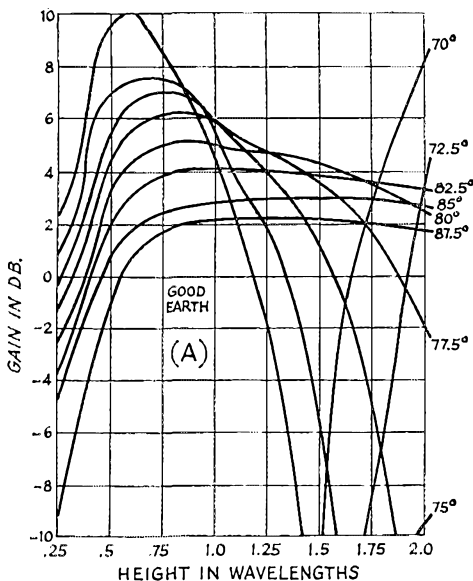


Fig. 6—Gain of a $\frac{1}{2}$ -wave horizontal antenna over a $\frac{1}{2}$ -wave vertical antenna, both at indicated height. The curves apply only in the horizontal direction broadside to the horizontal antenna.

The High Frequency Case²

Fig. 4 shows the pattern of a 14-Mc. half-wave vertical antenna with its center one-quarter wavelength above poor, good, and perfect earth. This pattern will be repeated in the left-hand quadrant since such an antenna is nondirectional. It cannot be too strongly emphasized that the pattern has a finite (non-zero) value at $\theta = 90^\circ$ only when the ground conductivity is infinite. That is, a complete null will appear at the horizon even over sea water, which has about the best conductivity of any large natural surface. Furthermore, this null would appear even if the earth were a silver-plated copper sphere.

² Schelkunoff and Friis, *Antennas, Theory and Practice*, John Wiley & Sons, Inc., New York.

Only with infinite conductivity does the null at 90° disappear. Since there is a null here with horizontal antennas regardless of conductivity, the "low-angle radiation" comparison of the antennas becomes a matter of how the pattern increases from zero as θ backs off from 90° .

Figures 5, 6, and 7 give three comparisons made in the light of the aforementioned definitions and limits. Each line for a given θ may be considered to be the center of a family which would consist of one curve for each band — 3.5, 7, 14, 21, and 28 Mc. To show them all would hopelessly clutter the diagram, so let it be noted that the "spread" of the family is negligibly small except at low heights. In Figs. 6 and 7 the 87.5° curve has been drawn for the low-fre-

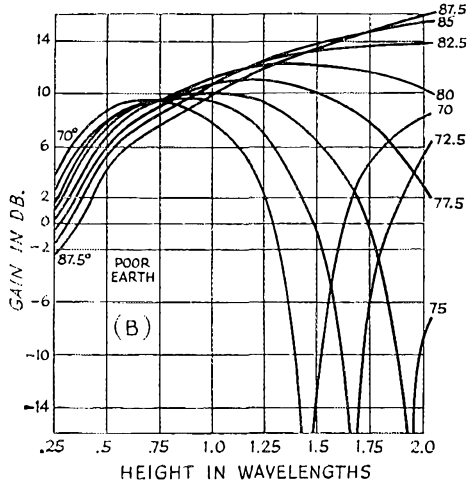
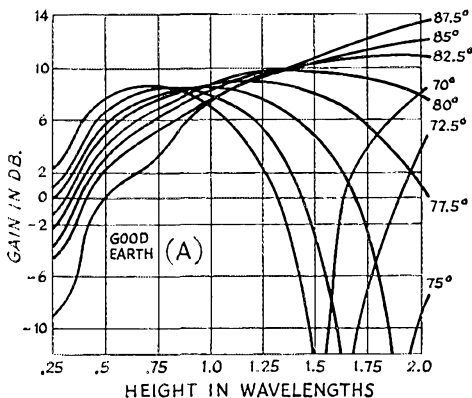


Fig. 7—Gain of a $\frac{1}{2}$ -wave horizontal antenna over a $\frac{1}{2}$ -wave vertical antenna with its center $\frac{1}{4}$ wavelength high, measured broadside to the horizontal antenna,

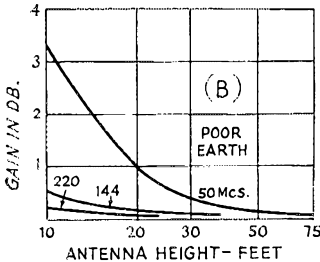
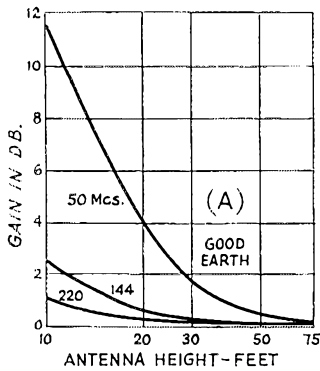


Fig. 8—Gain of vertical over horizontal $\frac{1}{2}$ -wave antennas both at the same height, surface wave.

quency limit at this θ while the 70° curve outlines the high-frequency limit. The opposite combination exists in Fig. 5.

The sharp cusps in the 70° , 72.5° , and 75° traces result from nulls in the horizontal-antenna lobe pattern at certain heights. Conspicuous sharp nulls of this sort do not occur with the vertical over real earth. Another point that must not be lost sight of is that the plane of comparison in all cases is at right angles to the wire. Since directions (N, SW, etc.) refer to a horizontal plane, the horizontal antenna only performs with the indicated gain (Figs. 6 and 7) in two directions — at right angles to the wire — while the vertical is nondirectional. No antenna achieves gain in any other manner than by pouring its

output through lobes whose cross section is smaller rather than larger, so relative gain in a certain direction (both horizontal and vertical) must be balanced by relative loss in other directions. On the basis of these graphs of h.f. antenna behavior, there seems to be very little to be said for vertical polarization, except for this non-directional feature, unless high-angle (short distance) paths are positively desired.

The Very High Frequency Case³

The standard modes of v.h.f. propagation are:

1. The direct wave
2. The ground-reflected wave
3. The reflected or scattered wave
4. The surface wave.

The surface wave, unlike the first three, is invisible on the usual ray diagram since it arises from the energy being accepted by the earth but not being completely absorbed or completely reflected, the balance being reradiated with an amplitude and phase angle that depends on the ground constants.

Since ionospheric reflection and scattering is a sporadic effect, it has been omitted from consideration here. (It may be considered as an extension of the h.f. case — see above). When one recalls that the horizon is only about 14 miles distant (permitting a range of 28 miles) for a 100-foot tower above a spherical earth, it does not seem reasonable to devote much attention to true line-of-sight situations. On the basis that the surface wave is the dominant mode, a number of computations leads to the summary shown in Fig. 8, which assumes equal-height antennas at both ends of the circuit. For unequal antenna heights, a good approximation may be obtained by averaging the number of decibels for each height.

There would seem to be little to choose, on the basis of antenna behavior, between vertical and horizontal polarization unless antenna heights are low and the path is over good earth, in which case vertical polarization has a measurable edge.

QST

³ Jordan, *Electromagnetic Waves and Radiating Systems*, Prentice-Hall, Inc., Englewood Cliffs, N.J.



Strays MEMORANDUM

On April 27, 1965, QST Assistant Technical Editor W1TS worked his 1000th different Asian station (since 1957). Several days later a few of the DXers on the ARRL Headquarters Staff took note of this occasion by presenting Don with a handsome engraved plaque commemorating an outstanding DX achievement. Through many decades of DXing, Don has used no more than two hundred watts, groundplane, ordinary location, a superlative pair of ears and infinite patience.

The Anatomy of Public Service Communications

Part 1: How John Hamm Got His ARPSC Started.

BY GEORGE HART*, WINJM

A CERTAIN midwestern area of the U.S. is visited by a low pressure storm system of wide extent. The Weather Bureau puts out tornado warnings over the entire area and some of the more active amateur nets stand by for possible action. Things look pretty bad.

Then suddenly a tornado funnel forms along the western edge of Southport, a small city in the southeast corner of the state of Winnemac, literally tearing a hole in it. Damage is severe. Several people are killed, and many more are left homeless and destitute. Communications are completely annihilated.

Fortunately, Southport has a super-active AREC-RACES organization under the control of an ARRL emergency coordinator with experience and background. His boys are well-drilled and ready. Emergency communications are established with strategic points by amateur mobiles and fixed and portable stations, inside and outside the critical disaster area, in jig time, all in accordance with a prearranged plan. There is no panic, no momentous decisions, no "big deals." Why should there be? Everyone knows just what to do, and how to do it.

Amateur circuits are set up to carry on until regular communication can be restored, with mobiles quickly deploying to places they are needed most. Installations located at police headquarters, at the Red Cross, at c.d. headquarters are activated by their preassigned crews, mobiles quickly arrive at other points where communications might be needed, such as hospitals and first aid stations.

Officials of all these agencies, having been previously contacted by the EC and worked into preparedness plans, start right in using AREC facilities. Some of the equipment was purchased by the Red Cross, some is c.d. gear purchased for RACES use, but there is no distinction between RACES and AREC in Southport, and this particular emergency automatically comes under the AREC aegis because it concerns a natural disaster.

Utopia? Of course. That's why we are describ-

* National Emergency Coordinator, ARRL

ing it. Here is a city set up the way it is supposed to be set up. What we want to tell about is how it got this way, in the hope that it will help you to get *your* city into the same kind of shape. Then we'll try to show how the developing emergency situation was handled.

John Hamm, Esp.

This, essentially, is the story of John Hamm, WA0XIII. He wasn't always an amateur (although he was, of course, always a Hamm). As a small boy, he was average, just as you were (or are). One year for Christmas his parents bought



him one of those little do-it-yourself electronics kits, and he developed an interest in it. It so happened that his science teacher in school was a licensed amateur, who mentioned to John that the local radio club offered a course in radio theory and code, and eventually John enrolled. It took only one evening a week, with some practice on the code in between times, and it was a lot of fun, with many other kids his own age in the class. In no time at all, John took the test and became WN0XIII. Thus began his career as a licensed amateur.

John Hamm had a good time during his short novice career, working on 80, 40 and 15 meter c.w., and even on 2-meter phone, but he often listened longingly in the general class band and

Emergencies have a bad habit of occurring where preparation is poorest. Amateurs always show up, nevertheless, and always do a creditable job. Supposing an emergency occurred where preparation is at a peak of efficiency — how much better a job could be done? In this series, we intend showing just how it could be done, in narrative form; but first, we want to sketch the background to show how the organization got that way. Believe us, it doesn't just happen.

very soon decided that staying a novice wasn't for him. The theory came to him rapidly, because he liked working with the soldering iron, and his code speed quickly increased as he pounded brass on the c.w. novice segments. He got his RCC certificate and got started on his WAS, but the operating restrictions annoyed him and before long he was heckling his father to take him down to St. Loo for the general class exam. Naturally, he passed it with ease.

As a full fledged amateur, John Hamm started out as most of us do, working DX, rag chewing, getting into contests, collecting certificates and in general enjoying the hobby. He joined the League and got his WAS, his DXCC, voted for his SCM and director, read *QST* and other magazines, and did quite a bit of constructing. As the years passed he built transmitters, put up antennas, even had a crack at a receiver project. Inevitably, he joined the local club and became involved in its many projects, and wound up as secretary. After he had been general for a couple of years he had another opportunity to go to St. Loo where he took the exam and qualified for his extra class license.

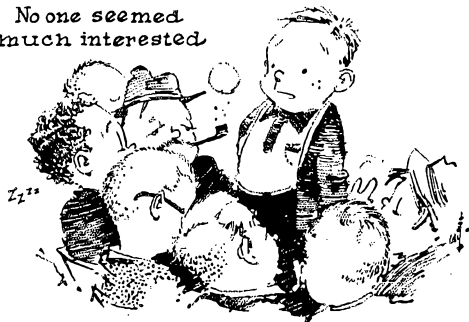
John was a good all-around amateur, no doubt about it. He worked both phone and c.w., did some work on RTTY, monitored OSCAR, served as FD chairman for the club. A little bit of everything, did John, just following the paths of his inclinations from year to year. Everything, that is, except the most important thing.

John Grows Up . . .

But John was growing up. After a few years he began to get just a little bored with it all. He had had a crack at just about every phase of amateur radio, and it was most interesting and educational, not to mention being a great deal of fun; but something was missing. He decided to take a vacation from hamming, maybe concentrate on another hobby for a while.

This was fine, but it still didn't quite satisfy his urge to do something constructive. He had reached the age where "fun" was no longer enough; he hankered for something deeper, more lasting and meaningful than that. If he hadn't been a ham, no telling where this urge may have led him. As it was, he started browsing through his back issues of *QST* and the Handbook, and was surprised to find that there was one phase of amateur work he hadn't quite touched — Public Service.

No one seemed much interested



He brought up the subject at club meeting, but no one seemed to know much about it. What was more, most of the gang didn't seem much interested. No wonder, thought John, that this part of amateur radio had escaped him, and the more he thought about it the more interested he became. He wrote to headquarters asking for information.

What he got back was surprising. Two of the publications, the Emergency Communications Manual and Operating an Amateur Radio Station, he had received before, but never read them very carefully, then had completely forgotten that they ever existed. The third one was marked CD-24 and described the National Traffic System, which he had never even heard of — and yet it seemed to be quite a tight, nationwide organization. Also enclosed were a couple of AREC registration forms.

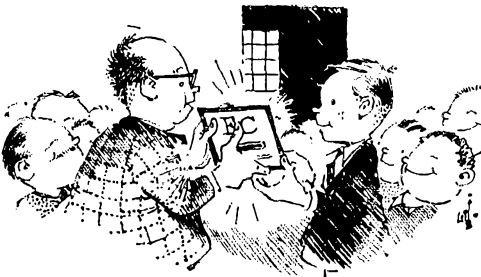
John decided then and there that it was time he started looking into things. He got out his back issues of *QST* and started reading the Public Service page and articles on this subject. Surprising how many of them there were; he had just glossed over them before. As he leafed through these back issues, he gradually accumulated an understanding of what ARPSC was all about. That was some flood they had in 1955, when he was just a boy, and what a job the amateurs in New England and Pennsylvania did! There were writeups, large and small, about hurricanes, fires, ice storms and blizzards. Look at the spread about the Alaska earthquake in 1964! He knew amateurs had been active in it, but somehow he never identified any of them with himself. These were a different kind of amateur.

Going back, he found articles about explosions, tornadoes, and shorter writeups covering every conceivable type of emergency: lost persons, accidents, wrecks, personal emergencies, commercial equipment failures, illness, downed planes, ice jams, landslides — you name it, it has been in *QST* somewhere, some time.

But one thing seemed to be lacking in most of them: *preparedness*. True, amateurs responded to the call and hustled around trying to find out what needed to be done and how to do it, and usually did themselves proud in the end. Spontaneity and ingenuity are among the amateur's greatest assets, and they have bailed him out of many an urgent situation. But John could not help but reflect how much greater service could have been rendered in every one of these cases if we had been adequately prepared to render it.

And how much organization and preparations, pray tell, was there in Southport? So little that John had scarcely ever heard of ARPSC. It was never mentioned at club meetings; all they talked about was equipment, DX, contests and miscellaneous club business.

Undaunted by the previous reception his inquiry about public service had elicited, he harangued the club about it at the next meeting. He shouted, pounded on the table, deplored loudly and at length the club's lethargic attitude about doing anything that would be of interest or serv-



Guess who gets the EC job...

ice to someone other than club members, particularly the city or general public as a whole. He made them sit up and take notice.

This kid isn't a kid any more, some of the old timers reflected. Guess we *are* getting kind of set in our ways and behind the times, and here's a fiery young fellow who wants to do something about it. Sure, some of the members kept right on yawning and wished this young squirt would sit down and shut up; but most of them decided, well, if he wants to do something, let's let him do it. Goodness knows *they* didn't want to take the responsibility or initiative, but they were willing to go along if someone else did.

So, as usual, the guy who did the most hollering got the job to do. The club immediately created a new office, that of communications manager, and John was elected by acclamation. In due course he was recommended to the ARRI section manager to serve as emergency coordinator for Southport. At the club's request, the SCM and section emergency coordinator even visited one of their meetings to present the certificate in person. It was a gala occasion.

... and Sticks His Neck Out

Apparently nothing, but nothing, had ever been done along these lines in Southport before. One of the first things John did was to sign up everyone in the club in the AREC — all except a small handful who said they didn't "have time." From among those signed up he picked some who he felt were qualified to take the lead in certain phases. Joe Schmaltz, for example, was a good v.h.f. man and had the makings of a good assistant EC-V.H.F. Dick Roe had a Red Cross connection, so John designated him assistant EC-Red Cross. Some of the assistantships he left open because none of the club group seemed just the right man for them. He had in mind some of the other amateurs in town who didn't belong to the club.

Next, John called a meeting of all amateurs in Southport and immediate vicinity. He and a few helpers in the club made a frontal attack on the call book, dug out names and addresses and either called them on the telephone or sent them cards. The Red Cross provided a place in the chapter house to hold the meeting. About 25 of the 70 or so amateurs in the area showed up, out of about 50 who promised to do so, and from among them John found a couple who were willing to take on assistantships and who John thought could do a

good job. Most of the rest signed up in AREC on Form 7.

After the meeting, John had a *short get-together* with his five assistant ECs. Nothing officious or overbearing about John. He wasn't the slightest impressed with himself, and he wasn't even sure what he was doing. "Look, guys," he told his committee, some of whom were considerably older and more experienced than he was, "we're starting from scratch and I'm not sure how is the best way to go about this, but ARRI says we ought to start out by contacting some people and see what they need. So tomorrow I'm going to call the mayor's office and see if I can get an appointment. Dick, will you talk with the Red Cross chapter chairman? And Mike, how about setting up a meeting with the c.d. director, we'll go see him together. If possible, I'll get the mayor to give me a letter of introduction to the chief of police, the fire chief and anyone else he suggests who might be able to use us. When we've made the rounds and have some idea what is required, then we'll get together and start mapping out details. Sound all right?"

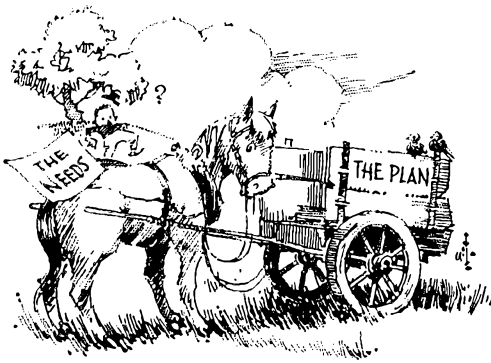
No thinking person always agrees with another thinking person, and there were some questions, some problems raised by the committee, but in general there was agreement that this was as good an approach as any, so each member of the committee was given some groundwork to do and the meeting broke up.

John wasn't especially extroverted, and when he called the mayor's office the next day he felt, all of a sudden, as though he had an awful crust, a youngster like him (he was 22) trying to bend His Honor's ear. He explained his business to the mayor's secretary and there was a pause. Then the mayor himself picked up the phone. With a slight quaver in his voice, John explained who he was and what he was trying to do. Somewhat to his surprise, the mayor invited him to come down and talk about it.

The interview that followed lasted about a half hour and the results were quite gratifying. The police and fire chiefs were contacted, along with the city engineer and public works director, and appointments were set up. When the interview was over, the mayor wished John luck and promised full cooperation.

Encouraged, John went about making his other contacts. He met the editor of the local paper, the manager of the Western Union office, an official of the telephone company, the power and light company, and the managers of the local TV station and a couple of radio broadcast stations. Usually they received him courteously, mostly because he asked courteously and respectfully for the interview. Some showed great interest in the amateur radio project, others listened politely and said they'd let him know if something came up. All seemed impressed, if not inflected, with John's obvious youthful enthusiasm and vigor. It was an interesting and progressive series of visits.

The civil defense agency and the Red Cross got into the program with both feet at the very start.



Through John's assistants, both promised aid with equipment and facilities to do the best possible job. The assistant EC-C.D. was asked to accept appointment as RACES radio officer, and it was agreed that the RACES and ARPSC programs would be tied closely together, with AREC in charge for normal preparations and RACES in charge for c.d. preparations. Red Cross offered a room at the chapter house, some equipment to set up a station there, and adequate antenna facilities in return for a staff of amateurs to operate and maintain the station. The Southport Amateur Radio Club licensed it as their club station and everybody was happy with this arrangement.

Up to this point the work had been largely preliminary, but it is putting the cart before the horse to build the working organization first, then try to determine what is needed. John now knew whom he could count on, what cooperation he could expect from other community services,

what points needed coverage, and the possible nature of emergencies likely to occur in Southport.

Now the plan of Southport ARPSC began to take shape. John Hamm called his planning committee together and they discussed in detail the results of their interviews. It was decided to set up an amateur radio (ARPSC) control center at the club station at the Red Cross chapter house, to maintain close contact with all services, including c.d. (RACES) which established its own control center at c.d. headquarters. The amateur control center at Red Cross headquarters would be in charge for AREC drills and for emergencies other than war or enemy action. The RACES control center would take charge for civil defense activities and drills and of course in the event of war.

All but a small handful of the AREC gang signed up as RACES operators, and their stations were assigned sub-numbers of the RACES station license, "just in case." John Hamm was the alternate RO under c.d.; the RO was John's assistant EC for civil defense. There was to be no conflict of authority, no confusion, everybody knew just where he stood and just what to do, where to operate, *how* to operate. The plan was set up, agreed upon, and frequently tested. Officials of served agencies were contacted regularly and were in full sympathy and cooperation with the amateur effort because they were included in it.

No doubt things are not quite this rosy in your neck of the woods, but maybe they *could* be if you went about it right. In the next installment we'll discuss how John Hamm's group worked into the nationwide organization of ARPSC.

QST



June 1940

... The editorial this month noted the adoption of the "multiple-choice question" examinations for all classes of amateur operator licenses. It was pointed out that the new exams would continue to require the drawing of some circuit diagrams, and that there would be a few questions involving simple radio arithmetic. The editorial also reported the opening of a segment in the five-meter band to frequency-modulated voice transmission.

... Technical articles this month included "More on Extended Variable Crystal Control," a continuation of information on the subject from last month by W1JPE (now W1DX), and two articles on amateur TV, "A New Iconoscope for Amateur Television Cameras", by Jim Lamb, W1AL, and "A Receiver for the New Amateur Television System", by J. B. Sherman, George Grammer, W1DF, came up with an article on 56-Mc. f.m. transmitting methods and ways to check linearity and deviation. "The Double Vertical Antenna", by Henry Riesmyer, Ex-W8CHT, showed an element-switching

scheme for two-band operation from a vertical. Henry Rice's (W9YZH) article on "Single-Dial Frequency Control" described a *gang-tuned* transmitter. The accompanying box contained some crystal-balling by the editor who said, "Some day, we imagine, some amateur will build a station with a control panel having one switch to select the band he wants and one dial to tune that band — for both transmitter and receiver."

... Joe Moskey, W1JMY, reported on the Third U.H.F. Contest and Relay, where the top scorer, W3AC/3, worked a total of 32 stations. The winner operated portable at High Point Park, New Jersey from his Plymouth coupe!

... Speaking of u.h.f., Ed Tilton, W1HDQ, was pushing the use of f.m. on u.h.f. in his column, "On the Ultra Highs". A new DX record was sent for 112 Mc. — 200 miles. The record for 224 Mc. still stood unchallenged at 6 miles!

Strays

Lew Clement, WA3CKE, and Howard Cookson, W6GW, met at the sideband show in New York through the assistance of W3ZP, and discovered they had previously met more than 50 years ago when they were members of the Bay Counties (Calif.) Wireless Telegraph Association with the calls SAG and SHC.



Correspondence From Members -

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

INCENTIVE REACTIONS

☐ I cannot escape the feeling that what the FCC proposes would be a good thing for us all. Needless to say, something has to be done. The conditions on the bands, the enormous rise in the numbers of licensed amateurs, the equally enormous decline of technical ability and operating practices speaks loudly for the sort of action proposed.

Doubtless this will cause a major explosion among the rank and file. The proposed call letter changes are cause enough, but any attempt to limit a person to the frequencies he can use will add fuel to the fire. However, I think that it is important for every licensed amateur to keep this fact in mind: whatever we may think of the Commission's actions relating to amateurs in recent months, we must remember that they are, by and large, on our side. We may disagree with them until the cows come home — and this is our privilege — but it must be admitted that they have resisted astronomical amounts of pressure from commercial interests in past years to seriously curtail amateur privileges and band assignments — *W5MVP*

☐ FCC's proposed amateur rule changes are simply horrifying!

Not many years ago 20- and 80-meter phone were opened to any kind of riff-raff, despite the fact that those of us who had passed the Advanced Class examination were supposed to have earned the exclusive right to phone operation on these bands.

Not satisfied with letting every Tom, Dick and Harry with a General move in on our earned rights, now it is proposed to kick the Advanced men downstairs again, making the affront doubly vicious.

If it is necessary to amend the rules, by all means do so for new amateurs, but don't compound foul errors of the past by dragging thousands of law-abiding old timers back into the school rooms with the 12-year olds and the slide-rule boys. — *W7B.V.V.*

☐ I favor a new theory and code exam for all amateurs rather than letting us Advanced Class boys sneak in under a Grandfather clause. This is real incentive licensing, code as well as theory.

I'll take any test, code or theory, that is necessary to keep my amateur ticket with full privileges. I always felt that anything someone else could do in amateur radio I could do, too. But I certainly would be sore after going to the trouble of a new test to lose my good old call. I feel so strongly about this I might be willing to lose the operating privileges rather than my call. Let the boys who flunk the new tests have the new calls. — *W4SMK*

☐ I am specifically in agreement with the petitions submitted which would "Grandfather-in" the old Advanced Class licensees since, as you will remember, it was the most advanced examination available at that time, and the examination was taken in anticipation that the Commission would re-activate

rules similar to the pre-war Class A privileges. Therefore, in this regard I am against down-grading of the Advanced Class license to General Class. — *W3TLG*

☐ I would like to register my feelings against the proposed FCC changes which would ride roughshod over Advanced Class ticket holders which I have been since 1935, by demoting them to General Class with no special consideration for past experience, etc. — *WA4FHP*

☐ It does not seem fair to take anything away from anyone when they have already earned it, by examination or "required time period." — *W3ARM*

☐ Hurray for the FCC! It's about time we provided a little stimulus for technical interest in our hobby.

As a former commercial license holder (and present holder of the Advanced Class ticket), I know that I'm going to have to do a little studying, but I don't think it will hurt a bit. — *W2VZF*

☐ It is like voiding a diploma that was earned in school, or college, and asking a person to take another exam, or lose the diploma.
Nuts to FCC. — *W3OTW*

☐ Have had an Advanced ticket 28 years. I am heartily in favor of new FCC proposals for First and Extra Class tickets. Here finally is an incentive worthy of the real amateurs. Good luck! — *W5IKE*

☐ One of the prime purposes of the amateur radio service is to better the state of the art, a prime reason given for the proposed changes. However, it must also be recognized that the service affords a wonderful hobby to many men and women who would not, or cannot, hope to qualify to the requirements of the upgraded license. In short, these amateurs will lose certain privileges that are rightfully theirs, having passed an FCC authorized and controlled examination.

I find no fault with the intent of rewarding those amateurs who have the desire and ability to pass the upgraded requirements. This is as it should be, however, it should never be done in a manner that will restrict the rights of others. I can think of no walk of life where such unethical practices are employed. Once a man earns a degree, a certificate, a license to drive, to practice law, or any other accomplishment, the privileges thus afforded are never revoked unless they are misused. Misuse of the privileges is generally punishable by a fine, suspension or revocation. — *WA2NWR*

☐ It would be impossible to devise an incentive licensing plan which would not hurt many amateurs, at least temporarily. The FCC proposal seems to embody the minimum of injury to any one group of licensees yet give the maximum incentive for improvement. The need for a general up-

grading of our skills, for the reasons stated in the proposal, is too compelling and too vital to the future of amateur radio to ignore any longer. I urge the League to support this plan, substantially as proposed. If we work to acquire the knowledge and skill we need to meet these new requirements, we will all benefit and no privileges need be lost. — W4WQZ

¶ It certainly is in order for all of us to become more current with the state of the art technically and operationally. As a matter of fact, I thought the FCC's proposal might have been even more stringent. As it is, I believe, any amateur who is at all interested in bettering his hobby can only agree that this is a step in the right direction. — W4VCJ

¶ It sure looks as if you have finally forced the hand of the FCC and made them suggest measures impalatable to many of us. I think you have thereby wrecked the ARRL and the ham cause.

In protest I ask you to cancel my subscription to *QST* and my membership in ARRL — now! — K3OJA

¶ Now see the mess that the ARRL has gotten ham radio into. The FCC plans to take away the majority of the 1.6 bands from the General Class, and they even plan to re-issue the amateur call signs. — W1AXB

¶ "Win or Lose", by W0LJO on page 55, April *QST*, is deserving of reprint, wide distribution, especially through those sources of information now subscribed to by "Drop Outs", (former ARRL members who reject anything prefaced by ARRL). Even the Dropouts might read and understand this appeal to their reason if they read it.

If, ARRL and *QST* ain't always right, it is all the hams have — and dropouts and walkouts don't vote. — W0VEA.

¶ I had planned to renew my membership in ARRL before hearing the latest from the FCC. It now appears that I belong to a minority who lost the struggle. I am sure that the League is proud of the part that they have played in creating complete and total confusion in the ranks of the amateurs.

I will not give up my efforts to serve in some way through amateur radio as long as I am permitted to do so. However, it will not be through any connection with the League. — K4WJU

¶ I cannot think of a fairer or more appropriate settlement to the need for an incentive program in the amateur ranks than that recently proposed by the FCC. I recognize that this program was stimulated by the League proposal and that it bears many of the features of the original League proposal. For this my hat is off to the ARRL and the FCC — the future of amateur radio is assured and rests in very good hands. I will wholly support this proposal on and off the air. — W6ZFL

¶ As Emergency Coordinator of Wayne County, Michigan, I feel that this proposal will destroy the usefulness of a large segment of the amateur population insofar as disaster planning is concerned. At a time when this county is in need of more manpower for AREC, there is apathy and lack of interest due to the feeling of many licensees that this proposal will be the forerunner of regulation that

will completely destroy our hobby, as we know it.

Speaking now only as an amateur and a League member, I feel that the proposal will hurt the over-all growth of our hobby by discouraging new people from joining our ranks at a time when we need numerical strength to fight the assault on our frequencies at the coming ITU convention. In addition, this proposal if adopted, will depress the market for items of electronics equipment, creating a financial loss to those currently owning gear by depressing the available market. This I believe will also lead manufacturers to reduce their production capacity, thereby doing damage not only to industry but to individual hams who have made their living in the electronics industry related to amateur equipment. — K8VRQ

¶ The technical requirements alone will arouse the interest of every progressive amateur in the U.S.A., i.e., the written test will make it necessary for the poorly developed licensee to pull himself up by his bootstraps and try to match the technical ability of the rest of the world's amateurs. In short order our amateur's technical understanding will improve a hundred fold. We can truly have a vast reservoir of competent operator-technicians in the very near future. — W7ORB.

¶ It is immediately evident upon reading Docket 15928 that the docket is in no measure an attempt to either remedy or rectify the crowded conditions and resultant interference and confusion prevalent on the amateur bands at the present time. Instead, it can be clearly seen that Docket 15928 is a well calculated and clearly defined plan to reward those, and only those, who are willing and/or able to advance their standing and knowledge of amateur radio and communications technology by granting them privileges denied those less willing or able.

This is quite an acceptable plan and well suited to achieve its goal of giving the incentive to better one's self in the amateur radio service.

However, the only possible result of the band reallocations as suggested in Docket 15928 can be none other than a worsening of the crowded conditions and interference present on the band segments remaining in the use of the General, Advanced and Conditional Class licensees.

In order to alleviate this imposed additional problem and its possibly serious consequences, the only possible course that would be in any way feasible is to provide additional incentive to amateurs by changing the power limitations in effect at present. — W4PEMS

¶ I, for one, am tickled to death to see this whole affair come to fruition — and, "in our time," too! I was beginning to think we might have to wait till, say, the year 2050 A.D., to begin to see some results!

Perhaps now (assuming the ultimate FCC adoption) we may see the hoped-for influx of a better breed-of-cat into the ranks of amateur radio, and the prodding of the incumbent, serious segment of the fraternity re the upgrading of their knowledge and skills. — W6FJI

¶ I have to hurry now to get my Extra. I have been thinking about it for years, but until now there has been no incentive. — W4ZAU

¶ I am studying for the Amateur Extra license and will take the test this summer. Thanks to all the

petitions I've finally decided to take the test. — *K1VPP*

☞ Many people feel that this is a hobby and that FCC is being radical and unjust. What it is actually doing is separating the men from the boys. What good is a hobby if it doesn't present a challenge? Amateur radio must be a sincere hobby and public service, otherwise it is likely to be detrimental to our society. Many people feel that their privileges are being taken away from them. Where they get this idea, I'll never know. There are no privileges being taken away. We are just getting an incentive to work harder to obtain the same privileges. Those people who don't care enough about working for these privileges do not deserve them. — *K1ERI*

☞ I fail to see how the FCC's proposal provides a genuine incentive to amateur radio as a whole. A sound incentive plan yields production as well as status. The present FCC proposal speaks to the latter, not the former. If we're really interested in meeting amateur's mandate, why not incentive licensing on the basis of certified public service; or, impartially-judged technical inventiveness relative to age, occupation, and education; and, why not assign operating privileges according to those accomplished goals which challenge the imaginativeness of the bulk of amateurs, both phone and c.w. operators alike? Adoption of the latter suggests an administrative nightmare, but probably not significantly greater than the one we now face. At the very least, we would not be deceiving ourselves into thinking that we have finally confronted the prime issue: namely, how may we encourage the amateur operator to become a vital force in the field of discovery, development, and community service. — *W2AXH*

☞ It seems that even the First Class should still have something to work for, with all privileges accorded only the Extra Class holders. That one thing to work for would be the choice plum of all the amateur voice bands, the 20-meter voice band. To me, it seems that the choice 20-meter voice band should be reserved for the exclusive use of the Extra Class license holders. Thus would we have real upgrading. — *W6ODX*

☞ On April 3rd I heard the first rumors of the FCC's "proposed rule making" on incentive licensing. I was at the local FCC office on Monday morning, April 5th, inquiring about this even before the Engineer-in-Charge had opened his mail, and he and I read the full proposal together. Amateur exams are scheduled on Friday mornings only in San Juan, so I had to wait until April 9th to take the Extra Class exam, and in the week of waiting ex-KP4AK, who let this ticket lapse several years ago, got sufficiently enthused at the proposal, to go along too. We both passed the exam and are awaiting the license from Washington, and we have several of the other KP4's steamed up enough so there will be at least four others going down in the next two or three weeks. The FCC Engineer-in-Charge, Mr. Klein, told me that he couldn't recall when he had last given this exam, if ever, so look what even a proposal to re-establish incentive licensing has done for Puerto Rico. — *KP4CF*

☞ I think the new FCC proposals are the best news I've heard in a long time. I hope to take the Extra

Class exam this summer in Los Angeles, my old home town. If I can't make it there I'll make every effort to drive the 600 miles to Seattle to take the test later on. — *W7BYG*

☞ If we want to start weeding out incompetent operators, the place to do it is at the beginning. I am of the opinion that those beginners who do pass a more rigid Novice examination might also become better operators. This might be the first step in combating mediocrity within the amateur ranks about which so many operators are complaining. This proposal would also lead the way to upgrading the General and Technician Class license examinations. — *W5GLQ*

☞ Amateur radio is a hobby with both my wife and myself. Both of us work long hours which leave us little time or enjoyment of this, or any other hobby. We passed the same written test as a holder of a General Class license, although we could pass only the Technician Class code test, due to many factors. Both of us feel that, even though we would like to improve ourselves in code proficiency, we have precious little time to devote to it.

If a person has the time to improve himself, more power to him. However, some of us enjoy just what we are doing and the experimenting we do on the v.h.f. bands. We, as technicians, are limited to v.h.f. and have probably done more to further the use of these bands than holders of General, Advanced and Extra Class licenses. We see no reason for a special prefix to be added to any call to show the degree of proficiency in code when code is a very minor part of amateur operation in these days of advanced radio theory and equipment. If those who want to demonstrate superior knowledge of theory and code want to have a special band, special privileges and special calls, I have no objections; however, I would not want to be forced to have my call, or my wife's call, amended by a special prefix to show someone my class of license. If they are interested in what class of license I have, they can ask me or visit my home where the license is posted on the wall in a prominent place. — *K4ROI & K4MLY*

☞ I am all for the proposed incentive licensing—except that I object violently to the proposed call letter changes for the higher grade licenses. What kind of incentive is this? Your call letters become your name "on the air" and who wants to change their name? I have been very active for almost 33 years with the call W9AIW and subsequently W0AIW and hundreds—yes thousands—of "on the air" friends recognize and know me as W0AIW. I am repulsed by the thought of being forced to use WB0AIW or some such call sign with the highest grade license. — *W0AIW*

☞ The call problem is one of emotional reaction. The Conditionals will scream that they are being made second class citizens. The Technicians, most of whom already feel they are second class citizens but don't want to admit it, will scream even louder at being labeled. And a lot of Generals are going to scream very loudly indeed at having to give up their old, cherished calls when they go for a First or Extra to avoid giving up their old, cherished frequencies. I bring up these reactions in order to state that, in my opinion, you should completely ignore them and proceed as proposed. — *K3ZSX*

GENTLEMEN, PLEASE!

¶ The FCC proposal sounds very good even tho I will have to submit to a new examination. What disturbs me, however, is the realization that my call sign which is almost a part of my name will be dropped and I will have to get-on to using a new one.

This proposed change of call is perhaps the worst feature of the FCC proposal. Surely, you must agree with me on this and perhaps with others at the Board Meeting can work out a resolution expressing to the FCC our opposition to this particular portion of their proposal. — *W1BY*

¶ Reference RM-499, etc., FCC Docket 15928. After holding my call for over thirty years, I do not desire a new one. Example: you are John Doe all your life. Suddenly you are told that you are now Joe Doakes. Why? — *W7EJD*

¶ The new FCC incentive program is well intentioned, but why change calls? Old Class "A" and "B" did not require changes.

Total investment in license plates, QSLs, and certificates of all hams in established call plus intangible attachment should not have to be sacrificed.

How about some flexibility by the FCC on this one section? — *W2EEJ*

¶ In all probability, the new calls will be issued in the usual manner with the ascending order of the letters of the alphabet. This can be used to give a belated, but deserved, credit to those that "earned enough" to advance and got their Extra Class ticket without being "lured" by special privileges. Their incentive can be rewarded by issuing to them "single letter" and "early letter" call signs. — *K2ZRO*

1, 2, 3, ?

¶ Oscar III is probably the most significant milestone in amateur radio since our first crossing of the Atlantic. The first communications by satellite on March 10, 1965, gave us an important place in the space age. Congratulations are in order for all concerned with Project Oscar who have given us six years of untiring work and three outstanding satellites. The future of amateur radio lies with those of us who are also willing to make dedicated efforts for progress within our hobby.

We must not forget that without the cooperation of the Air Force and other government agencies, Oscar would still be a dream. — *W1ZYL*

APRIL FEEDBACK

¶ After having very little success with my balanced modulator transformer built from specs in the April, 1964, issue of *QST*, I was extremely delighted to see K5LFS's design in the April 1965 issue. I find that this crate, when used as the transformer core, does a much better job. I used garden hose for the windings and have had excellent results with all tests conducted so far. I hope to incorporate this transformer in an all-band transmitter as soon as my next order of hose comes in.

I had very little trouble with this particular model after I remembered to disconnect the garden hose and had the house repaired for water damage. — *W15ERC*

¶ In his 1000 words of platitudes on behalf of Technicians (Correspondence of April 1965) WA5BTO neglects to mention what we Generals really think is wrong with Technicians. I am afraid that the mail-order exam taken by the prospective Tech does not engender the respect of those who have taken more extensive examinations before official FCC examiners. Technicians are unjustly proud of their 5 w.p.m. code and their mail-order exams. After all, how much respect should be given an examination which the FCC does not consider worth administering? — *WB2DM*

¶ It would seem that WA5BTO would divide the amateur world into two categories: Those with restricted licenses and those with unrestricted licenses. Then he adds on more qualifications. For those with restricted licenses, he blesses with all that is good: Good manners on the air, superior stations, higher interest. Those with unrestricted licenses, he damns with all that is deplorable: Poor manners, uncouth operating tactics, inferior stations, etc., etc.

I would dispute the logic of the assignment of these alleged attributes. In a long lifetime of association with radio amateurs and in over a quarter-century of intimate involvement in technical training, I have come to the conclusion that ability, in its very broad sense, is spread quite evenly across an individual's goals of accomplishment; every individual tends to advance as far as his capabilities and opportunities permit.

If a man has interest, ambition, and capability in one aspect of a vocation, avocation, or hobby, it is highly probable that he'll possess a comparable ability in the other aspects. If he possesses the human drive for recognition that every normal person has, he will strive to attain a recognized status of achievement. In the field of amateur radio, the universally-recognized attainment steps are symbolized by the grade of license to which the amateur has achieved.

This is a pathway to achievement open to all. It requires no test of age. It asks no proof of financial ability. It asks only that one possess an interest and a sincere desire to progress upward.

No one can contest that the ascending classes of amateur licenses represent ascending grades of achievement. The Novice Class requires only a minimum of code, law, and theory. The Technician Class expands the depth of the law and theory requirements. The General Class broadens the requirements by asking a better mastery of code. The old Advanced Class heightened the requirement for additional theory. The Extra Class broadens and heightens; it extends the breadth of the examination to include every facet of amateur radio and also requires a higher degree of mastery of the subjects of code, law, and theory.

A man will advance as far and as fast as his interest and capability permits. He will seek to attain recognized steps of achievement. One who specializes in one field of amateur radio to the total exclusion (even to a working knowledge) of another is not an amateur of radio; he is an amateur of a tiny fragment of radio. — *W5EHC*

MISLEADING AD

¶ I would like to complain about one of your *QST* advertisers. Page 142 of your April issue contained

an ad for "original equipment cartons," by the Original Carton Co., Ltd. Just picturing my 1928 Atwater-Kent model 13 in its original, hand finished carton was too much. So I wrote for one, preclating my letter, of course, to meet their April First deadline. They kept my check, but did not send the carton. Fortunately I did not sign the check with my name, so I'm not out any money. But can you tell me if this is a reliable outfit? — *K8ERV*

FIVE PLUS ONE

¶ Your recommendations in April *QST* of effective spectrum use are timely and certainly deserve the cooperation of all active hams. However, in my opinion a sixth principle should be added: by gentlemen's agreement or otherwise, make a real effort to keep s.s.b. and a.m. fone operation separate in all bands; brassy breakers, nutty nitwits and nuisance networks notwithstanding! — *W7JMK*

REAL HAM SPIRIT

¶ I believe that our organization's development would be of interest to your readers. Over the past year since our re-organization we have:

1. doubled our membership
2. purchased a club rig
3. obtained a room in the school for a shack
4. obtained a club license, WA5LYP
5. affiliated with the ARRL
6. begun code classes
7. and begun theory courses.

In the future for our club we see the purchasing of new equipment, operation over the entirety of the summer, and Field Day operations aboard a cabin cruiser loaned to us for the occasion.

We believe that our club has made remarkable progress over the past year. The handicaps of our limited income have been overshadowed by the helping hands of our principal, Mr. Louis Charbonnet, our trustee, Mr. Omer Lapre, and the dozens of local hams who have donated time and equipment to us. — *James A. Gremillion, Activities Mgr., East Jefferson Amateur Radio Club, Metairie, Louisiana.*

THE DUEL PURPOSE

¶ Bravo to W1RST for his excellent definition of today on the ham bands, in his recent article "Death or Survival." However, his naive inference that DX chasing "serves no truly useful purpose" suggests to me that he is missing the point and ignoring the many dexterous benefits to the operator's co-ordination, patience, timing and

judgment. These traits are undeniably the marks of a good operator and what can be a more "useful purpose" than that which develops not only the science of radio but also the art of its operation. — *K8VRF*

PROPER PRACTICE MAKES PERFECT

¶ What do the hams have against the Novice? I've heard many hams say, "the Novice bands should be cleaned up." I have also read many articles about the Novice. Do you fellas think that a new person in ham radio can know everything at once? The answer is no. The Novice has to have time to learn the proper procedures. If more hams will instruct the Novice on good operating procedures, and stop criticizing them, maybe we can make them good operators.

Many hams won't even talk to a Novice. They just turn the dial on the receiver, and pretend to have not heard him. What good operating procedures can they learn, if no one wants to correct them. Contact the Novice, tell him what is wrong with his operating. I know he'll really appreciate the help from an experienced ham.

OK, Novices, it's up to you also. Get that book out, study those operating procedures, and read on how to send CQ. Stay at your proper power and also your speed. Send carefully. It's not how fast, but how good you send.

Stop your fellow radio operators from criticizing you. Do something about it right now. — *W19LVE*

QNI

¶ Prior to the Alaska earthquake a year ago, it was evident that there was little or no c.w. activity in KL7 territory. Since that disaster, there seems to have been no change in this situation. There is a very weak link in the communications setup here in the west.

The British Columbia Emergency Net, which operates on 3650 kc. with two schedules daily, is admirably placed to help fill the gap, being part of the National Traffic System, with regular liaison with Regional Net 7.

We are ready, willing and able to help. All we need is some c.w. men in Alaska ready to check in regularly, so that in the case of another emergency, we will be able to render better service than was possible in the past.

So here is a challenge to you, KL7s. Come on down to 3650 kc., get acquainted, and help us to extend and improve the traffic service between Alaska and the mainland. With several stations in central British Columbia active on the net, we can provide reliable QSP anytime. — *VE7QQ*



FEEDBACK

In the article on directors, pages 41-43 of May *QST*, the call sign of Director Denniston, is W0NWX rather than W0NMX. In the caption for Director Spencer, the phrase, "former section emergency communicator" should have read "former section emergency coordinator." Finally, Director Eaton holds the call 6Y5BP in Jamaica, rather than in Caymans; he formerly operated VP5BP in Cayman.

There is a newly formed net open to all teenagers on the north east Atlantic coast. The Eastern-Atlantic Teen Amateur Radio Association meets weekly at 0800 EST every Saturday on 3840 kc.

— . . . —

Readers who are alumni of Harvard College or of one of the graduate schools of Harvard are requested to send a QSL to the Harvard Wireless Club, 52 Dunster St., Cambridge, Mass. 02138. The club is interested in finding out who among the alumni are active hams, where they are, etc.

V.H.F. QSO Party Announcement

June 12-13

HERE'S your chance for real v.h.f. fun in the June V.H.F. QSO Party, scheduled for June 12 and 13. This gala operation, open to all amateurs who can work any band or bands 50 Mc. or above, gets under way at 2 P.M. (1400) your local standard (not daylight) time Saturday, and continues until 10 P.M. (2200) local standard time Sunday.

To raise other participants just call "CQ V.H.F. QSO Party" or "CQ Contest." The only exchange required during contact is ARRL section (see page 6, this QST). Score one point for completed exchanges made on either 50 or 144 Mc., two points for exchanges on 220 or 420 Mc., and three points for exchanges on higher v.h.f. bands. To derive final score, the sum of these points is multiplied by the sum of number of different ARRL sections worked per band. You may work the same stations on different bands to increase both your contact points and multiplier.

A certificate will be awarded to the top scorer in each ARRL section, plus VES; as well as a certificate to the highest scoring Novice, and multiple-operator station in each section with at least three such entries.

Please follow the log and summary form as shown in the example. You can get these logs free by writing to the ARRL Communications Dept., 225 Main Street, Newington, Connecticut 06111. Reports should include your call, section,

times (in GMT), calls and sections of stations worked; postmarked by July 5, 1965.

Rules

1) The contest starts at 2:00 P.M. Local Standard Time, Saturday, June 12, and ends at 10:00 P.M. Local Standard Time, Sunday, June 13. All claimed contacts must fall within this period and must be on authorized amateur frequencies above 50 Mc., using permitted modes of operation.

2) Name-of-section exchanges must be acknowledged by both operators before either may claim contact point(s). A one-way exchange, confirmed, does not count; there is no fractional breakdown of the 1-, 2-, or 3-point units.

3) Fixed-, portable- or mobile-station operation under one call, from one location only, is permitted. A transmitter used to contact one or more stations may not be used subsequently under any other call during the contest period (with the exception of family stations where more than one call is assigned to one location by FCC).

While no minimum distance is specified for contacts, equipment in use should be capable of real communications (i.e. able to communicate over at least a mile).

Contacts made by retransmitting either or both stations do not count for contest purposes.

4) Scoring: 1 point for completed two-way section exchanges on 50 or 144 Mc.; 2 points for such exchanges on 220 or 420 Mc.; 3 points for such exchanges on the higher v.h.f. bands. The sum of these points will be multiplied by the number of different ARRL sections worked per band; i.e., those with which at least one point has been earned. Reworking sections on additional bands for extra section credits is permitted. Cross-band work does not count. Contacts with aircraft mobile stations cannot be counted for section multipliers.

5) A contact per band may be counted for each station worked. Example: W2BLV (S.N.J.) works K1CRQ (Conn.) on 50, 144 and 220 Mc. for complete exchanges. This gives W2BLV 4 points (1 + 1 + 2) and also 3 section-multiplier credits. (If W2BLV contacts other Connecticut stations on these bands, they do not add to his section multiplier but they do pay off in additional contact points.)

6) Each section multiplier requires a complete exchange with at least one station. The same section can provide another multiplier point only when contacted on a new v.h.f. band.

7) Awards: A certificate will be awarded to the high-scoring single-operator station in each ARRL section. In addition, the high-scoring multiple-operator station will receive a certificate in each section from which three or more valid multiple-operator entries are received. Certificates will also be given to top Novice in each section where three or more such licensees submit logs. Award Committee decisions will be final.

8) Reports must be postmarked no later than July 5, 1965, to be eligible for awards. Follow the sample log for correct form, or a message to Headquarters will bring printed blanks for your convenience. QST

Sample log and summary form giving an example of how to score. Count one point for contacts on 50 and 144 Mc. two points for 220 and 420 Mc. contacts, and three points for higher v.h.f. bands. Multiplier is sum of sections per band. You can obtain these log forms free by writing to ARRL Communications Dept., 225 Main Street, Newington, Conn. 06111.

SUMMARY OF CONTACTS, V.H.F. QSO PARTY

STATION.....		ARRL SECTION.....		Record of new sections for each band					Contact Points
W1AW		CONN		50	144	220	420	other B/S	
50	1901	W1MEH	CONN.	1					1
	1905	W2BAH/2	NY	2					1
	1915	W1MH/1	N.H.	3					1
	1920	W1YDS	CONN						1
144	2000	W2GK/R	N.N.J.	1					1
	2005	W1MH/1	NH	2					1
420	2200	W1YDS	CONN				1		2
1215	2300	W1HDC	"					1	3

(Enter below on last sheet used)

Band	Contacts	Points	Mult.
50 Mc.	4	4	3
144 Mc.	2	2	2
220 Mc.			
420 Mc.	1	2	1
Other 221.5 Mc.	1	3	1
TOTALS	8	11	7

CLAIMED SCORE: $11 \times 2 \times 7 = 154$ (Points) (Mult.) = **77** FINAL SCORE

I hereby state that I have abided by the rules specified for this contest and that, to the best of my knowledge, the points and score as set forth in the above summary are correct and true.

Signature _____ Call _____ Address _____

QST for

I.A.R.U. News



The Amateur Radio Society of Barbados received the unanimous approval of the member-societies participating in last year's balloting and as a consequence the Union is pleased to welcome its 64th member.

The ARSB has a total of 50 members, 38 of whom are licensed radio amateurs. Headquarters is maintained at the Highgate Signal Station, Highgate, St. Michael and the officers include VP6GC, President, and VP6NW, Secretary and Treasurer. Power input of up to 1 kw. is permitted on Region II amateur frequencies after successful completion of a 12 w.p.m. c.w. test and a written examination equivalent to that of Great Britain. Licenses are currently available only to British citizens.

Voting is currently in progress on applications from Zambia and the Bahamas with results available in midyear. Several other societies have made inquiries and the headquarters welcomes applications from any society in a country not presently represented.

The Vereniging Voor Experimenteel Radio Onderzoek In De Nederlandse Antillen has asked that all radio amateurs be advised of its new address. All correspondence and QSL cards should now go to P.O. Box 383, Willemstad, Curacao, Netherlands Antilles. The new VERONA president is PJ2CZ and the secretary is PJ3CH.

GERMANY

The very popular Lake Konstanz Ham Festival will be repeated this year on June 26-27 with the main meetings held at the historical Kouzil Building in Konstanz, Germany. One of the features of the event is that special temporary mobile permits may be obtained for the two days upon presentation of the home country license. Information may be secured by writing to International Ham Festival, P.O. Box 3029, Konstanz 3, German Federal Republic.

BELGIUM

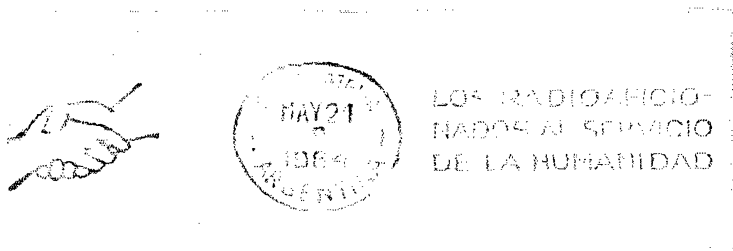
Radio amateurs visiting Belgium during September of this year may be interested in participating in the Belgian Mobile Radio Rally scheduled for September 12, just outside of Brussels. Special amateur licenses, good for one month, may be obtained for the event if application is received before August 15th. Applications should be sent to M. Le Directeur General des Radio Communications de la R.T.T., 42, rue des Palais, Brussels, 3, Belgium, and should include a photostatic copy of own license, Christian name, home address, home call sign, number of car license plate, and date of visit to Belgium. Information concerning the rally may be obtained from M. Mareel Godon, 85, rue de l'Institut, RIXENSART, Belgium. Operation at the rally will be on 3.5 and 144 Mc.

QSL BUREAUS OF THE WORLD

For delivery of your QSLs to foreign amateurs, simply mail cards to the bureau of the proper country as listed below. Cards for territories and possessions not listed separately may be mailed to the bureau in the parent country: e.g., cards for VP8s go to RSGB in Great Britain. W, K, VE and VO stations only may send foreign cards for which no bureau is listed to ARRL. See "How's DX?" for QSL information on specific stations.

For service on incoming foreign cards, see list of domestic bureaus in most QSTs, under "ARRL QSL Bureau." **Bold face listings indicate corrections or additions.**

- Aden:* Amateur Radio Club, RAF Khormaksar, P.O. 69, London, England.
- Algeria:* G. Deville, 7X2RW, 21 Blvd. Victor Hugo, Alger
- Angola:* L. A. R. A., P.O. Box 484, Luanda
- Antarctica:* KC4AA cards go to the Office of Antarctic Programs, National Science Foundation, Washington 25, D. C. KC4US cards go to K1NAP, COMCBLANT, USN, CBCEN, Davisville, E. Greenwich, R. I.
- Argentina:* R.C.A., Carlos Calvo 1421, Buenos Aires, BA
- Australia:* WIA, 23 Landale St., Box 1111, E.11, Victoria



While not every country is fortunate enough to have an amateur radio stamp, several have special cancellations honoring radiomen. LU2AO sent along the Argentine postmark and SM5BDS sent in the Swedish mark.

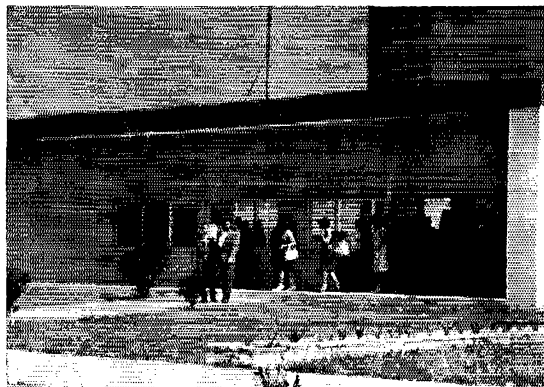
Austria: Oc. V.S.V., Box 999, Vienna 1/9
Azores: via Portugal
Bahama Islands: D. R. Thompson, VP7NS, Box 48, Nassau
Bahrain: (All MIP4) Ian Cable, MIP4BBW, P.O. Box 425.
 Awali
Barbados: Highgate Signal Station, Highgate, St. Michael
Belgium: U.B.A., Postbox 634, Brussels 1
Bermuda: R.S.B., P.O. Box 275, Hamilton
Bolivia: R.C.B., Casilla 2111, La Paz
Brazil: L.A.B.R.E., Caixa Postal 2353, Rio de Janeiro
British Guiana: D. E. Yong, VP3YG, Box 325, Georgetown
British Honduras: VP1RL, P.O. Box 463, Belize
Bulgaria: Box 830, Sofia
Burma: B.A.R.T.S., P.O. Box 800, Rangoon
Burundi: via Congo (9Q5) QSL Bureau
Cape Verde Island: Radio Club de Cabo Verde, CR4AA,
 Praia, Sao Tiago
Caroline Islands: Father Jack Walsh, Xavier High School,
 Truk



Shown at the 1964 dedication ceremonies of the new headquarters of the Radio Club Dominicano are incoming club President Guillermo De Marchena, H18AMA, President of the Dominican Republic Donald J. Reid Cabral, and at the rostrum outgoing RCD Vice-President Elizardo Dickson, H1EAD.

Cayman Island: via Jamaica
Ceylon: 4S7WP, P.O. Box 907, Colombo
Chagos: via Mauritius
Chile: Radio Club de Chile, P.O. Box 13630, Santiago
Colombia: L.C.R.A., P.O. Box 584, Bogota
Congo: (TN8) QSL Bureau, P.O. Box 2239, Brazzaville
Congo: (9Q5) U.C.A.R. QSL Bureau, B.P. 1459, Leopoldville 1
Cook Island: ZK1 QSL Bureau, % Radio Station Rarotonga, Rarotonga
Costa Rica: Radio Club of Costa Rica, Box 2112, San Jose
Cuba: ANRAC QSL Bureau, P.O. Box 6996, Havana
Cyprus: C.A.R.S. QSL Bureau, P.O. Box 216, Famagusta
Czechoslovakia: C.A.V., Box 69, Prague 1
Denmark: E.D.R. QSL Bureau, ØZ6HS, Ingstrup
Dominican Republic: R.C.D., P.O. Box 1157, Santo Domingo
Ecuador: Guayaquil Radio Club, P.O. Box 5757, Guayaquil
El Salvador: YS10, Apartado 329, San Salvador
Ethiopia: Kagnew Station Amateur Radio Club, ET3USA, APO, New York, N. Y. 09843
Faeroes Islands: via Denmark
Fiji Islands: P.O. Box 184, Suva
Finland: S.R.A.L., Box 306, Helsinki
Formosa: (BV1US calls only) Taiwan American Radio Club, (ISARSCAT, Box 8, APO 63, San Francisco, Calif.
 All other BV stations: QSL Bureau, C.R.A., Box 2007, Keelung, Taiwan, Rep. of China
France: R.E.F., Boite Postale 26, Versailles (S & O)
France: (F7 only) F7 QSL Bureau, % Base MARS station, APO New York, N. Y. 09083
Germany: (DL2 only): G. D. Griffiths, DL2OX, 212 Hohenroller Str., Moench-Gladbach
Germany: (DL4 & DL5 only) MARS Radio Station, Hqtrs. 12th Signal Group, APO 46, New York, N. Y.
Germany: (Other than above) D.A.R.C., Box 99, Munich 27 (thana: 9G1CW, Hans Suess, P.O. Box 3773, Accra
Gibraltar: RAF Amateur Radio Club, New Camp, RAF

Gilbert and Ellice I.: Charles W. Adams, VR1A, % P. and T. Dept., Betio, Tarawa
Great Britain (and British Empire): R.S.G.B. QSL Bureau, G2M1, Bromley, Kent
Greece: George Zarans, P.O. Box 564, Athens
Greece (SV0s only): Signal Officer, Hqtrs. JUSMAGG, APO 223, New York, N. Y.
Greenland (OX calls only): via Denmark
Greenland (KG1 calls only): KG1A-KG1E to MARS Director, KG1BX, APO, New York, N. Y. 09023. KG1F-KG1Z to MARS Director, KG1FR, APO, New York, N. Y. 09121
Guam: M.A.R.C., Box 445, Agana, USPO 96910
Guantanamo Bay: Guantanamo Amateur Radio Club, Box 55, Navy 115, FPO, New York, N. Y.
Guatemala: C.R.A.G., P.O. Box 115, Guatemala City
Haiti: Radio Club d'Haiti, Box 913, Port-au-Prince
Honduras: Jacobo Zelaya Jr., HR1JZ, Bo. Buenos Aires, 13 Calle 505, Tegucigalpa, D. C.
Hong Kong: Hong Kong Amateur Radio Transmitting Society, P.O. Box 541
Hungary: H.S.R.L., P.O. Box 214, Budapest 5
Iceland: Islenskir Radio Amatorar, Box 1058, Reykjavik
India: A.R.S.I. QSL Bureau, P.O. Box 534, New Delhi 1
Iran: Amateur Radio Soc. of Iran, APO New York, N. Y. 09205
Ireland: I.R.T.S. QSL Bureau, 21 Wicklow St., Dublin 2
Israel: I.A.R.C., P.O. Box 1099, Tel-Aviv
Italy: A.R.I., Viale Vittorio Veneto 12, Milano 101
Jamaica: Mr. Lloyd Alberga, Jamaica Amateur Radio Association, 76 Arnold Rd., Kingston 5
Japan (JA only): J.A.R.L., Box 377, Tokyo
Japan (KA only): F.E.A.R.L. -M-, APO, San Francisco, Calif. 96525
Johnston Island: QSL Bureau, APO 105, San Francisco, Cal.
Kenya: RSEA QSL Bureau, Box 30077, Nairobi
Korea: Korea Amateur Radio League, Central Box 162, Seoul
Korea: (HL9) HL QSL Bureau, Signal Section, USFK/ FUSA, APO, San Francisco, Calif. 96301
Kuwait: Alhaf Nasir H. Khan, 9K2AN, P.O. Box 736, Kuwait, Persian Gulf
Laos: Houmphauh Saignasith, XW8AL, P.O.B. No. 46, Vientiane
Lebanon: Varoujan Calinian, OD5CS, P.O. Box 1818, Beirut
Liberia: EL1 and EL2 to G. Marcus Kelley, % Liberian Government Radio Station, Monrovia. Others to Robert Flemister, P.O. Box 465, Monrovia
Libya: 5A QSL Service, Box 372, Tripoli
Liechtenstein: via Switzerland
Luxembourg: R. Schott, 35 rue Batty Weber, Esch sur Alzette
Macao: via Hong Kong
Madeira Island: via Portugal
Malagasy Republic (Madagascar): P.O. Box 587, Tananarive



The new headquarters building of the Radio Club Dominicano. The tower, partially visible in the photograph, supports Vee beams on 80 and 40 meters. The club station call is H18RCD.

Malawi: 7Q7RM, P.O. Box 472, Blantyre
 Malaya: QSL Manager, M.A.R.T.S., Box 777, Kuala Lumpur
 Malta: R. F. Galea, ZB1E, "Casa Galea," Railway Road, Birkirkara
 Mariana Islands: see Guam
 Marshall Islands: KX6 QSL Bureau, via KX6BU, Box 444, APO, San Francisco, Calif. 96555
 Mauritius: Paul Caboche, VQ8AD, Box 467, Port Louis
 Mexico: L.M.R.E., P.O. Box 907, Mexico, D.F.
 Midway Island: KM6BI, AIRBARSRON, Two Det., Midway Navy 3080, FPO, San Francisco, Calif.
 Monaco: Pierre Anderhalt, 3A2CN, 49 rue Grimaldi
 Mongolia: JT1KAA, Box 639, Ulan Bator
 Morocco: A.A.E.M.L., P.O. Box 2060, Casablanca
 Mozambique: CR7LU, P.O. Box 161, Beira
 Netherlands: V.L.R.O.N., Postbox 400, Rotterdam
 Netherlands Antilles (Aruba): VERONA, P.O. Box 392, San Nicolas, Aruba
 Netherlands Antilles (Curacao): VERONA, P.O. Box 383, Willemstad, Curacao
 New Zealand: N.Z.A.R.T., P.O. Box 489, Wellington
 Nicaragua: C.R.E.N. QSL Bureau, Box 925, Managua
 Nigeria: Dr. M. Uransfield, 5N2IKO, Agricultural Research Station, Samaru, Zaria, Federation of Nigeria
 Northern Ireland: via Great Britain
 Northern Rhodesia: See Zambia
 Norway: N.R.R.L., P.O. Box 898, Oslo Sentrum, Oslo 1
 Nyasaland: See Malawi
 Okinawa: O.A.R.C., APO 331, % Postmaster, San Francisco, Calif.
 East Pakistan: Mohd, AP5CP, Tiger Amateur Radio Club, Dacca Signals, Dacca 6
 West Pakistan: Ahmed Ebrahim, AP2AD, P.O. Box 65, Lahore
 Panama, Republic of: L.P.R.A., P.O. Box 1622, Panama City
 Papua: VK9 QSL Officer, P.O. Box 204, Port Moresby (or via Australia)
 Paraguay: R.C.P., Casilla de Correo 512, Asuncion
 Peru: R.C.P., Box 538, Lima
 Philippine Islands: P.A.R.A. QSL Bureau, P.O. Box 4083, Manila
 Poland: PZK QSL Bureau, P.O. Box 320, Warsaw 1
 Portugal: R.E.P. Rua de D. Pedro V., 7-4°, Lisbon
 Rodriguez Island: via Mauritius
 Roumania: Central Radio Club, P.O. Box 95, Bucharest
 Rwanda: via Congo (9Q5) QSL Bureau
 Samoa (American): Clark Browne, KS6AX, Comm. officer, Government of American Samoa, Pago Pago
 Saudi Arabia: HZIAB 7244th ABRON-COMM., APO 616, New York, N. Y.
 Scotland: via Great Britain
 Senegal: Ch. Teot, 6W8BF, P.O. Box 971, Dakar, or via R.F.F. (France)
 Sierra Leone: Radio Society of Sierra Leone, P.O. Box 907, Freetown
 Singapore: QSL Manager, P.O. Box 777
 Somali Republic: Box 397, Mogadiscio
 South Africa: S.A.R.L., P.O. Box 3037, Cape Town
 Southern Rhodesia: R.S.S.R., Box 2377, Salisbury
 Spain: U.R.E., P.O. Box 220, Madrid
 St. Vincent: QSL Bureau, P.O. Box 112, St. Vincent, West Indies
 Surinam: QSL Manager (PZ1AR), Surinam Amateur Radio League, P.O. Box 240, Paramaribo
 Sweden: Sveriges Sandare Amatörer, Enskede 7
 Switzerland: U.S.K.A., 6233 Buron/LU
 Syria: P.O. Box 35, Damascus
 Tanganyika: RSEA, P.O. Box 2387, Dar es Salaam
 Trinidad and Tobago: P.O. Box 756, Port of Spain, Trinidad
 Turks and Caicos Islands: via Jamaica
 Uganda: R.S.E.A. QSL Bureau, P.O. Box 3433, Kampala
 Uruguay: R.C.U., P.O. Box 37, Montevideo
 U.S.S.R.: Central Radio Club, Box 88, Moscow
 Vatican: HVICN, Domenico Petti, Radio Station, Vatican City
 Venezuela: R.C.V., P.O. Box 2285, Caracas
 Virgin Islands: Richard C. Spenceley, KV1AA, 16 Commandant Gade, Charlotte Amalie, St. Thomas
 Wake Island: KW6CGA, USCG-LORAN Station, Box 7
 Wales: via Great Britain
 Yugoslavia: S.R.J., P.O. Box 48, Belgrade
 Zambia: Radio Society of Zambia, P.O. Box 332, Kitwe
 Zanzibar: via Tanganyika

QST

DX OPERATING NOTES

United States Reciprocal Operating Agreements currently exist *only* with: Canada, Costa Rica, Dominican Republic, Ecuador, and Bolivia. Several other foreign countries grant FCC licensee amateur radio operating privileges on a courtesy basis; write headquarters for details.

Third-Party Restrictions

Messages and other communications — and then only if not important enough to justify use of the regular international communications facilities — may be handled by U.S. radio amateurs on behalf of third parties *only* with amateurs in the following countries: Bolivia, Canada, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Haiti, Honduras, Liberia, Mexico, Nicaragua, Panama, Paraguay, Peru, and Venezuela. Canadian radio amateurs may handle these relatively unimportant third-party messages with amateurs in Bolivia, Chile, Costa Rica, El Salvador, Honduras, Mexico, Peru, U.S., and Venezuela.

DX Restrictions

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

Cambodia, Indonesia (including West New Guinea), Thailand and Viet Nam forbid radio communication between their amateur stations and amateur stations in other countries.

A.R.R.L. QSL BUREAU

The function of the A.R.R.L. QSL Bureau system is to facilitate delivery to amateurs in the United States, its possessions, and Canada of those QSL cards which arrive from amateur stations in other parts of the world. All you have to do is send your QSL manager (see list below) a stamped self-addressed envelope about 4½ by 9½ inches in size, with your name and address in the usual place on the front of the envelope and your call printed in capital letters in the upper left-hand corner.

- W1, K1, WA1 — G. L. DeGruener, W1GKK, 109 Gallup St., North Adams, Mass. 01247.
- W2, K2, WA2, WB2 — North Jersey DX Ass'n, P.O. Box 303, Bradley Beach, N. J. 07720.
- W3, K3, WA3 — Jesse Bieberman, W3KT, P.O. Box 201, Chalfont, Pa. 18914.
- W4, K4, WA4 — Thomas M. Moss, W4HYW, Box 20644, Municipal Airport Branch, Atlanta, Ga. 30330.
- W5, K5, WA5 — H. L. Parrish Jr., W5PSB, P.O. Box 9915, El Paso, Texas 79989.
- W6, K6, WA6, WB6 — San Diego DX Club, Box 6029, San Diego, Calif. 92106.

(Continued on page 174)

As the final instalment of the QST series under this title, we are proud to present the contribution which the judges chose for the top award in the Golden Anniversary Essay Contest. We agree that W0IBN well describes the reasons for ARRL's existence and why every amateur should be a member.

What ARRL Means to Me

BY LAWRENCE OSTERMAN,* W0IBN

AS THE YEARS have passed ham radio has changed, and so also, have I changed. Fifteen years ago, when I was thirteen years old, a huge organization with the mysterious and impressive title of ARRL symbolized all the fine things that amateur radio had to offer. ARRL meant contests, code practice, the *Handbook*, Field Day, and Organization, spelled with a capital O. It was apparent that if any one group was pulling the strings of ham radio that group was ARRL.

Time has a kaleidoscopic effect on personal opinion and outlook, especially since it takes time to appreciate the myriad areas of interest that ARRL has its eye on. Not only is there "our man in Washington," but there is that lucky guy at the Newington hamshack pounding the WIAW key, and there is a fellow at a desk writing his fingers to the bone while attempting to meet the *QST* deadline, and there are others racing over the countryside trying to hit every hamfest, gabfest, convention, and picnic in the country; not to mention the coordinators behind the AREC, the National Traffic System, the v.h.f. contests, the DX contest, the Official Observer program, and dozens of other activities. All of these things are important and very interesting, but they in themselves are only parts of a larger program.

First, for me and every ham, the American Radio Relay League offers guidance and direction. This is an area in which the League has served us for fifty years. With farsightedness and honesty, a guiding program of development and planned progress has been provided over the years to assist the growth and public acceptance of ham radio. Through publicity, outspoken leadership, and personal assistance to thousands of hams and prospective hams, the public image of the amateur operator has been carefully nurtured and constructed. As a ham I am often considered a public-spirited radioman of special talent and worth to the community — this due primarily to the League's efforts in public relations. Membership in the League has given me a certain pride in being a ham that no other association has been able to impart.

A second area in which the League offers an outstanding contribution to the hobby is in activities. To the active amateur, the ARRL Sweepstakes and Field Day are two of the biggest days

on the calendar. Competition, and recognition of operating accomplishments, have been valuable satisfaction builders for me over many years. Not only Field Day, but the v.h.f. parties, the DX contest, the code copying sessions, all have offered me many hours of enjoyment. It's almost as much fun preparing for these activities as it is a pleasure operating in them. And, the thrill of achievement when recognition is given in *QST* — even though my call is lost midst the tightly packed columns — is surely a relished encounter. These hours of fascination and pleasure, and even of hard work during the Sweepstakes, are due primarily to the efforts of ARRL in getting this show started, and in keeping it going.

How many people have time to write a letter to their Congressmen every time their interests are threatened, let alone even knowing enough about the threat to do so? As an ARRL member my interests as a ham are being well cared for, and if some situation should arise that requires my attention as a letter-writer, I'll be informed through *QST* of the problem and may then take

(Continued on page 172)



At the Midwest Division Convention in Des Moines, Director Robert W. Denniston, W0NWV, presents W0IBN with top award in the essay contest.

* 3011 11th Ave., SE, Cedar Rapids, Iowa.

The W6IEL Chassis Design

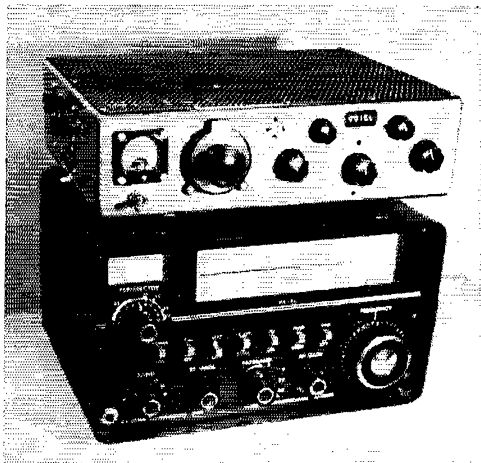
Novel Constructional Design with Many Advantages

BY RUSSEL C. ALEXANDER,* W6IEL

EARLY in the year, I decided that our vacation trip north would not be made without a portable rig, even though the space in a 16-foot travel trailer is quite limited. Already having a physically small Drake 2-B receiver. I set about designing a comparably small all-band c.w. transmitter, but no ready-made chassis seemed to be adaptable. As a result of much "brainstorming" over possible chassis configurations, the transmitter shown here was designed and constructed. Some of the advantages that developed are light weight, high component density without destroying accessibility, excellent r.f. shielding, and perfect heat rejection, in addition to low cost and flexibility of size and shape.

This simple concept is described for the proponents of "home-brew" construction. Basically, the chassis is constructed from a length of lightweight sheet metal, 18 to 20 gauge, formed into a shallow channel of the desired depth (C), as shown in Fig. 1. This material can be obtained very inexpensively at any sheet-metal shop in either aluminum or steel. I used half-hard aluminum. A flange width of about $\frac{3}{8}$ inch is ample for purposes of rigidity. This channel is then formed into the desired width (A) and length (B) by simply notching as shown and bending by hand. If desired, a sharper corner bend can be obtained by inserting a wood block inside the channel; finish bending by striking with a soft mallet. The fourth corner is closed and secured with a "closing tab."

* 2890 San Francisco Ave., Long Beach, Calif. 90806.

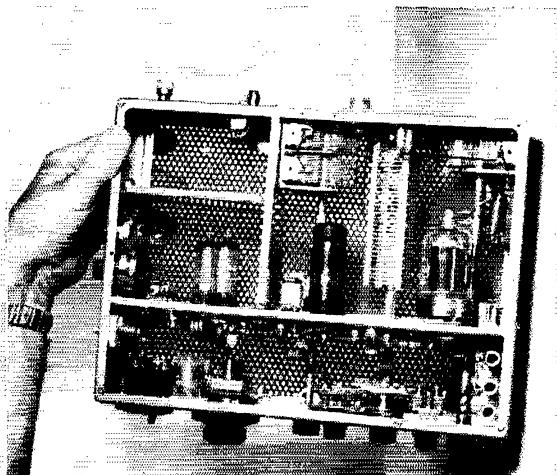
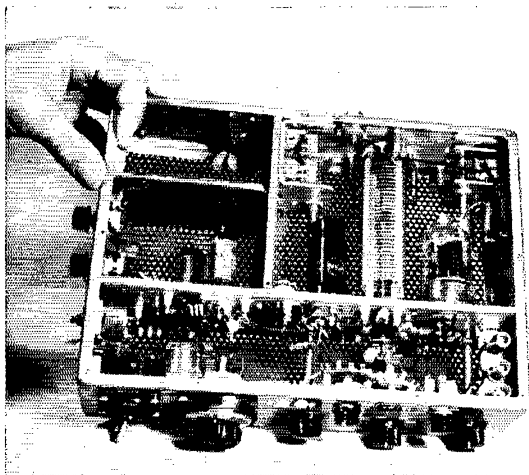


W6IEL's compact transmitter is shown here attached to the top of his Drake receiver by means of 1-inch aluminum channel bars to form a single unit for portable use.

Partitions are installed as shown. They are fabricated by cutting $\frac{3}{4}$ inch off both edges of the flange at both ends of the partition and bending at 90 degrees, $\frac{3}{8}$ inch in from each end. In this way, the partition flanges will be flush with the outside edge flanges.

All fastenings may be made with nuts and bolts, blind rivets, or sheet-metal screws. Use of the latter facilitates disassembly for changes or adjustments.

Upon completion of the installation and wiring



These two views show the unusual accessibility provided when both perforated covers are removed. Partitions can be made up as prefabricated units before installing the chassis frame.

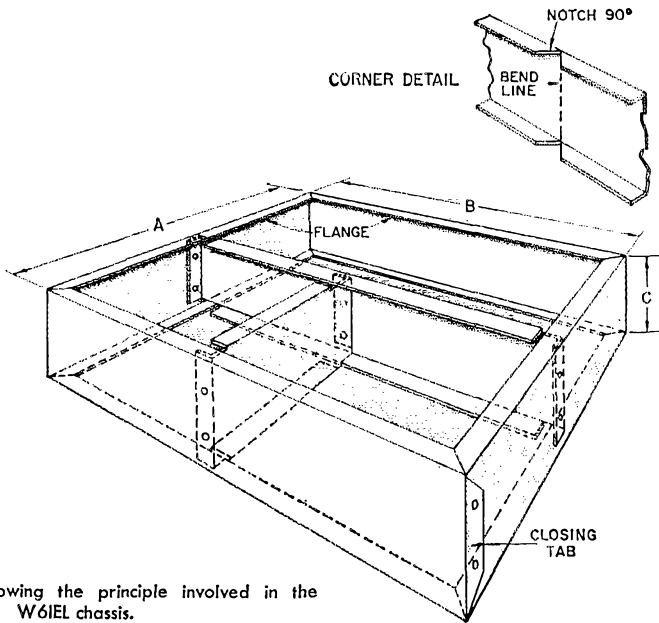


Fig. 1—Sketch showing the principle involved in the W6IEL chassis.

of the electronic components, the top and bottom faces are covered with perforated metal attached with sheet-metal screws. The resulting assembly is well shielded, superbly cool in operation, and

extremely rigid.

The completed unit may be finished in the builder's choice; the writer has found aerosol hammer-tone enamel to be very satisfactory. **QST**

Congratulations to Project Oscar And More Pictures of Oscar Participants

As representatives of the U. S. military services we extend our heartiest congratulations to you and all amateurs associated with the magnificent Project Oscar Three accomplishments. In this era of rapid technological advancement it is heartening to know that amateurs can still be found in the front ranks of technical explorers. — *Edward Liscombe, Acting Chief, Army MARS; Lt. Cdr. Micklej, Chief, Navy MARS; Major Aluah Cole, Chief, Air Force MARS.*

Heartiest congratulations for the successful orbiting of Oscar III. This outstanding feat reflects the highest credit upon all radio amateurs associated with the project.

Once again, the U. S. radio amateur has proven his ability to contribute to the advancement of the radio art and the enhancement of international good will. Regards. — *Rear Admiral Koelder, Director Naval Communications, CNO.*

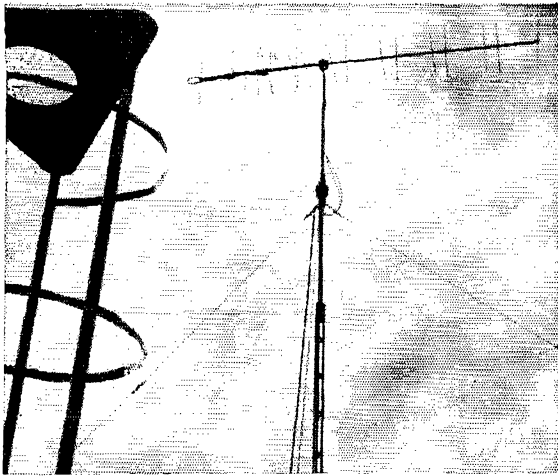
Please convey my congratulations to the Association and all concerned for the successful launch and operation of Oscar III. In creating an amateur relay satellite, the radio amateurs have again achieved a notable "first" in the field of radio-communications. — *E. William Henry, Chairman, FCC.*

On behalf of all members and officers of ARRL, I wish to congratulate you and your associates in Project Oscar for the magnificent job of creating

Oscar III, which was successfully placed in orbit today. This is another great achievement for amateur radio. An outstanding characteristic of this satellite is its ability to accept all modes of communication — a.m., s.s.b., c.w., RTTY or any other type of signal — and faithfully repeat them back to earth instantaneously. It opens entirely new horizons for amateur v.h.f. communication. Again, congratulations for a job well done. 73. — *Herbert Hoover, Jr., W6ZII, President ARRL.*



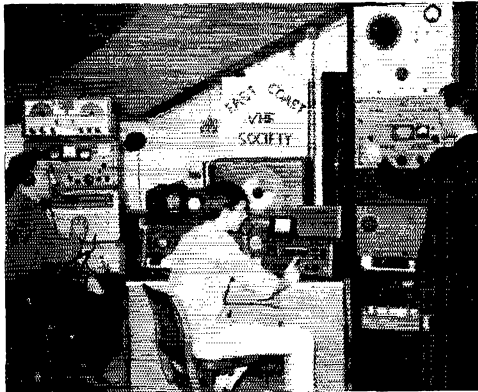
WB6JZY working hard at his orbit plotting board.



The cross-polarized, boom-staggered, 10-element Yagis are used to track Oscar III at W6QJW. At the left, that's the top of a helix antenna which was also used for tracking.



Up there somewhere are DL3YBA's Oscar antennas, which include 20-element and 48-element Yagis.



The East Coast VHF Society Oscar tracking station.



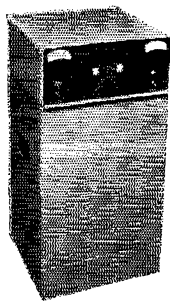
K2MHJ (left) and K2GUN adjust their helical antenna.



HB9RG waited for Oscar III from a farm on top of a 2400-foot mountain. He was assisted by HB9IN, HB9QQ and HB9RE.

And this is all we had room for this month.

• Recent Equipment —



Henry 2-K Linear Amplifier

In a departure from the present trend of packing everything into one small box, Henry Radio has come out with a kilowatt linear amplifier, the 2-K, which in every sense of the word is rugged. The 2-K comes in two packages, the r.f. section and a separate power supply. There are two combinations available. The 2-K is a floor-mounted console with the r.f. section permanently mounted atop the power supply unit. Also available is the 2-KD, in which the r.f. section can be mounted separately from the power supply. If you want to build your own power supply, the r.f. section, 2-KR, can be purchased without the supply.

R.F. Circuit Details

The r.f. unit is a linear amplifier utilizing a pair of Eimac 3-400Zs connected in parallel and operated in grounded-grid. Any exciter capable of 80 to 160 watts p.e.p. output will drive the amplifier to full input. The amplifier covers the amateur bands between 3.5 and 29.7 Mc. Five fixed-tuned circuits, one for each band, are used in the grid r.f.-input section for driving the 3-400Zs. A single ganged bandswitch is used to switch both the input circuits and the tank circuit of the amplifier. A somewhat unusual feature of the 2-K is the pi-L combination used in the plate tank circuit, a switched L section being connected between the output of the pi and the antenna.

As Rinaudo pointed out in a *QST* article,¹ the pi-L circuit has the advantage of providing an additional 10- to 15-db. attenuation of the second harmonic and even more on the higher-order harmonics. This is particularly desirable in an amplifier operated at the kilowatt level, and even more so where multiband antennas are used with no provision for harmonic attenuation, such as a transmatch, between the transmitter and antenna. The pi-L network is designed to work into a 50-ohm load.

Two meters are used to measure the operating voltages and currents of the amplifier. One meter, 400 ma. full scale, is used to measure the grid current. A momentary contact switch mounted just below this meter can be pushed to measure the plate voltage, changing the full-scale range to

¹ Rinaudo, "Pi-L Plate Circuit in Kilowatt Amplifiers," *QST*, July, 1962.

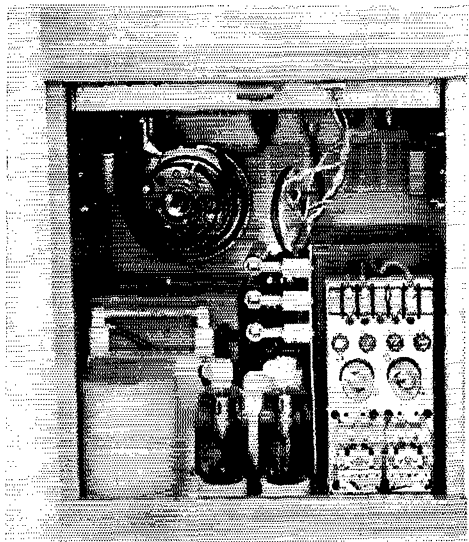
4000 volts. The other meter is a 0-1 amp. full-scale unit used to measure the plate current. The plate meter is connected in the negative lead of the high-voltage supply.

There are two switches on the front panel of the r.f. unit. One controls the filament supply for the 3-400Zs and turns on the plate power supply; the other switch controls the plate voltage.

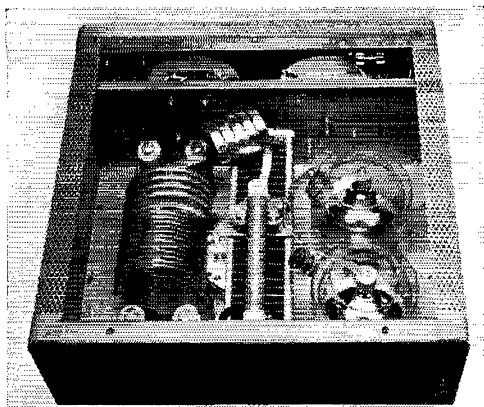
Power Supply Details

Earlier we used the word "rugged" when describing the 2-K. This certainly applies to the power supply. The high-voltage supply is a full-wave circuit using a pair of RCA 3B28 xenon rectifiers. A choke-input filter is used, the 8-henry choke being used in conjunction with 20 μ f. of filter capacitance. Either 115- or 230-volt a.c. input can be used for the supply.

A low-voltage supply that provides d.c. for the various control relays is also included. When



This view shows the interior of the power supply section. At the upper left is the blower used to cool the tubes. (In the desk mounted version, the blower assembly is mounted on the rear of the r.f. section.) The panel just to the right of the rectifier tubes contains the time delay switches and control relays for the supply and r.f. section.



Looking down into the top of the r.f. compartment, the two 3-400Zs with their chimneys are at the right. The tank tuning capacitor is in the center and the pi-network inductor at the left. Not visible in this view is the L section which is mounted below deck. Safety interlock switches are used on both the r.f. section top cover and power supply front panel.

the filament switch in the r.f. unit is turned on, a system of time-delay relays protects the xenon rectifiers during their warmup period. Also, a blower used to cool the 3-400Zs is started. After approximately 20 seconds the high-voltage switch may be closed, applying the high voltage to the amplifier tubes, and the amplifier is ready for operation.

All of the power supply components are amply rated. For example, the power transformer is approximately 6000 volts, center-tapped, at 1 amp. This, along with the other heavy-duty components, contributes to a no-load to full-load regulation of better than 5 percent.

In the 2-K model, the blower is mounted below the r.f. section, near the top of the power supply. When the desk-mounted r.f. section is used, and the power supply is remote, the blower is mounted on the rear of the r.f. unit.

Other Details

Steel cabinetry is used for both units. The r.f. section sides and top are perforated. Shielding of the r.f. section is complete, even to the extent of using metal-backed panel meters.

It isn't necessary to disconnect the amplifier if you want to run your exciter "barefoot." When the plate voltage switch is turned on or off the switch also controls the antenna relay which is built into the amplifier. Turning off the plate switch routes the exciter output to the antenna, bypassing the amplifier. Also, the amplifier can be used with any transceiver that has provision for controlling an external relay, as most do. The antenna relay in the amplifier has an external connection point that can be connected to the transceiver control circuits. When this connection point is grounded (closing the antenna coil to ground) the antenna relay is energized, feeding the output of the transceiver into the amplifier. When the transceiver is in the receive position, the antenna relay coil is opened and the antenna is connected directly through the amplifier to the transceiver.

The instruction book provides complete details for tune-up procedure plus a circuit description and complete list of parts. Power-input specifications are 2000 watts p.e.p. on s.s.b. and 1000 watts on c.w. or a.m. Drive requirements are 60 to 150 watts p.e.p. for s.s.b. or c.w., and 40 to 60 watts for a.m. phone.

In the event the r.f. section alone is purchased, power requirements are 2500 volts d.c. at 400 ma., 5 volts at 29 amp. (3-400Z filaments), and 6 volts d.c. for relay control. — W1ICP

Henry 2-K Linear Amplifier

Height: 29½ inches.

Width: 11½ inches.

Depth: 13 inches.

2-KD

Height: 12 inches.

Width: 11½ inches.

Depth: 13 inches.

Weight: 2-K, 158 pounds, 2-KD 33 pounds.

Power requirements: 115 volts a.c., 30 amps., 230 volts a.c. 15 amps.

Price class: 2-K, \$675.00, 2-KD, \$475.00.

Manufacturer: Henry Radio, Los Angeles, Calif.

IMPORTANT NOTICE

Changes of Address

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

Strays

All amateur radio operators who are members of the Knights of Columbus and who are interested in a K of C amateur radio network please contact Dr. R. P. Steigerwald, K8ENX, 217 Kurtz St., Wooster, Ohio.

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J. R. Hermann, W8TSF/Ø, 31 Fairmont Blvd., Rapid City, South Dakota 57705, would like to hear from hams who are professional librarians, with Master's degrees in Library Science.

AMATEUR RADIO PUBLIC SERVICE CORPS

CONDUCTED BY GEORGE HART,* WINJM

UP THE FLAGPOLE

HAVE you ever heard the expression: "Let's run it up the flagpole and see if anyone salutes it"? That's what we'd like to do this month, present a few ideas that have been kicking around, see if anyone thinks they are worth much.

First of all, we would like to call attention to this column in May *QST* in which the results of the Roanoke Division LO meeting are discussed. At the end of said discussion are some ideas which were proposed at that time. Please take a look, and consider them already flying from the masthead. Then, consider the following:

- (1) Reduce EC reporting from once per month to once per quarter year. Most ECs don't have anything to report every month anyway.
- (2) Reduce SEC reports to card size and require them once per quarter instead of every month.
- (3) Abolish OPS and PAM appointments, make phone operators eligible for ORS and RM appointment. After all, why make a distinction? This might help break down the barrier between phone and c.w.
- (4) Change RM and PAM appointments to Net Manager (NM).
- (5) Here's a dilly: a "point" system for a monthly ARPSC honor roll, replacing the present BPL (which recognizes traffic count only). In the form in which presented, points would be awarded as follows:
 - (a) For every 100 message handlings (i.e., traffic points), 1 point.
 - (b) For every complete NCS job duly reported to net manager, 1 point.
 - (c) For every duly authorized (by net manager) liaison performance with other net or nets (including TCC function), 1 point.
 - (d) For "making" BPL on present basis, 1 point.
 - (e) For each *three* QNIs in directed public service nets, 1 point.
 - (f) For each *reported* operation in which emergency communications were handled in a bona fide communications emergency, 5 points.
 - (g) For each *reported* alert operation in which station was on alert for not less than 3 hours, 2 points.
- (6) Annual endorsement stickers for NTS section net certificates, to be executed and signed by the SCM.
- (7) Revise the ARL list to include more texts for special occasions and delete some of texts not now used.
- (8) Re-name the BPL. Many amateurs don't

* National Emergency Coordinator

know that traffic handled by phone is eligible for BPL count.

(9) Get up a form for monthly reporting by RMs and PAMs equivalent to EC and SEC report forms.

(10) Add a CFM (confirm) line to standard message form, following the signature and containing all numerals, non-word groups and difficult or unusual words in the order sent in the message.

(11) Open the NCEFs to unlimited calling for *any* purpose, except during the first five minutes of each hour; but no QSOs, stations move to another frequency after contact is made.

That's enough for now. We aren't asking anyone for "votes" on the above questions, we just want to know what you think of them, for our own guidance. Overwhelming support for any of them will probably result in its adoption. Lack of opposition to any of them *may* result in its being put into effect. So let us know whether you are "fer" them or "agin" them, and *why*.
— WINJAM.

ARPSC Forum

Question: If a station receives the place of origin of a message on c.w. as NEWINGTON CONN, how should he indicate, when relaying it on phone, that Conn. is abbreviated and not spelled out?

Answer: In the preamble, it doesn't really matter whether it's abbreviated or spelled out. Most operators will abbreviate it in any case. In the text, however, that's a different matter, and if it is abbreviated there the phone transmitting operator should so indicate by spelling it out, "I spell, C-O-N-N."



CAN manager W9DYG waited until he moved into his new house before taking this shot. Fred has been manager of CAN for five years and is one of the mainstays of NTS. He holds (in addition to the DX awards) BPL, CP-30, A-1 Op., and an ORS appointment.

Question: If a text of a message is received on c.w. with an abbreviation in it such as UR NR, should it be relayed on phone as "your number"?

Answer: Definitely not. While it is a pretty safe assumption that this is what it means, we don't make assumptions in handling traffic, we relay it exactly as we received it, especially if it's part of the text.

Question: If an ARL numbered text is given as ARL 65, is it proper to change it to ARL SIXTY FIVE and correct the check accordingly?

Answer: This is risky. It is permissible to correct the form in which a message is sent (but not its content), but texts of messages are pretty sacred cows and it is always best to relay them exactly as received. The message shouldn't have been given such a text by the originator in the first place, but if 65 should get garbled to 75 by the time you receive it and you change it to SEVENTY FIVE, you are compounding the error, because there is a lot more difference between SIXTY and SEVENTY than there is between 6 and 7.

Question: Why is ARRL traffic often listed and routed differently from other IRN traffic?

Answer: This only occurs when an ARRL station (i.e., a staff member) is QNI. Even then, it is up to the judgment of the NCS whether or not to route it direct or via the Region Net.

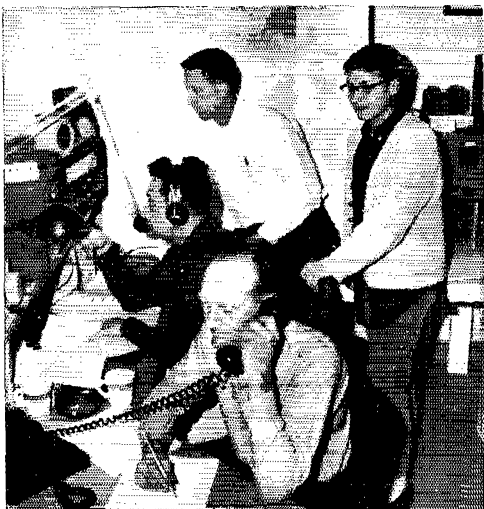
We solicit more questions for this forum. Is there something you'd like to know about ARPS that isn't answered in regular literature? Spill it. We'll answer it here if it's general enough, but personally to you in any case.

National Traffic System

No matter how much we talk about amateur radio as a public service and the need for organization, system and orderly procedures, we always, sooner or later, come back to the realization that a great majority of us amateurs are in this game for the unadulterated pleasure we get out of it.

Most ARRL-sponsored activities are geared to this concept, to a greater or lesser extent. DX activities have this as the primary consideration, then you come down the list through awards, contests, traffic handling, emergency preparedness work, until you come to that activity which gives the least consideration to the personal desires and conveniences of those amateurs who would normally participate in it — the National Traffic System.

Offhand, this may seem like a pretty cockeyed basis on which to sponsor an activity which depends on volunteers for its implementation. No doubt there are some who have strong feelings on this score. But since 1949, when NTS first came into being, the system has gradually accumulated a following of amateurs who subscribe to its basic tenets.



On April 1, members of the Denver Radio Club activated the club-Red Cross station, WØOU, for a fund drive for crippled children. From front to back are WAØCQO, EC WØGVT, Colo. SEC WØSIN and WAØKYV

one of which is that we don't operate the system at the convenience of the amateurs, but find the amateurs who will fit into the system's scheme of operation. That there appears to be a large enough group of operators who are willing to do this is a tribute to the inherent sense of dedication in the amateur fraternity.

Nevertheless, now and again we notice in NTS a tendency to want to change the system's operating hours, at one level or another, because it becomes inconvenient for certain key personnel to continue meeting at the time specified for best sequential traffic flow. Each year, for example, when "daylight saving" time goes into effect, NTS's sequence of net meetings goes to pot. Some nets meet an hour earlier, some don't, and half the time one doesn't know whether a particular net meets on "standard" or "daylight saving" time, or what brand of either is used in any particular location.

NTS does not officially recognize any operating time standard but GMT. Officially, the time sequence begins at 0000 GMT in the Eastern Area, 0100 GMT in the Central Area and 0300 GMT in the Pacific Area. NTS nets which deviate from this pattern are throwing different sizes of monkey wrenches into the works, depending on the extent of the deviation. Before arbitrarily deciding to go along with the clock and local habits, NTS net managers should consider the following, not necessarily in this order of importance:

- (1) How will the change affect the regular net participants?
- (2) How will it affect liaison with other NTS nets?
- (3) Can those adversely affected to the extent of non-participation be replaced?
- (4) Could those affected by *not* making the change be replaced?
- (5) Which would cause the greater defection, making the change or not making it?

This is not a "voting" matter. The net manager has to make the decision, based not only on what his net members want but also on the effect of any decision on the system as a whole. If the decision goes against the majority of the net participants, then consideration has to be given to getting replacements for those who cannot or will not continue to take part.

Make no mistake about it, conducting a full time traffic handling service on a systematic basis using mostly personnel who participate only because they enjoy it (and thus probably *won't* participate if they cease enjoying it), is not the path of least resistance. Many things have to be done the "hard way." The minimum possible change from normal net scheduling during seasonal madneses is preferable. The further you deviate from the norm, the more irregularities you are going to cause in the overall setup, many of which are not apparent on the surface at the time the deviations are put into effect. — WINJMM.

March reports:

Net	Ses-sions	Traf-fic	Rate	Aver-age	Repres-entation (%)
EAN	31	1771	1.174	57.1	99.5
CAN	31	1415	1.049	45.6	100
PAN	31	1178	.915	38.0	100
IRN	62	640	.410	10.3	95.7
2RN	62	923	.805	14.9	100
3RN	62	714	.445	11.5	99.5
4RN	59	775	.464	13.1	98.1
RN5	62	1233	.446	19.9	95.6
RN6	62	832	.637	13.4	96.9
RN7	30	436	.409	14.5	78.0 ¹
SRN	62	407	.345	6.6	96.7
9RN	31	125	.573	13.7	100 ¹
TEN	62	571	.503	9.2	91.3
ECN	28	90	.191	3.2	90.4 ¹
TWN	30	303	.413	10.1	70.7 ¹
Sections ²	1471	9634			
TCC Eastern ³	124	795			
TCC Central ³	93	1061			
TCC Pacific ³	124	853			

Totals 2148 23,966 EAN 9.9 several
Records 2172 33,340 1.420 14.2 100

¹ Representation based on one or less sessions per day.

² Section nets reporting (48): NYC-LIPN, NYC-LIYIF, NLS (NYC-LD); Wolverine, QMN (Mich.); OQN (Ont.-Que.); TSN, TSSBN, ETPN, TPN, TN (Penn.); OSN (Ore.); QFN (Fla.); GSN (Ga.); MDD, MDDDS (Md.-Del.-

D.C.); BUN (Utah); NCN, NCCW (N.C.); EPA, PTTN (Pa.); GBN (Que.); CN, SCN, SCVSN (Calif.); Buckeye, OSSBN (Ohio); SCN (S.C.); ILN (Ill.); WBSN (Wisc.); AENB, AENH, AENM, AENP (e), AENP (l), AENR, AENT (Ala.); NJN, NJPN, NJ6-2, NJNN (N.J.); AITN (Man.); RIN, RISP (R.I.); CN, CPN (Conn.); OZK (Ark.).

3 TCC functions not counted as net sessions.

No broken records this month, but again the number of nets showing a 90% or better representation is excellent. Last year at this time we were in the throes of the Alaskan earthquake and the nets were loaded. This year, all's quiet (except for the QRN), and everyone just keeps plugging along.

K1WJD opened the package of Area Net certificates we sent him and sent copies to W1NJMI, W2* GKZ GVH MTA ZRC ZVW, K2* RYH SIL, W3* EML NEM, K3* FHR MVO, W4* DLA DVT, W8ELW, VE2DR and VE3CYR. W9DYG remarks that this was a good month, with traffic on the upswing, and the improved condx have given the CAN gang a new lease on life. WB6JUH sez he doesn't have too much to complain about these days with PAN running smoothly and skip condx back to normal. W1BYR boasts the highest rep. for 1RN in a long time. Skip condx have improved for 3RN, and none of the late sessions were wiped out. W4SHJ, who rarely makes any comments, reports that this was the first month in over 8 years that four sections have been represented 100% on 4RN. K5IBZ sez traffic is up and so is the QRN. WB6BBO is still looking for more Nevada reps. This was the first time in a long time that 9RN had 100% representation. W6IGG issued a TEN certificate to VE4QX, and comments that everything is running smoothly. VE3BZ sez that the QRN is starting to bother ECN a little, but spirits are high and things should improve soon. A TWN certificate was issued to WA5DUH, and W6HXB reports that summer condx are starting to set in early this year.

Transcontinental Corps: W5PPE issued TCC certificate to W4OGG, WA4AVM, WA9BWW and KG0SY; Jim requests that all stations get their reports to him as soon as possible after their sked, either by mail or on the air. W7DZX reports another good month and is hopeful that he can have all the skeds filled in the near future. He still needs some boys with good 20-meter capabilities.

March reports:

Area	Fun- tions	% Suc- cessful	Traffic	Out-of-Net Traffic
Eastern	124	93.5	2148	795
Central	93	98.8	2121	1061
Pacific	124	92.7	1706	953
Summary	341	94.4	5975	2712

TCC roster: Eastern Area (W3EML, Dir.) — W1s BGD EMG NJMI, WA1CRK, W2GVH, WA2BLV, WB2HVB, W3* EML NEM, K3MVO, W4DVT, K4VDL, WA4PDS, W8CHT, K8s KMJ NJW QKY TIG. Central Area (W5PPE, Dir.) — W4OGG, WA4AVM, W5PPE, W9s CXY DYJ JOZ VAY ZYK, W49s AUM BWW, W90HJ, K0GSY, WAOAOY. Pacific Area (W7DZX, Dir.) — W6s ARG EOT HC VNQ, K6DYX, WA6BRG, WB6JUH, W7s DZX GMC WST.

Net reports:

Net	Sessions	Check-ins	Traffic
Mike Farad	55	583	1205
North American SSB	27	290	360
20-Meter SSB	23	742	1573
EASN	31	225	433
HBN	31	453	6041
7290	40	1234	584
Interstate SSB	31	1448	841
Northeast Area Barnyard	27	701	19
CNEN	27	776	4

Diary of the AREC

On Jan. 18, W4ZBQ relayed a request for two eyes from a doctor in Knoxville, Tenn., via the Eye Bank Net. Within record time, the eyes were located and arrangements were made to have them flown to Knoxville. — W4RRV.

On Feb. 20, W6FAY, radio operator aboard a vessel off the coast of Bermuda, was asked by the captain to get



K4AUM (right), president of the Georgia Single Sideband Assn., presents the first annual award for the Georgia Amateur of the Year to W4DDY. Homer is the Ga. RM and manager of GSN.

weather information regarding an approaching gale. The regular marine channel antenna had been blown down, but W6FAY's 20-meter antenna was still intact, and a QRRR went out. W4YZC answered and quickly made the necessary telephone calls to the Coast Guard and Air Force for the information which was relayed back to W6FAY. — W6FAY.

On Feb. 25, the Somerset Co., N. J. AREC went into action because of a large snow storm in the area. Several sections of the county were without power for some time, and some stations had to use emergency power. Thirteen members participated in the half hour operation, and the net handled thirteen messages. — WA2ZKT, EC Somerset Co., N. J.

KG6FAE, Anderson AFB, Guam, was handling traffic with K6FDU on March 19 when a telephone call from WN6MYO/KG6 was received stating that W6SUIH/mm was operating on 14,270 kc. and was requesting medical aid; he was suffering from an attack of appendicitis. W6SUIH was the radio officer on board the Pt. Montara and there were no doctors on board the ship. KG6FAE advised W6SUIH of the operating frequencies and times of the Guam Air/Sea rescue facilities. Later that day, W6SUIH called KG6FAE and K6FDU and informed them that this was his last transmission; he feared that his appendix had ruptured. Another operator took over at W6SUIH, and directions for administering medication were given by a doctor at the Naval Hospital on Guam. The Joint Rescue Control Center was notified and a rescue plane was dispatched. W4SLW/KG6 was the navigator on the rescue plane, and communications were carried on between the three principal stations on 20 meters. Difficulty was experienced in getting a good landline connection to the Naval Hospital, so KG6AKZ, Guam, contacted KG6IG, Chi Chi Jima, and asked him to go to the emergency frequency to assist. When the rescue plane arrived at the scene, two pararescue men from the plane were quickly put aboard the Pt. Montara and under the direction of the flight surgeon aboard the plane, gave additional medical aid. Transferring the patient to a rescue helicopter was vetoed by the doctor as he felt it to be too dangerous, and the Pt. Montara set out at top speed for the Naval Hospital on Guam. W6SUIH's wife was kept informed of his condition by W6FMO and KG6FAE, while KG6UEF and WB6DIU helped keep the frequency clear. A total of 14 amateurs participated. Oh yes, W6SUIH recovered nicely. — W1TRB/KG6



During a recent provincial test, Saskatoon EC VE5FC (far left), Sask. SEC VE5CU and the civil defense director (far right) were pictured in the shack of VE5FC which was being used as a monitoring station to check on the results of the test.

On March 17, W0KZZ, enroute from his home in Fargo, N. Dak., to Minneapolis, Minn., was trapped in drifted snow near Paynesville, Minn. The storm had struck with sudden force about 1100 CST, shortly after W0KZZ had left Paynesville. He traveled approximately five miles before his car became stuck, and within a short time six other motorists became stranded at the same location. As soon as it became apparent that the seven cars were trapped, the County Hunters Net, in which W0KZZ was operating, established an emergency net. K8CIR and W0CIF were net controls. One of the first contacts was to K0SPH, who relayed a message to W0KZZ's wife. During the balance of the day, messages were relayed to the families of the snow-bound motorists. The highway patrol and highway department were notified. The temperature dropped to 10 degrees. Communication was suspended as the motorists doubled up in cars to conserve gasoline and heat. Communication was again established at 0700 CST, March 18. By this time, the men had been without food or water for 24 hours and the situation was further complicated because one of the men had a severe case of ulcers and required a special diet. During the morning, W0KZZ was on the air only at half-hour intervals to conserve a steadily-decreasing supply of gasoline. By this time, net control had contacted W0ZQB and W0RVO, both of whom lived in the immediate area. These operators contacted the county sheriff and the state police. At the same time, K0SPH and K0AHH from Fargo checked in. K0SPH kept in contact with the Minnesota Highway Department while K0AHH contacted both the Civil Air Patrol and the Air National Guard in Fargo for rescue attempts or food and fuel drops. Wind and weather made both impossible at that time and weather forecasts were not promising. Additional attempts to send snow plows proved futile. Drifting snow, packed drifts and poor visibility stopped these efforts. Meanwhile, W0RHT provided the first news of the situation to a Minneapolis radio station. A farmer less than a mile from the location in question heard the newscast and made his way to the cars and offered them use of his home. An official of the highway patrol advised the men to leave their cars and walk to the house, because plows would not get through for another 24 hours. A total of 23 amateurs participated in emergency communications. — W0KZZ.

On March 17, a tornado hit the Muscle Shoals area of Tenn. Communications from the Memphis Air Port Traffic Control Center were handled via FAA club station WA4SBF, manned by W4MRD and WA4KZP. WA4OCL directed operations in the Shoals area, made available mobile units to operate at the airport and later moved his own equipment there to operate from the Flight Service Station location. WA4HFE maintained communications with WA4SBF during the move. K4ROR drove his car, equipped with radio gear, to the airport to provide the first contact with the facility there and handle the first

messages. K4UVJ also operated mobile at the airport until he was relieved by WA4OCL. W4ZSI also handled traffic. — W4MRD.

A six-year-old Tyrone, Pa., girl left for school on the morning of March 18, and was never seen afterwards. A search-and-rescue-type operation was started and the Blair and Huntingdon Counties AREC groups were called into action to provide communication for the search. Amateurs were dispatched with the search teams, and when they got out of communication range with headquarters, local amateurs acted as relays from their home stations. The search lasted three days with no success. Twenty-two amateurs took part. — K3MIL, EC Blair Co., Pa.

The morning after the March 28 Chilean earthquake disaster, K2USA, Ft. Monmouth, N. J., received a request from one of the students at the Signal Corps school to check on the welfare of his family who lived in the disaster area. K2USA attempted to contact any station near the disaster area, but with no success. W6JNG offered his assistance, and 22 minutes later he had the information, from CE2QB, that the student's family was safe.

Almost one year from the date of the Alaskan earthquake, another quake, of greater magnitude, was recorded in the Aleutian Islands, more specifically near Rat Island. When KH6FKU heard the news on the radio, he immediately got on the air, looking for some station in Alaska who might have information on the quake, and the details, if any, of possible tidal wave activity. He first contacted KL7EQQ, 200 miles in the interior of Alaska, who hadn't heard about the quake, but offered to get what information he could. Almost immediately, stations began checking in, and an emergency net was formed on the spot with KH6FKU as net control. KH6DE advised that civil defense had been activated, and any information concerning the tidal wave should be passed to c.d. and any points that might be effected. Within 15 minutes, some 59 stations checked in and stood by. In addition, 5 stations from islands in the Pacific checked in for any possible information. Estimated time of arrival of the tidal wave, should one form, was given and noted by all stations. A few minutes later, KH6DE informed the net that no tidal wave was generated and the net closed. — KH6FKU.

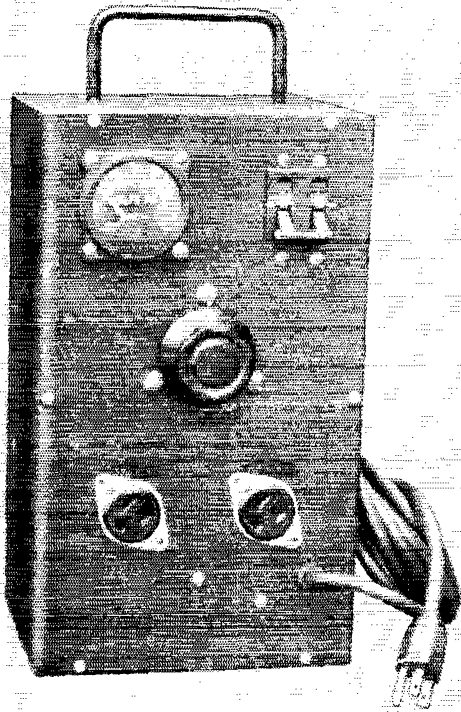
Forty-one SEC reports were received for Feb. representing 21,203 AREC members. One more SEC report than last year and a sizable increase in AREC membership. Let's keep the ball rolling fellows. Maybe we can hit that 74 mark yet. Sections reporting: Ill., N. N. J., Tenn., N. C., Ind., Iowa, Nebr., NYC-LI, Los A., Miss., R. I., Alta., Sask., E. Pa., B. C., Man., Man., La., W. N. Y., Hawaii, E. Mass., W. Pa., Ariz., Kans., Wyo., Wisc., Maine, Mich., Ala., E. Fla., Wash., Nev., Ohio, Utah, Mo., N. Mex., Ark., S. Tex., Va., Colo., S. Dak., Okla.

Strays

On June 5, the Mt. Baker Amateur Radio Club, K7SKW, of Bellingham, Washington, will be operating from the 5,000 foot level of Mt. Baker, in northwest Washington state. A special certificate will be available to stations who contact this group. Bands of operation are 20 meters s.s.b., and 75 meters a.m. QSL address is K7SKW, P.O. Box 457, Bellingham, Washington. For further information write W7VRO, 2935 Plymouth Drive, Bellingham, Washington 98225.

SWITCH
TO SAFETY!





The protected variable-voltage test unit. The double-pole circuit breaker is opposite the a.c. voltmeter. The control of the variable-voltage transformer is at the center, and the outlets for fixed and variable voltages at the bottom. This steel cabinet (Bud CU-1124) measures 12 by 7 by 6 inches, but a size should be selected to accommodate the particular components used.

A Helper for the Workbench

Protected Variable-Line-Voltage Test Unit

BY GEORGE P. SCHLEICHER,* W9NLT

ALMOST every experimenter finds from time to time that he needs to have a means of varying the a.c. supply voltage to equipment under test. This need, together with a few associated requirements, led to the design of the "Black Box" shown in the photograph. While similar units are available commercially, they are usually costly; the unit described here was built of surplus parts at a cost of under \$20.

Objectives

By the time construction was started, it was decided that the device should:

- 1) Furnish continuously-variable a.c. from 0 to 140 volts,
- 2) provide isolation from the power line; the output should be ungrounded,
- 3) be completely self-protected against overload or short circuit,
- 4) provide an indication of the output voltage, and
- 5) not produce excessive heat.

Circuit

The unit was assembled using the circuit shown in Fig. 1. T_1 is a 1:1 transformer that provides isolation from the a.c.-line ground. T_2 is a variable-voltage autotransformer (e.g., Variac, Powerstat). CB_1 is a double-pole magnetic circuit breaker with one pole in the load circuit and the other in the primary circuit of T_1 . Variable voltage is taken from J_1 , while fixed line

voltage may be taken from J_2 . The variable voltage is monitored by the a.c. voltmeter M_1 .

Components

At considerable saving in cost, I used major components found by careful search of the surplus and used-equipment market. Suitable standard catalog items are listed under Fig. 1, depending on the power level desired.

You will find that the lowest-priced components are usually those that are included in apparatus offered for sale as manufacturers' surplus. Be sure, however, that the units selected are for 60-cycle supply. The 400/500-cycle units found in surplus are not suitable.

For economy in space, T_1 and T_2 should have approximately equal ratings in watts or volt-amperes. If the ratings differ, power drawn from the unit should be limited to the rating of the lowest-rated unit, and the circuit breaker should be selected accordingly. Very little protection will be sacrificed by using a lower-cost single-pole breaker. I happened to find one with two poles at a bargain. The variable-voltage transformer I picked up has a brush rating of 3 amperes. Each pole of the breaker has a rating of 2.5 amperes. While a 3-ampere breaker might have been selected to match the brush rating exactly, a more conservative approach was taken for two reasons: In the first place, all of the components were to be operated in a completely-closed metal case. This might result in operating temperatures higher than those anticipated in the manu-

* 1535 Dartmouth Lane, Deerfield, Illinois 60015.

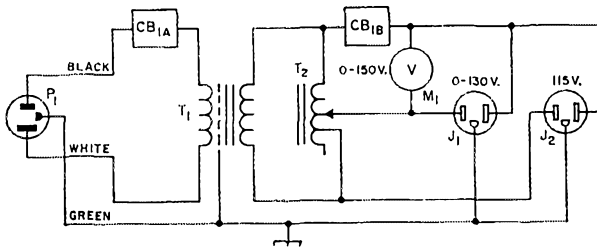


Fig. 1—Wiring diagram of the protected testing unit.

CB_{1A}—Double-pole magnetic circuit breaker, 115 volts, a.c., current rating to match ratings of T_1 or T_2 ; see text (Heinemann, Wood Electric Type 190, or similar).

J_1 , J_2 —A.c. outlet with grounding terminal (Amphenol 160-2, or similar).

M1—0-150 a.c. voltmeter; see text.

P_1 —A.c. power plug with ground terminal.

T_1 —115/115-volt isolation transformer. Typical: 250 watts—UTC R-74.

350 watts—Stancor P-6415.

600 watts—UTC R-75.

T_2 —Variable-voltage transformer, 115-volt 60-cycle input, 0-130—140-volt output.

Typical:

3-amp.—GE 9H30LA10X.

4-amp.—GE 9H4OAA10X, Superior 21, Standard 375BU.

7.5-amp.—GE 9H6OAA10X, Superior 116U, Standard 500BU.

manufacturer's "free-air" rating. In the second place, circuit breakers of the type used generally have a current-time relationship in their operation. They will carry the rated current continuously and carry small overloads for a minute or more; large overloads cause immediate tripping. When experimenting, the breaker may operate and be reset several times in a minute. Damage to the brush could result in this kind of service if higher circuit-breaker ratings were used.

Applications

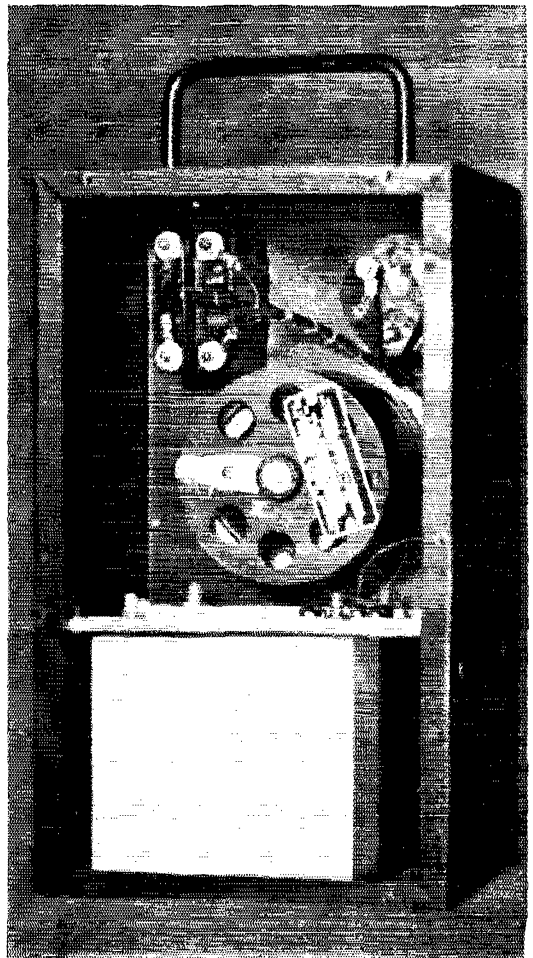
There are so many uses for the arrangement that it is hard to select a few that will best illustrate its versatility. The device is always used when work is done on faulty appliances; its value lies in its ability to open a faulty circuit quickly. If an a.c.-d.c. radio set is under test, it protects the person working from receiving a shock from a "hot" chassis. A few difficult intermittent troubles have been made to show themselves when the equipment involved was subjected to under-voltage and over-voltage testing. It is helpful in determining transformer ratios and characteristics of other equipment components. It can also be used to control soldering-tool temperatures, battery-charging rates and Christmas-tree light voltages (bulbs rarely fail when they are operated at 90 volts).

Possible Refinements

Experience has shown that some additional features might be desirable. A frequently-used accessory is a 4-foot power cord equipped with a grounding plug on one end; insulated alligator clips are connected to the conductors on the other end. The variable-voltage output might be terminated on binding posts as well as in the receptacle; this might better suit some applications. A two-range voltmeter would be handy if the box is used frequently to supply voltages of less than 50; voltages less than 50 cannot be read to any

degree of accuracy on most 0-150-volt a.c. voltmeters. An a.c. ammeter in the load circuit might also be worthwhile. A toggle switch might be added to permit shutting off T_2 when it is not being used.

QST



Rear view of the variable-voltage test unit. The isolation transformer occupies the lower portion of the box.

18th V.H.F. Sweepstakes Summary

Great Club Activity Offsets Poor Conditions

COMPILED BY ELLEN WHITE,* W1YYM

FOR more than a week previous to the January 9-10, 1965 ARRL VHF Sweepstakes, unusually good wintertime v.h.f. propagation prevailed. It had to happen. Tropospheric propagation began to deteriorate steadily from average winter conditions to the poorest by early Sunday. Even with band occupancy the greatest in history, picking up contacts was tough. It was the sort of contest in which casuals could have given up early and one in which you might have predicted a small number of submitted logs. If you had, you would have been wrong! Close to 1400 logs were received topping by 100 the 1964 endeavor!

Statistics for the 18th VHF SS indicate that almost 70% of the logs received were noted for the club competition, making this contest outstanding for teamwork results. Regardless of conditions, club members *could* and *did* get on to work for a club score.

All awards are scheduled for mid-June mailing.

Club Comments

"It looks like the Packrats (from the score standpoint) have reached their peak and are now on the downgrade. Propagation conditions in this area seemed to be even worse than last year. Several of our better operators had unfortunate setbacks. W3IBH operated just briefly due to a bad throat condition. W3KKN was hit by a virus bug after the finest start he ever had in a contest. K3IPM was forced to abandon his hilltop portable location due to a severe ice and snow storm. Even with the lower scores, each member did his best and everyone had a lot of fun. The club directors have tried to emphasize the fact that contests are for enjoyment *and* improvement of the station." — *W3LHF, Mt. Airy V.H.F. Club.*

* Assistant Communications Manager, ARRL.

"Participation increased to 60% of the membership of the club this year. Although average score per member was down due to generally poor groundwave conditions, this is the largest combined score that our club has had the pleasure of submitting." — *W3HFY, Mobile Sixers.*

"At an early meeting of our club, I stuck my neck out saying that we (as a club) ought to do a lot better than we did a year ago. Of course they made me chairman of the January affair and asked me for a plan. The one I proposed was to double our last year's score. It worked well, but not without a lot of phone calls, etc. We went over the top, slightly better than doubling our 1964 total. Last year 17 members participated, this year 29." — *W3HB, Rock Creek Amateur Radio Association.*

"Plenty of activity, especially on two but a lower score than 1964. Everyone had a good time." — *W3DPW, Dayton Amateur Radio Association.*

"This is our club's first effort in v.h.f. contest work and 90% of the members having v.h.f. equipment participated. We're proud of our results and plan even greater improvement next year." — *K3RGA, Fort Belvoir Amateur Radio Club.*

"We observed no openings but most of the locals were making contacts." — *K4WHW/4, Decatur Amateur Radio Club.*

Division Highlights

The heavily populated sections in the Atlantic Division are the scene of intense interest in "The World Above." Approximately 570 logs were received from this area, about 40% of the entire reports. You may be able to work a lot of stations in these areas but, correspondingly, the competition is rougher. In Eastern Pennsylvania, W3MIF turned out with a 4-hand effort and high single-operator score for the division, 27-K. In a 6-meter-only show, K3UHU took the Delaware lead with 326 two-ways in 9 sections. Top division score by a multioperator station was by WA2WUN, assisted by WA2TQI resulting in over 17-K on 6 and 2. In the Central Division competition was brisk. Top solo performance was by K9QKB, topping 100 entries from Illinois with 209 contacts in 7 sections in 3 hands. K9MFE topped the more-than-one-operator class in Illi-

KL7ENZ topped all scores in the active Alaska Section using a Communicator III on two meters and HW-29A on six. Bob reports that there are over 50 two-meter rigs within 20 miles of Fairbanks and hopes scores will be higher next test.

QST for



CLUB SCORES

Club	Aggregate	Valid Entries	Certificate Winner	Club	Aggregate	Valid Entries	Certificate Winner
Mt. Airy V.H.F. Club (Pa.)	641,177	94	W3MIFY	Syracuse V.H.F. Club	11,688	9	W2RHQ
South Jersey Radio Assn.	248,556	58	WA2EMB	Hartford County Amateur Radio Assn. (Conn.)	11,683	6	W1HDQ
Mobile Sixers Radio Club (Pa.)	185,964	53	W3AWA1	Cheltenham High School Amateur Radio Club (Pa.)	10,384	3	K3UDA
Reading Radio Club (Pa.)	119,260	69	W3WJC	Merrimack Valley Amateur Radio Club (Mass.)	10,117	5	W1CUV
Rochester V.H.F. Group	113,825	73	WA2YUE	Ranococas Valley Amateur Radio Assn. (N. J.)	10,032	3
6 Meter Club of Chicago	94,247	38	K9EVA	Huntsville Amateur Radio Club (Ala.)	9890	12	W4ZNI
Rock Creek Amateur Radio Assn. (Md.)	52,075	29	K3VJH	York V.H.F. Society (Ont.)	9522	3	VE3DSE
Central New Jersey V.H.F. Society	51,084	15	W2GKR	V.H.F. High Banders (Ohio)	9445	4	K8ZES
Dayton Amateur Radio Assn.	45,735	24	W8KKF	Seneca Radio Club (Ohio)	8964	4	W81D*
Zephyr V.H.F. Society (N. J.)	42,546	3	Mid-Island Radio Club (N. Y.)	8508	10	W2SEU
Gloucester County Amateur Radio Club (N. J.)	41,722	15	W2LVW	Van Wert Amateur Radio Club (Ohio)	7928	14	WA81AD
Greater Pittsburgh V.H.F. Society	38,594	23	W3BFWU	Morris Radio Club (N. J.)	7690	7	K2BI
National Capital V.H.F. Society	38,200	9	W4UIS	Niagara Peninsula Amateur Radio Club (Ont.)	6972	10	VE3FPG
Hampden County Radio Assn. (Mass.)	37,760	26	W1VNH	Air Capital Amateur Radio Assn. (Kans.)	6928	9	W0MMR
Ft. Belvoir Amateur Radio Club (Va.)	37,331	21	K3RGA	Decatur Amateur Radio Club (Ala.)	6590	10	K4WHW/4
Southern California V.H.F. Radio Club	35,526	12	WB6ITG/6	Mid-Hudson V.H.F. Society	6546	5	K2BGU/2
Central Michigan Amateur Radio Club	32,757	31	W8CCK	Dutchess County V.H.F. Society (N. Y.)	5386	5	W2HZZ
Albany Amateur Radio Assn. (N. Y.)	32,051	18	WA2JWO/2	Greater Pittsburgh Teenage Radio Club	5043	3	K3YQA
Germantown Radio Club (Pa.)	25,680	5	K3ZPL	Bergen Amateur Radio Club (N. J.)	4634	4	WB2HID
Searborough Amateur Radio Club	23,371	20	VE3EZO	Larkfield Radio Club (N. Y.)	4512	3
Opequon Radio Society (W. Va.)	21,962	17	K8WXB	Arctic Amateur Radio Club (Alaska)	4334	8	KL7ENZ
Keystone V.H.F. Club (Pa.)	21,348	7	W3BJG	Norwood Amateur Radio Club (Mass.)	3614	5	K1JME
Pop Bottle Net of the STARS Club (Pa.)	21,252	4	K3PGB	Apple Pie Hill Amateur Radio Club (N. J.)	3605	8	K2VFT
Argonne Amateur Radio Club (Ill.)	21,096	17	K9YHH	Metro Amateur Radio Club (Ont.)	2652	3	VE3RN
Skokie Six Meter Indians (Ill.)	21,076	15	W9KAW	Limestone Amateur Radio Club (Ala.)	2054	5	K4KJD
6 & 2 Ham Club (Ill.)	19,890	13	WA9FJW	Dundalk Senior High School Amateur Radio Club (Md.)	1758	5	K3YGC
Lake Success Radio Club (N. Y.)	16,496	9	E2PWG	Nittany Amateur Radio Club (Pa.)	1748	4	K3AKR
1200 Radio Club (Mass.)	15,695	9	K1OUY	New Providence Amateur Radio Club (N. J.)	1650	3	WN2OTL
Communications Club of New Rochelle (N. Y.)	14,758	3	WB2FXB	CRES Amateur Radio & Electronics Club (Ohio)	1118	3	W8FBT
Springfield Amateur Radio Club (Ohio)	14,528	12	WA8HVK	Elgin Amateur Radio Society (Fla.)	1100	6	W4RKH
Fulton Amateur Radio Club (N. Y.)	13,952	12	K2DUR				
MIC Amateur Radio Club (Pa.)	13,490	5	W3GCR				
5 Towns Radio Club (N. Y.)	13,108	8	WA2NZA				
Lawndale Boys' Club Amateur Radio Assn. (Ill.)	13,024	10	WN9MRP				
6 Meter Club of Dallas	11,925	9	K5MLD				

* W3HIFY opr. † W8JLJ, opr.

nois-Indiana-Wisconsin assisted by K9ZFG and W9NZF; 7680 points in a 6 and 2 meter endeavor. Though sections were hard to come by, the fellows worked Illinois, Indiana, Wisconsin, Michigan, Ohio and Iowa. V.h.f. activity in the **Dakota Division** was limited although K0LTA in Minnesota found 67 stations on 6 and 2 to exchange two-ways with, for top score. K0FKJ bemoaned the lack of local contacts concluding his comments with "This was a contest?" From the numerous contacts made with locals exchanging low numbers, it looks like all three sections are ready for club challenges to promote local contest activity. In the **Delta Division**, WA1CGA of Kingsport Tennessee, put a 4-element beam on 6 and a 7 element beam on 2 to good work for top section and division score. In the same section, K4EJQ/4 assisted by WA4CBX and W4YAU wound up with 3502 points for a 6 and two meter effort, top multioperator score in the division. The **Great Lakes Division** is always the scene of great contest interest, as it was in January with 136 entries from the three sections. K8ZSZ/8 led all single ops. with 8.5-K on 6 and 2 while the Butler County VHF Association crew at W8CCI turned in a 33-hour effort on two bands for over 20-K. The W8CCI antennas include 11 over 11 at 80 feet for 6 meters and 11 over 11 at 118 feet for 2! The **Hudson Division** shows the second highest number of entries, about



This handsome coco bolo gavel with an engraved sterling band is the prize for the club with the top aggregate score in the VHF SS. Mt. Airy takes it for 1965 for a 94-club-member effort and 641,177 points!

DIVISION LEADERS

Single Operator		Multioperator
W3MFY	Atlantic	WA2WUN
K9QKB	Central	K9MFE
K9DTA	Dakota
WA4CGA	Delta	K4EJQ/4
K8SZS/8	Great Lakes	W8CCI
K2SWI	Hudson	WA2FGK
K0LJJ	Midwest
W1MEH	New England	W1UDT/1
K7SJQ	Northwestern	K7WXW/7
K6DTR	Pacific	WA6ODP/6
W4VCC	Roanoke	K4WCC
W0WYX	Rocky Mt.	K0ZAQ
K4HPR	Southeastern	W4TOE/4
WB6ITG/6	Southwestern	W6FNE/6
K5MLD	West Gulf	K5CFM
VE3CVX	Canadian	VE3SAU

170 from the three heavily populated sections. The top solo performance was by K2SWI in N.Y.C.-L.I. George's 6 and 2 meter effort was a last-minute affair, begun 10 minutes after installing new arrays on a 90-foot tower. Although activity was down his results of 12-K led the division. Point-wise, the multioperator total of WA2FGK is stunning. Six operators took advantage of four bands and well over 800 two-ways were concluded in 21 sections for over 60-K. The WA2FGK antennas include 11 elements up 70 feet on a 36 foot boom for six meters; 32 elements up 85 feet on a 5 degree tilt for two, 15 elements for 220 and 30 elements for 432! The major conclusion of the crew was that band conditions in the area (N.N.J.) were very good Saturday evening and the use of c.w. gave them a great total on two meters. More c.w. work should be done on 6. One of the unusually productive single-band efforts in N.Y.C.-L.I. was by W9ECV/2 assisted by WA2KDZ for 17 sections on 6 meters. Mark expects to be QRT for some time while going to graduate school.

In the **Midwest Division**, the pickings were slim but K0LJJ of Missouri led his section and division with 4320 points. Kansas activity was brisk with 11 entries, led by K0ITF with 3330 points in a 3-band effort. The good Kansas turnout was due to the Air Capital Amateur Radio Association interest, *f. b.!* In the **New England** area, the top single-operator endeavor by W1MEH of Connecticut resulted in just under 17-K on 6 and 2 meters while the high multi-operator total was by W1UDT/1 assisted by K1DJN in Western Massachusetts. Over 100 logs were submitted in this division. Good club activity was shown by the Hamp-

den County Radio Association and the 1200 Radio Club. Out in the **Northwestern Division**, the most striking activity was registered by the State of Alaska. Although skip possibilities were nil, the fellows livened up things thanks to the Fairbanks area Arctic Amateur Radio Club (with 8 club entries). Section topper was KI7ENZ with 39 QSOs on 6 and 2. K7UGD/7 reports from what he terms a v.h.f.-desolate Idaho section. He says the nearest contact from his operating QTH was over 50 miles and the best gear on the other end consisted of Two'ers and 522's. K7UGD is endeavoring to interest the denizens of the d.c. bands in v.h.f.; watch out for Idaho in future contests! Oregon is the scene of good local v.h.f. interest and division high scorer K7SJQ reports lots of local activity in the Portland area. Division top multioperator score by K7WXW/7 (also in Portland) produced 117 contacts for 2908 points. After a few brief months in Washington, W9QKM fired up an hour before the start of the SS. This was his first v.h.f. contest in almost ten years, since back in Glenview, Illinois. Jim reports fair activity on 6 in Seattle but little on 2. What happened to the reports fellas? **Pacific Division** logs indicate fair activity although numbers of logs are low. K6DTR led S.C.V. and the division with 3000 points on 6 and 2, in 5 Pacific Division sections. WA6QQL/6 reports his largest single accomplishment was the working of W7CNK in Tacoma, Washington on 50-Mc. meteor scatter s.s.b. CNK runs a 5-second-on 5-second-off tape loop on the VOX and there is enough residual signal coming through on ionospheric scatter to get aligned on the frequency. When a good burst comes, Doug says one just talks as fast as possible keeping the amount of information transmitted at any one time to a minimum to permit a complete exchange of information to be transmitted on a single try. He says it's time consuming but just about the only way one can get enough information across in the SS-type contest to qualify as a contact. When section information *only* needs to be transmitted Doug says c.w. is better. In East Bay WA6ODP/6 operated by 8 Livermore Amateur Radio Club members, turned in a 3-band effort for 4256 points and high division multioperator score. Back in the east, in the **Roanoke Division**, top solo job was by W4VCC with 228 exchanges in 10 sections for Virginia honors. Virginia also took top multioperator honors with a 3-operator performance by K4WCC for 5292 points. West Virginia put in a good showing, thanks to the efforts of the Opequon Radio Society, led by K8VXB and 2460 points. In the **Rocky Mountain** division results were sparse with W0WYX of Colorado leading with 33 two-ways in two sections, Colorado and Wyoming. K0ZAQ (top multiop) reports that the local Leukemia Telethon really cut into the number of stations working the contest, but for a good cause. In the **Southeastern Division**, K4HPR sparked Alabama activity and division single operator honors with 2856 points, 102 QSOs in 4 sections. A fine Alabama turnout with 28 entries. The Greater Atlanta V.h.f. Society W4TOE/4 produced the top group effort in the division with 119 exchanges in 6 sections for 3808 points. The **Southwestern Division** with 4 sunny sections (now up to 5 with Orange) produced numerous interesting sidelights. In Arizona, a tie



The Butler County V.H.F. Assn. W8CCI, tallied over 20-K in a two-band effort. On the left W8DJY puts the 6-meter gear through the paces (the left rack houses the 300-watt a.m. rig and the right cabinet, 900 watts p.e.p.). On the right, W8MDY operating the 600-watt two-meter station. All told, 8 operators added up figures for the top multioperator score in the Great Lakes Division.

for the section award by Novices WN7BIA and WN7BTF. Los Angeles activity was great, led by WB6ITG/6 of the Southern California V.h.f. Radio Club. Dan managed 345 contacts in 3 sections for 8970 points, top single operator in the division. In the same section, W6FNE/6 aided by WA6GAG and K6YUL run up the top division multiplier score with 300 exchanges in 1 section. Down in the West Gulf area the top single operator performance by K5MLD of North Texas netted 3328 points in a 6-meter-only effort. The fine section showing is due to the club interest sparked by the 6 Meter Club of Dallas. Top multiplier score was recorded by K5CFM with K5EYG and WA5JRH operating in Oklahoma for a 4760 final score. One of the most active Canadian sections proved to be Ontario. Fifty entries were received, topped by the Canadian Division high VE3CVX. John concluded his two-meter-only effort with 209 exchanges in 4 sections for 5852 points. Top Canadian multiplier score by VE3SAU with 11 operators brought in 3900 points. Elsewhere in the division popular Quebec was well represented by VE2WT working 80 stations in 7 sections on two meters. The wonderful activity is due in no small measure to the Scarborough Amateur Radio Club, the York V.H.F. Society, the Niagara Peninsula Amateur Radio Club and the Metro Amateur Radio Club.

Disqualifications

In accordance with V.H.F. SS Rules, the entry of K8DEO has been found invalid.



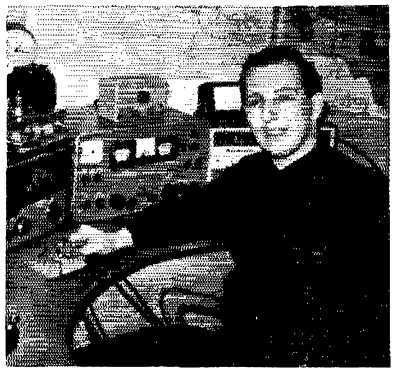
WB6ITG/6 turned in the top single-operator effort for the Southwestern Division, almost 9000 points on 6 and 2 while "roughing it" portable fashion. Dan also takes the club certificate award for the Southern California V.H.F. Radio club, top western group in the club competition.

SCORES

In the tabulation on the next pages, scores are listed by ARRL divisions and sections. Unless otherwise noted, the top scorer in each section receives a certificate award. The highest-scoring Novice also receives a certificate in each section where at least three such licensees submitted valid contest logs, (an asterisk denotes Novice winner). A certificate also will be awarded to the highest scoring Novice from sections of less than three entries . . . that in the opinion of the Awards Committee displayed exceptional effort; footnotes denote these winners. Columns indicate final score, number of contacts, number of different sections worked, and the bands used. A represents 50 Mc., B 144 Mc., C 220 Mc., D 420 Mc., E 1215 Mc. Multioperator stations are shown at the end of each section tabulation.

ATLANTIC DIVISION

Delaware		VA3AAN		W3BAH		K3MGO	
K3OHU	12,388-326- 9-A	W3AJF	9576-266- 8-ABC	W3BRU	3220-115- 4-A	K3BRJ	1512- 54- 4-B
K3FFD	2430- 81- 5-A	K3GAS	9420-314- 5-ABC	K3DMS	3192-114- 4-ABC	K3ABS	1488- 82- 2-AB
K3OBU	2688- 81- 6-AB	W3IZU	9360-260- 8-AB	W3CCH	3150-105- 5-AB	K3PGF	1456- 52- 4-AB
W3HC	1860- 62- 5-B	W3WJC	9240-231-10-AB	K3DMA	3016-116- 3-A	K3IOJ	1440- 60- 2-AB
W3CGV	1664- 52- 6-ABC	W3HAB	9150-305- 5-AB	K3CYN	2968-105- 4-A	K3ZJU	1440- 60- 2-ABC
K3CUU	1380- 46- 5-A	K3UJD	9112-268- 7-ABC	W3AZP	2940-105- 4-A	K3MBO	1430- 55- 3-A
K3URP	870- 29- 5-A	K3TPT	9036-252-18-A	W3GNS	2940- 98- 5-A	W3RAV	1404- 54- 3-B
Eastern Pennsylvania		K3PNT	8910-297- 5-AB	K3JFY	2912- 91- 6-B	W3ITH	1368- 57- 2-AB
W3MFL	37,016-614-12-ABCD	K3JNZ	8452-261- 6-A	W3HLX	2856-102- 4-ABC	W3IMV	1350- 45- 6-B
K3IPM/3	18,600-465-10-ABC	W3BKU	8064-224- 8-AB	K3QVY	2808-108- 3-AB	W3EYN	1342- 61- 1-AB
W3AWA	18,200-455-10-ABC	K3HSS	8052-183-12-A	K3UQU	2800-100- 4-A	K3NSD	1342- 61- 1-AB
W3HF	16,200-450-10-ABCD	K3ZPN	7350-245- 5-AB	W3QAS	2704-101- 3-ABC	K3TOS	1326- 51- 3-A
W3CL	17,518-461- 9-ABC	K3RCV	7296-238- 6-AB	W3BJG	2660- 70- 9-ABC	W3BHT	1320- 60- 1-B
W3ALXW	16,790-366-13-AB	K3RYW	7200-225- 6-A	K3YLZ	2656- 83- 6-ABC	K3LNL	1300- 60- 3-B
W3LFE	16,440-411-10-ABC	K3PGB	7168-256- 4-A	W3ZLL	2600-100- 3-A	W3TJQ	1300- 50- 3-A
K3ACR	15,336-426- 8-ABC	K3TEP	7028-251- 4-AB	W3UQU	2574- 99- 3-ABC	K3BUM/3	1296- 54- 2-AB
K3LOM	14,402-379- 9-A	K3WEU	6870-229- 5-AB	K3YVZ	2520- 90- 4-A	K3RCB	1278- 84- 2-AB
W3HKZ	13,908-366- 9-ABC	K3AQH	6840-228- 5-AB	W3MNC	2470- 95- 3-AB	W3HYO	1272- 52- 2-B
W3OHY	13,000-326-10-A	K3ZPL	6720-225- 3-A	K3FOC	2421-101- 2-AB	K3JFD/3	1224- 51- 2-AB
K3DUW	12,563-370- 7-A	K3YVW	6692-239- 4-ABC	K3YJC	2400-100- 3-AB	K3VFS	1034- 47- 1-B
K3IUY	11,662-343- 7-ABCD	W3RTU	6132-236- 3-A	K3PSQ	2398-109- 1-AB	W3AFB	1012- 46- 1-B
W3SAO	11,168-349- 6-ABC	W3KTY	6132-219- 4-AB	K3WAK	2282- 87- 3-AB	K3ZZN	984- 41- 2-A
K3BHK	10,872-302- 8-AB	K3KVS	5984-187- 6-ABC	K3RODZ	2250- 75- 5-ABC	K3PFV	946- 43- 1-B
W3KKN	10,836-258-11-ABC	K3ALK	5964-213- 4-ABC	K3PTE	2214-102- 1-AB	K3CHN	864- 36- 2-A
K3JJZ	10,556-377- 4-ABC	W3JSD	5856-183- 6-ABC	W3BTE	2223- 86- 3-A	W3BPS	858- 33- 3-A
K3UDA	10,230-341- 5-AB	K3IUZ	5830-265-11-AB	K3RZF/3	2210- 85- 3-AB	K3QEA	856- 33- 3-A
K3HHS	10,038-239-11-B	K3DAQ	5796-207- 4-A	K3PNS	2160- 90- 2-AB	W3ZZR/3	856- 36- 1-B
W3ETB	9945-293- 7-A	W3AJP	5790-196- 5-A	W3GXB	2158- 83- 3-B	W3KPK/3	832- 32- 3-A
W3GEW	9828-351- 4-AB	K3JXC	5790-193- 5-ABC	W3JYL	2142- 77- 4-A	W3AVU/3	816- 34- 2-A
W3CXU	9720-270- 8-AB	K3SZG	5684-158- 8-AB	K3ZTP	2132- 82- 3-A	W3CDS	814- 37- 1-B
		K3RPH	5684-203- 4-ABC	K3GYZ	2098- 80- 3-A	W3WOL	814- 37- 1-B
		K3MSV	5610-187- 5-A	K3MLL	2028- 78- 3-A	K3FMI	806- 31- 3-A
		K3HWZ	5600-200- 4-ABC	W3GFW	2016- 72- 3-A	W3AYO	792- 36- 1-AB
		K3ZRB	5535-186- 5-A	K3YNN	2002- 77- 3-AB	K3FZC	780- 30- 3-A
				K3EJQ/3	1826- 83- 1-AB	K3PVL	770- 35- 1-AB
				K3HUU	1632- 88- 2-AB	K3GCU	748- 31- 4-A
				K3WGO	1606- 73- 1-AB	K3NDA	744- 31- 2-AB
				K3MNI	1560- 65- 2-ABC	W3ABBA/3	728- 28- 3-A
				K3GYS	1534- 59- 3-AB	K3CBE/3	726- 33- 1-A
						K3TVB	726- 33- 1-AB



Ontario leader VE3CVX totaled 5852 with 209 QSOs in 4 sections. The antenna used in this two-meter only operation was a 15-element Telrex 110 feet up. Top single-operator score for Canada.

- W80DN 2408-86 4-AB
- W80CPJ 2370-79 4-AB
- W80CJ 2368-81 5-AB
- W80TN 2240-80 4-AB
- K8KDW 2236-86 3-AB
- W80KRE 2072-75 4-AB
- K8YWF 2072-76 4-AB
- K8LIS 1976-76 3-AB
- W80NK 1950-75 3-AB
- W80LPU 1820-70 3-AB
- W80DPW 1664-64 3-AB
- K8GDI 1488-62 2-AB
- W80DWT 1464-61 2-AB
- W80SK 1430-55 3-AB
- W80AD 1428-51 4-AB
- K8ABC 1414-51 4-AB
- W8YCP 1352-52 3-AB
- W80NBU 2000-50 3-AB
- W8WAW 1296-54 2-AB
- W80CW 1254-57 1-AB
- W80AJ 1248-48 3-AB
- W80NZA 1188-50 2-AB
- W80JOC 1170-45 3-AB
- K8TUY 1152-48 2-AB
- W80NJJ 1040-40 3-AB
- K8RZR 1040-40 3-AB
- K8SBC 1020-34 5-AB
- W80LXW 946-43 1-AB
- W80MOI 880-40 1-AB
- W80IB7 792-33 2-AB
- W80AEE 768-32 2-AB
- W80D 744-31 2-AB
- W80HCC 744-31 2-AB
- W80KSE 744-31 2-AB
- W80PFS 726-33 1-AB
- W80NYJ 696-29 2-AB
- W80DFD 660-30 1-AB
- K8RND 650-25 3-AB
- W80DHG 600-25 2-AB
- W80LXZ 552-23 2-AB
- K8TFL 528-22 2-AB
- W80LW 520-22 3-AB
- W80FNJ 494-29 3-AB
- W80 300-15 2-AB
- W80CK 374-17 1-AB
- K8CUA 374-17 1-AB
- W80IBE 348-18 2-AB
- W80IBD 336-17 2-AB
- K8BSC 308-14 1-AB
- W80CPA 288-12 2-AB
- W80RPT 288-12 2-AB
- W80ROJ 288-12 2-AB
- W80XC 286-13 1-AB
- W80BDI 281-11 3-AB
- W80IGD 264-12 1-AB
- W80LX 264-12 1-AB
- W80EHW 242-11 1-AB
- K8KFY 240-10 2-AB
- W80CPS 220-10 1-AB
- W80LWY 220-10 1-AB
- W80CSJ 132-6 1-AB
- W80EOP 120-5 2-AB
- W80LEO 110-5 1-AB
- W80NMI 110-5 1-AB
- W80BDI 88-1 1-AB
- W80JSC 88-1 1-AB
- W80ZA 88-1 1-AB
- KL7FAP 84-2 1-AB

HUDSON DIVISION

- Eastern N.e.n York*
- W82FXB 9500-250-9-AB
 - W2AQV 6060-170-9-AB
 - W82DST/2 5120-160-6-AB
 - K2YZR 3658-137-2-AB
 - W2ATFC 3495-117-5-AB
 - W2AJWO/2 3420-90-9-AB
 - K2BGU 2470-65-9-AB
 - W2AZPD 2336-73-6-AB
 - W2HZZ 2196-61-8-AB
 - K2ARO 1904-56-7-AB
 - W2ADTE 1560-52-5-AB
 - W2AWSY 1530-51-5-AB
 - K2ETI 1485-50-5-AB
 - WN2NVJ 1484-53-4-AB
 - W2ATIF 1440-36-10-AB
 - W2LKE 1326-39-7-AB
 - W2CTH 1092-39-4-AB
 - W2YPM 1088-34-6-AB
 - W82JRS 896-28-6-AB
 - W82NRP 800-25-6-AB
 - W2MBA 798-29-6-AB
 - W82RFE 650-25-3-AB
 - W2AGGD 650-25-3-AB
 - W82HZY 600-20-5-AB
 - W82MOX 546-21-3-AB
 - W2KCK 512-16-6-AB
 - W2AFZ 504-18-4-AB
 - W2HRE 476-17-4-AB
 - K2EJL 456-19-5-AB
 - W2HF 450-15-5-BC
 - W2AGXM 408-17-2-AB
 - K2BUT 384-16-2-AB
 - W82DVF 361-12-1-AB
 - W2LVE 354-11-3-AB
 - W2BAJ 221-13-3-AB
 - W82LQF 130-5-3-AB
 - W2ZYRF 44-2-1-AB
 - W2BAH (KIUGQ) 19,494-363-17-AB
 - K2BJR (W2BAH) 19,494-363-17-AB
 - K2DNR (K5IPEM) 3150-88-N-BC

- K3IRJ 836-38-1-AB
- A3TTP 744-31-2-AB
- K3WFL 726-33-1-AB
- W3ABR 704-32-1-AB
- K3WBL 660-30-1-AB
- W3EWW 572-26-1-AB
- W3TDW 528-21-1-AB
- K3MPD 440-20-1-AB
- K3ZVF 396-18-1-AB
- K3WLG 332-12-2-AB
- W3KJM 254-12-1-AB
- K3ONK 66-3-1-AB
- W3QZF/3 (5 oprs.) 2176-68-6-AB
- K3NXO/3 (K3NXO, K4CJO) 572-26-1-AB
- K3VBC/3 (K3s JLV, VBC) 720-10-1-AB

CENTRAL DIVISION

- Illinois*
- K9QKB 7106-209-7-ABC
 - K9EVA 7020-195-8-AB
 - K9ZVV 6720-224-5-ABC
 - K9TWF 6615-221-5-AB
 - W9AFTL 5330-205-3-AB
 - W9AIRZ 5124-183-4-AB
 - W9AFA 5012-179-4-AB
 - K9IDT 4980-166-5-AB
 - W9AJV 4830-161-5-AB
 - W9AVB 4536-162-4-AB
 - K9ZWU 4350-145-5-ABC
 - W9AKAW 4284-153-4-AB
 - K9ZPS 4172-149-4-AB
 - W9AGAO 3976-142-4-AB
 - W9AHR 3930-131-5-AB
 - W9BVB 3920-140-4-AB
 - W9BGL 3800-116-6-AB
 - K9YOA 3500-125-5-AB
 - K9TUL 3480-116-5-AB
 - K9YHH 3220-115-4-AB
 - K9PHF 3090-103-5-AB
 - W9AKYE 2977-116-3-AB
 - W9ACW 2800-100-4-AB
 - W9AIRY 2660-95-4-AB
 - W9AGSM 2352-99-2-AB
 - K9YJQ 2152-73-3-AB
 - K9YGR 2080-80-3-AB
 - K9TYH 2070-69-5-AB
 - W9RPH 2002-77-3-AB
 - K9BIDJ 1904-68-4-AB
 - K9WYF 1898-73-3-AB
 - W9WJL 1876-67-4-AB
 - W9IJJ 1846-71-3-AB
 - K9EHM 1820-65-4-AB
 - K9KLL 1560-60-3-AB
 - K9DKI 1536-64-2-AB
 - W9LPL 1456-56-2-AB
 - K9DGC 1440-60-2-AB
 - W9ABRE 1404-54-3-AB
 - W9AVE 1400-50-4-AB
 - K9YHF 1352-52-3-AB
 - W9ANTC 1344-56-2-AB
 - W9AHDF 1330-48-4-AB
 - W9AKQD 1300-50-3-AB
 - W9AQYI 1274-49-3-AB
 - W9ADLL 1248-52-2-AB
 - WN9AIDX 1222-47-3-AB
 - K9AMG 1205-48-4-AB
 - K9VTU 1104-46-2-AB
 - W9PJM 1080-45-2-AB
 - W9AMGI 1079-42-3-AB
 - W9CTR 1056-44-2-AB
 - K9FAJ 1040-40-3-AB
 - K9TBZ 1036-37-4-AB
 - W9DID 1032-43-2-AB
 - K9ECZ 980-35-4-AB
 - K9PJM 962-37-3-AB
 - WN9MR 936-39-2-AB
 - W9AERC 910-35-3-AB
 - W9ACXB 888-37-2-AB
 - W9AEEG 888-37-2-AB
 - K9HMB 875-18-15-AB
 - W9AKGA 864-36-2-AB
 - K9SZZ 864-36-2-AB
 - W9ABWB 840-35-2-AB
 - W9AEBT 840-30-4-AB
 - K9YTU 840-30-4-AB
 - W9ALRY 836-38-1-AB
 - K9QYT 792-33-2-AB
 - K9SST 744-31-2-AB

- W9RHZ 728-28-3-AB
- W9GQY 702-27-3-AB
- W9A9VF 624-26-2-AB
- K9BNV 612-25-3-AB
- W9CMD 600-25-2-AB
- K9TLR 572-22-3-AB
- W9EFR 528-22-3-AB
- W9A9SO 504-21-2-AB
- WN9KTG 484-22-1-AB
- W9AXT 476-17-4-AB
- W9AJAD 468-20-2-AB
- W9DJCF 456-19-2-AB
- K9ZOO 420-15-4-AB
- K9GRL 416-16-3-AB
- W9BFX 406-17-2-AB
- W9A9EJ 396-18-1-AB
- W9A9WU 384-16-2-AB
- W9QVE 330-15-1-AB
- WN9NGB 308-14-1-AB
- K9EIVV 288-12-2-AB
- W9DJR 264-12-1-AB
- W9A9EFS 264-12-1-AB
- W9A9BQQ 220-10-1-AB
- W9KYA 220-10-1-AB
- W9AGOV 192-8-2-AB
- K9CNY 168-7-2-AB
- W9A9FO 132-6-1-AB
- W9ZEW 132-6-1-AB
- K9YZG 110-5-1-AB
- W9AKTX 66-3-1-AB
- K9MFE (K9s KZG, MFE) 7680-240-6-AB
- W9MCG (2 oprs.) 6784-212-6-ABC
- K9JAM (7 oprs.) 5120-104-5-AB
- K9AJY (multi-op) 3598-129-4-AB
- W9A9ML (W9A9ML, W9ZND, K17EB) 3444-123-4-AB
- W9A9BDJ (4 oprs.) 3304-118-4-AB
- K9YHB (W9KYA, W9AS, A1N, FJD) 2388-100-2-AB
- W9A9GO (W9A9s GOB, W9A9J, W9A9BOJ, K9HDE) 858-33-3-AB

GREAT LAKES DIVISION

- Kentucky*
- W44SKP 832-32-3-AB
 - WN4VZR 288-12-2-AB
- Michigan*
- W8BPG 5728-179-6-AB
 - W8CKK 3698-132-4-AB
 - W8LKM 3472-124-4-AB
 - W8RPA 3400-100-7-AB
 - K8LNR 2240-80-4-AB
 - W8LNI 2136-89-2-AB
 - W8CLH 1920-64-5-AB
 - K8BZV 1512-63-2-AB
 - W8LTY 1416-59-2-AB
 - W8SKZY 1364-62-1-AB
 - K8ZNP 1320-60-1-AB
 - W8CJV 1248-48-3-AB
 - W8ASJW 1248-48-3-AB
 - W8AJE 1056-44-2-AB
 - K8LAI 1008-42-2-AB
 - K8WEX 902-41-1-AB
 - W8AJJE 880-40-1-AB
 - K8ATU 814-37-1-AB
 - W8AJUG 814-37-1-AB
 - W8KX/8 806-31-3-AB
 - K8ZJY 792-36-1-AB
 - WN8MNK 770-35-1-AB
 - K8XNF 682-31-1-AB
 - K8BZY 660-30-1-AB
 - WN8MQT 594-27-1-AB
 - W8RXY 594-27-1-AB
 - K8ACO 550-25-1-AB
 - W8QGL 528-21-1-AB
 - W8SNC 528-21-1-AB
 - W8ABLU 484-22-1-AB
 - W8ABLU 484-22-1-AB
 - W8ABJD 336-14-2-AB
 - K8JNZ 330-15-1-AB
 - W8MX 286-13-1-AB
 - W8AKTO 258-12-1-AB
 - W8SDB 242-11-1-AB
 - K8KHV 220-10-1-AB
 - W8ARS 198-9-1-AB
 - W8ARGO 198-9-1-AB
 - W8RDI 176-7-1-AB
 - W8AKMR 154-7-1-AB
 - K8RW 154-7-1-AB
 - W8PZ 132-6-1-AB
 - K8ATU/8 8-1-1-AB
 - W8NSH (6 oprs.) 814-217-7-6-AB
 - W8BQD (W8s BQD, TJQ) 4956-177-4-AB
 - W8ADJM (W8s DJM, DMN) 2730-105-3-AB
 - W8AGSH (W8s GSH, IGN, JHP) 2626-101-3-AB
 - W8DXV (W8s DXV, NTO) 1464-61-2-AB
 - W8AMOA (3 oprs.) 902-41-1-AB
- Ohio*
- K8ZS/8 8568-252-7-AB
 - W8ARCA/8 8246-217-9-AB
 - W8KKF 7155-257-4-AB
 - K8WZS 620-184-7-AB
 - W8JRN 506-181-4-AB
 - K8KTX 4680-156-5-AB
 - W8MOW 4420-170-3-AB
 - W8IDW 4384-137-6-AB
 - W8ASAK 3612-129-4-AB
 - W8RPT 3380-130-3-AB
 - W8HVK 2990-115-3-AB
 - K8WVD 2968-106-4-AB
 - K8AMJ 288-100-4-AB
 - K8HRR 2688-96-4-AB
 - K8OTS 2678-103-3-AB
- Minnesota*
- K0DTA 1608-67-2-AB
 - K0OST 1144-53-1-AB
- South Dakota*
- K0FKJ 110-5-1-AB
- DELTA DIVISION**
- Louisiana*
- W5UGR 418-16-4-AB
 - W5DXA 352-16-1-AB
 - W5AIBT 220-10-1-AB
 - W5JBF 132-6-1-AB
- Mississippi*
- K5EUV 476-17-4-AB
 - K5TYP 448-16-4-AB

NOVICE CERTIFICATE WINNERS

WNICOD WN2QLP WN7ATS/6
 WNICWN WN2QPE WNSOVQ
 WN2PGE WN3AVH WN9MDX
 WN4UJI

N. Y. C. - L. I.

K2SWI 12,144-264-13-AB
 WA2RTA 7980-210-9-B
 WA2PTKL 5280-177-5-A
 W2SEU 4716-131-8-ABC
 WA2OOL 4140-115-8-R
 K2PWC 1032-112-8-AB
 WA2RZA 3744-104-8-A
 W2QAN 3096-102-8-A
 K2ANV 3024-108-4-B
 W2KKG 3010-108-4-B
 WA2NZA 3000-100-5-AB
 WB2POV 2775-94-5-A
 WA2RKK 2760-92-5-AB
 WA2PMW 2432-76-6-AB
 WB2D1N 2240-80-4-B
 WB2MH 2085-70-5-A
 WA2DRK 2080-65-6-B
 W2BNS 1680-60-4-B
 WA2VRJ 1652-58-4-AB

WB2ALEO 1624-58-4-B
 W2TNI 1512-54-4-B
 WN2Q1P 1372-49-4-B
 WB2HME 1316-48-4-A
 W2OUQ 1300-50-3-B
 W2JBQ 1176-42-4-B
 W2UFC 1050-35-5-B
 W2BOT 936-2-3-B
 W2NBL 900-30-5-B
 K2HTX 840-30-4-AB
 W2AIL 812-29-4-B
 WN2OUK 744-31-2-B
 K2RPF 700-25-4-AB
 W2ZSD 700-25-4-AB
 WN2PRP 663-26-3-B
 W2VL 608-19-6-B
 WN2OOJ 330-15-1-B
 WA2PNUF 231-9-3-A
 WA2ENP 224-8-1-B
 W2GKZ 182-7-3-B
 WA2LJS 132-6-1-B
 WA2DWZ 120-5-2-AB

WB2MCT 110-5-1-B
 W2UBW 110-5-1-B
 W2NYN 88-1-1-B
 WB2DNM 66-3-1-A
 W2HIE 46-2-3-B
 K2SYA 44-2-1-R
 W9RCV 2 (WA2KZDZ, W9RCV)
 15,444-288-17-A
 K2RCH (K28 RCH RTH)
 13,776-288-14-AB
 W2BAWZ2 (multi-ops.)
 13,414-353-9-AB
 WB2PVO (WB28 PKQ PVQ)
 5430-181-5-AB
 WA2YLL (WA2YLL, WB2QJ)
 3438-96-8-B
 WA2YHS (WA28 YDB YHS, WB2IQM)
 2790-93-5-AB
 WB2PVC (WB28 DTU FVC)
 2070-69-5-AB
 WA41J2 (WA2YSQ, WA4TVJ)
 614-23-4-AB

Northern New Jersey

W2NNL 11,666-307-9-AB
 W2GKK 8806-259-7-AB
 WA21DT 8766-199-7-AB
 WB2GCD 6120-180-7- -

WB2KLD 6086-179-7-4-B
 WA2OOD 5576-164-7-B
 WA2QCQ 5472-152-8-A
 K2GLI 5312-106-6-AB
 WA2BNI 4998-147-7-B
 WA2UEW 1512-142-6-B
 WB2LOO 4416-138-6-B
 K2RMD 3712-116-6-AB
 WA2KRX 3672-108-7-AB
 WB2DDJ 2 3232-101-6-A
 WA2UHF 3200-100-6-A
 WA2RIN 3165-106-5-AB
 WB2HLD 2970-99-5-AB
 WA2PDM 2880-90-6-AB
 WB2JVE 2688-85-6-A
 K2BI 2624-82-6-AB

K2POR 1176-42-4-A
 WA2VTE 1170-39-5-AB
 WA2PTN 1120-40-4-B
 K2QJD 1116-31-8-R
 W2SML 1022-12-2-AB
 WN2NTT 980-35-4-B
 WA2IDH 858-32-3-AB
 K2JRP 840-28-5-A
 WA2WYR 832-26-6-A
 WA2QCF 700-25-1-A
 WA2CMG 644-23-4-AB
 K2BJP 630-21-5-B
 WA2IQC 624-26-2-A
 K2SRK 588-21-4-A
 WB2IOM 572-22-5-B
 WA2EDP 560-20-4-AB
 WB2JFS 520-20-3-B
 WN2QJI 494-20-3-B
 K2IPZ 448-16-4-A
 WA2ZRT 442-17-3- -
 WB2QJN 432-17-3-B
 WA2VJN 403-16-3-A
 WB2JLF 286-11-5-A
 K2QEV 252-9-1- -

WA2QPD 240-10-2-A
 WB2GRC 196-7-1-A
 WB2GPG 122-2-2-B
 WB2FZW 156-6-3-A
 WB2EKA 132-6-1-B
 WA2PKM 41-2-1-AB
 W2PBR/2 22-1-1- -
 WA2PKK (65 ops.) 58,816-868-2-ABCD
 W2LST (11 ops.) 42,480-885-14-ABCD
 WA2FSQ (5 ops.) 29,350-592-15-ABC
 K2DEL (8 ops.) 9244-273-7-AB
 WB2QPA (2 ops.) 8058-237-7-B
 WB2NUW (multi-ops.) 5544-154-8-ABC
 W2SXO (K28XNO, WB2HPC) 4224-132-6-AB

W1HDQZ 7539-180-11-ABD
 K1YON 3520-88-10-A
 W1PHR 2346-68-7-AB
 K1ZLY 2280-60-9-A
 K1KSK 2108-62-7-A
 K1LSP 1920-60-6-AB
 K1YDZ 1768-52-7-B
 W1NCW 1300-50-3-B
 WA1CYM 1176-12-4-AB
 K1VAL 1170-39-5-AB
 W1VNO 1170-39-5-AB
 K1ETY 900-30-5-AB
 K1WVE 780-26-5- -
 W1BGD 574-21-4-R
 K1BNO 528-22-2-AB
 K1AZP 360-19-3-B
 W1BYX 224-8-4- -
 K1AOY 114-6-2-B
 K1QNP 130-5-3-A
 W1BAA (19 ops.) 2556-71-8-B

Eastern Massachusetts
 K1YDG 7254-202-8-AB
 K1JCC 6732-153-12-AB
 K1OUY 4114-121-7-AB
 K1CHY 3920-64-5- -
 W1JZD 3910-65-13-B
 W1OOP 2988-83-8- -
 K1UTH 2888-76-6- -
 W1JSM 2584-68-9-B
 K1ZCT 2633-78-7-A
 W1NCF 2400-80-5-B
 W1CUV 2244-68-7-A
 K1DVI 2190-73-5-A
 K1JQQ 2144-67-6- -
 K1KKS 2052-57-8-A
 K1JML 1710-57-5-AB
 K1ZGH 1412-41-6-A
 W1QIB 1288-46-4-A
 K1QDR 1176-42-4-AB
 K1WOW 1120-40-4-A
 W1SRJ 1050-37-4-B
 K1GJN 840-25-2-BC
 W1BXJ 812-29-4-A

New Hampshire

K1APA 5316-189-12-AB
 W1RXM 3036-69-12-AB
 VE3FCN 41-1-3-B
 W1SW 66-3-1-A
 W1ALE (W1AAL, YQH) 6776-154-12- -
 W1ASZ (K18 LFQ ABC, WA2ULP) 442-17-3-AB

Vermont

W1EXZ 420-15-4- -
 ABC

Western Massachusetts

W1JAE 11,638-253-13-A
 W1VNH 9200-200-13- -
 K1ULZ 3060-102-5-AB
 K1PXV 2926-77-9-A
 W1MNG 2312-68-7-AB
 K1NJC 2112-66-6-AB
 W1LPE 1852-61-6-AB
 K1LWY 1500-54-5-B
 W1FAB 1456-52-4-AB
 W1ALL 1428-51-4-AB
 W1BCI 1380-46-5-A
 K1RFP 1312-41-6-B
 K1LU 864-37-2-AB
 W1STR 1181-37-6-AB
 K1SAB 1066-41-3-B
 K1LDT 898-32-1-B
 W1IC 881-26-7-A
 K1LVO 868-31-4-A
 K1LU 864-37-2-AB
 W1UCR 784-28-4-AB
 WA1BU 780-30-3-B
 W1NY 572-22-3-AB
 K1ERN 504-18-4-A
 K1PMK 480-30-4-AB
 W1ESA 432-18-2-R
 W1OY 432-18-2-A
 K1LH 420-15-1-A
 K1QMV 192-8-2-B
 W1RH 176-1-1-B
 W1UDT (K1DJN, W1UDT) 12,936-308-11-AB
 W1UA (16 ops.) 5800-145-10-B
 W1UWX (12 ops.) 3975-117-7-AB
 W1GJY (2 ops.) 1664-64-3-B
 W1YK (2 ops.) 1531-45-7-AB

Northwestern Division

Alaska

K17ENZ 858-39-1-AB
 K17ENO 572-36-1-AB
 K17BT 396-18-1-B
 K17EFS 396-18-1-B
 K17EUW 308-14-1-AB
 K17EQ 132-6-1-B
 K17ECO (W1KNC, K17ECO) 858-39-1-AB

K17AEQ (K178 AEQ AZJ) 814-37-1-AB

Idaho

K7UGD/7 154-7-1-B

Oregon

K78JQ 2610-110-2-AB
 WA7RJ 1992-83-2-AB
 K7NZE 1056-41-2-AB
 K7ZFG/7 960-40-2-AB
 WNTBMR/7 792-33-2-B
 W7AWJ 638-29-1-B
 K7WXA 415-1-1-A
 K7WXW/7 (3 ops.) 2808-117-2-AB
 K7PUO (K78 PUO YCJ) 440-30-1-B
 K7OGK/7 (K78 WWZ ZCB ZSM) 312-13-2-AB

Washington

W9QKM/7 1080-45-2-AB

Pacific Division

East Bay

WA6ODP (8 ops.) 4265-133-6-ABC

Nevada

K7ICW 96-1-2-AB



...XYL WA2500 LOST A STEAK DINNER BET TO K2DUR

WB2PPD 2560-85-5-AB
 WA2VEB 2512-79-6-AB
 WN2QPE* 2482-73-7-B
 WB2LBR/2 2296-82-4-AB
 WN2PRF 2144-64-6-B
 K2LCL 2048-61-6-A
 WB2LDE 2040-68-5-AB
 WB2KPD 1848-66-1-B
 WN2MZB 1820-65-1-B
 WA2ZDA 1664-64-3-AB
 W2OJC/2 1530-51-5-B
 WA2WSI 1500-50-5-B
 K2GLS 1410-47-5-B
 WA2ZSN 1326-51-3-AB
 WN2OTL 1326-51-3-AB
 WA2THP 1312-41-6-B
 K2DMI 1184-37-6-B

MIDWEST DIVISION

Iowa

WA0CVA 1050-35-5-A

Kansas

K0ITP 3330-111-5-ABC
 W0MNR 1248-52-2-B
 K0GIC 1224-51-2-AB
 K0GCV 960-40-2-B
 W0HVC 840-35-2-B
 W0ADDZ 720-30-2-AB
 W0EJK 720-30-2-B
 W0OLC 660-30-1-AB
 W0ABR 528-21-1-B
 W0AKX 484-22-1-B
 K0RCH 264-12-1- -

Missouri

K0LJJ 1320-120-8-A
 W0LPE 936-36-3-B
 W0BHK 634-26-2-A
 W0PUL 96-1-2-AB
 WA0ANX 22-2-1-A

NEW ENGLAND DIVISION

Connecticut

W1ALEH 16,825-338-15-AB

W1WJ 756-27-4-BC
 K1AMP 702-27-3-AB
 W1GNK 676-26-3-A
 K1EZE 650-25-3-B
 W1NJVZ/1 624-24-3-B
 W1CTR/1 501-21-2-AB
 W1NVCYX 484-22-1-B
 W1CTR 381-16-2-A
 K1QIG 220-10-1-A
 K1RVT 176-8-1-A
 K1WHM (K18 FXN, W1A1) 9000-225-10-AB
 W1NBN (K1DIR, W1EU) 7880-197-10-AB
 W9DHR (K1QI, W9DHR) 6720-168-10-AB
 W18P (2 ops.) 3439-106-9-AB
 WA1CFE (4 ops.) 2445-82-5-AB
 K1ERO (2 ops.) 1170-39-5-B
 K1JMR (W1N8 BVW DEF, W1LUG) 832-32-3-AB

Maine

K1OYB 714-26-4-AB

CONDUCTED BY SAM HARRIS,* W1FZJ

LATE NEWS

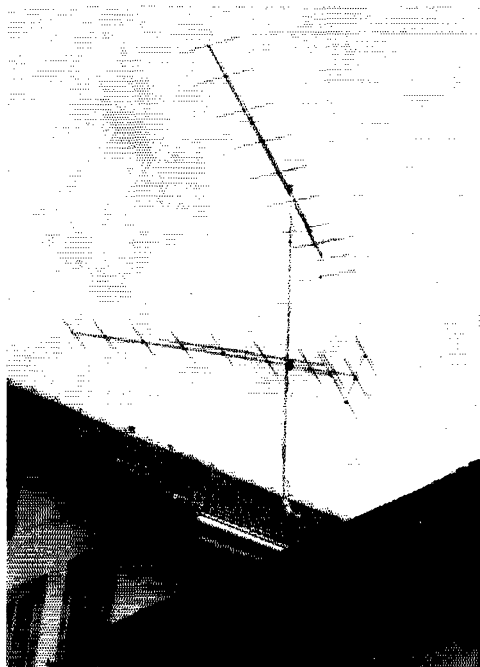
KP4BPZ, Arco, Puerto Rico will be on 432.0-Mc. moonbounce on Saturday, July 3, 1965. Get ready now and watch for details in next month's QST.

432 Mc. Tropo Propagation

ON August 31, 1961 SM6ANR and G3JHM established a new DX record on 432 Mc. of 686 miles. With the exception of several moonbounce contacts made in 1964, no one has ever exceeded this two-way 432-Mc. DX record. This of course has not been due to any lack of trying. Stalwarts like VE2LI, K2CBA, W1QWJ, W8PT, W5UKQ, W5AJG, to name a few, have been attempting to establish a new DX record for many years. KH6UK and W6NLZ had a one-way contact over a fantastic 2500-mile distance but were unable to make it two way. All this was to change however on the night of April 11, 1965. The following is an excerpt from W4GJO's report of the activity.

"Our stagnant high-pressure area is still with us. It has now been with us for over ten days. Saturday night conditions appeared to be even better towards the west and northwest, so Lou, WA4BYR, at Englewood and I decided to do something about it. First, I called John, K5STN in Houston on the telephone. Naturally he was not there. However, K5TUP, his NYL, said he'd be back about midnight and they'd get on 432 then. Lou called W4LTY, Barry, in Demopolis, Alabama. He agreed to get on right away. At 0355 GMT, April 11, we hooked up with Barry and he was 40 db over S9! Virtually no attenuation; signal positively like he was a high-power local. We continued to work him for about half an hour with breaks for other stations. W4UWH, Dave, in Auburndale, 66 miles east, northeast of me, was hearing Barry only about S3 and could not make himself heard in Alabama. Rather a sharp duct cut-off I'd say. I then called Rex, W5RCL, in Marks, Mississippi, and he agreed to get on. At 0448 we hooked up and he was 5-9 on c.w. We switched to phone and he peaked to S6, WA4BYR then worked him and signals were about the same. While I was signing with Rex the phone rang and it was John, K5SDM, in Houston. He said he was apparently receiving me so we left the phone open and I swung the beam toward him, put on the code wheel and he let me hear the

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



Oscar III antennas used by HB9RG to complete 25 contacts (three 2-way s.s.b., one transatlantic).

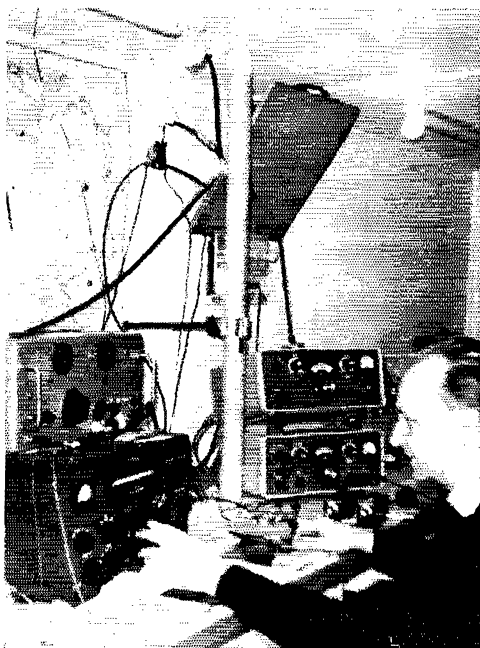
signal back. We closed the phone circuit and looked up at 0456. At that time his s.s.b. was 5-7 and my a.m. was 5-6. Later he was over S9 frequently at both Englewood and Sarasota. K5TUP, Houston was worked at 0500. At 0518, W5LDV in Houston was worked. Chick was solid 5 and 6 on s.s.b. Lou alerted W5UKQ at Baton Rouge, however he reported that he was still torn down with no transmitter or no antenna available for 432 Mc. so no Louisiana QSO for Lou or me. K5SDM called W5AJG and got him out of bed, and stayed to coordinate efforts at getting Leroy hooked up with us. We could copy K5SDM solid on s.s.b. when he had his beam pointed north towards Dallas. Unfortunately Leroy reported that while he could hear my code wheel briefly neither Lou nor I could copy him. At 8:30 a.m. EST I called Pappy, W4BCI, on the phone and he agreed to put Georgia on the air from St. Simon's Island. While waiting for him WA4JKY in Jacksonville was worked with S9 plus signals. At 1336, W4BCI, was contacted for state number five that night. Pappy was peaking S5 with deep QSB into the noise but a good contact was had on phone. Conditions remained wonderful all

day long with Channel 12, New Orleans, local intensity all day. At 0135 GMT April 12, K5SDM was contacted again and he was S7 to S9 on s.s.b. At 0304, K5LLL in Houston was worked S6 on s.s.b. and at 0319 we finally made it to San Antonio with a c.w. contact with W5LUU who was solid and peaking about 539. Needless to say lots of listening and code wheel sending was done throughout the period in all directions but nothing else developed simply because of lack of activity I'm sure. Throughout the period two meters was not nearly as good as 432. There was at least one Florida to Texas two meter contact after midnight Saturday but the two stations involved worked each other several times and no other signals were heard at either end. On the evening of April 13 and the morning of April 14 stable conditions continued over the Gulf. Local tropo conditions in Florida were excellent, signals from across the state were extremely strong as were the signals from Jacksonville. At about 8:30 p.m. EST while our beams were east, we began hearing c.w. from W5LUU San Antonio, Texas, off the back of the beam (this is a 1,000 mile path). Within minutes the duct was complete and Jim was in with an unbelievably strong signal up to 30 db. over S9 and very steady WA4KFW in Margate, on the east coast of Florida, has just really gotten going on 432 and it is only recently that Lou and I can hear him except on very special nights. But with the duct so terrific maybe it extends across Florida too so Lou and I pass info to each end and WA4KFW and W5LUU give it a go on c.w. Eureka! Instant success with Ken reporting Jim 449 in Margate and Jim copying Ken almost solid in San Antonio. No one else was on along Florida's gold coast when it happened. K4YXZ in Nakomis got on briefly and worked W5LUU for Bob's first DX on that band. Although K4PZW in Jacksonville was alerted he and LUU were not able to make a contact. W5LUU was steady S9 plus 30 all during the early evening. No signals were heard from Houston 200 miles nearer. At one point W5LUU worked K5LLL in Houston and still nothing heard here or there. The duct was perfect and right over Houston. Later, about 10:30 p.m., W5LUU would take an occasional fade, the first noted, and the Houston stations W5LDV and K5LLL broke in. W5LUU was still S9 plus 30 after midnight EST when he turned in. The Houston signals were good but with much fading. Two meters still showed no signs of Texas/Florida opening." This record breaking tropo contact on 432 between WA4KFW and W5LUU is all the more remarkable in that WA4KFW is using only a 6939 in the final and a single yagi fed with over 100 feet of RG8/U. This contact with only a watt or two into the antenna over an 1150-mile path shows how terrific the conditions really were. The boys with low power need have no fear on 432 if the antenna and feed line are good and the converter is top flight.

A report from W5LUU in Texas on the same

opening goes as follows: "On the evening of April 13 and the morning of April 14 we had another 432 Mc. opening between Texas and Florida. I first worked WA4BYR in Englewood, Florida, W4GJO in Sarasota, Florida, and then WA4KFW in Margate, Florida (on the east coast about half way between West Palm Beach and Miami and five miles west of Pompano Beach) at 2030 CST, K4YXZ in Nakoma, Florida at 2130 CST. The contact with WA4KFW covers a distance of about 1150 miles, which extends the previous best distance on 432 except for moonbounce by about 500 miles, and was made on c.w. with 559 signal levels. The signals of WA4BYR, W4GJO were terrific and steady running 20 to 30 db. above S9. There are several interesting aspects to the opening in that stations in Houston 200 miles east of me were not hearing the Florida stations until several hours after we first contacted and then only weakly. Even while I was hearing both Florida and Houston stations with S9-plus signal levels. Apparently it was a very tight duct. At 2230 I worked W4TDO in Bradenton, Florida on 144 Mc. and the signal was just a bare S9 while W4GJO about ten miles south was running 20 to 30 db. stronger at the very same time on 432 Mc."

W4GJO has the following comments about conditions and activity on the 432 Mc. band. 1. "For comparably equipped stations 432 Mc. is always better than 144 Mc. over the same path, whether closed band conditions, lower atmospheric conversion bending or various types of ducting. For most purposes power is the least important in evaluating equipment. Feedline, antenna performance and converter are all im-



Operating position at HB9RG with Hans at the controls.

portant. A good well-tuned properly matched single yagi fed with really low-loss feed line does a fine job although of course larger arrays do help. A really low-noise converter is a must. A couple of watts into the antenna provided a consistent signal in every night tests for months over the nearly 200-mile path between W4GJO in Sarasota and K4OCK, Miami. We have never been able to duplicate this on two meters.

2. When most 432 equipment was of necessity rather poor or uncertain compared to two meter equipment most VHFers acquired the habit of operating 432 only after completing two-meter contacts and then trying the path to see if just maybe 432 would work. This habit has carried over and many leading operators who are isolated from local activity have never really operated 432 on a random basis. All contacts have been pre-arranged and coordinated on two meters. We believe untold numbers of potential 432-Mc. DX contacts have been by-passed this way. If any operator who is serious about 432 Mc. will watch the weather maps and cooperate suspected conditions by observation of high-band v.h.f. and u.h.f. TV monitoring and then get on and operate and listen on 432 things will start happening."

As a result of this terrific mid-April Gulf Coast tropospheric opening W5LUU established a new 432-Mc tropo DX record at least four times. First, with W4GJO the record went from 686 miles to 1000 miles, then with WA4BYR to 1010 miles, then W4UWH, 1040 miles and finally with WA4KFW at 1150 miles where it now stands. Equipment at W5LUU consists of a 250-watt input transmitter using a 4CX250B, receiver is a homemade grounded grid converter using a pair of 8058s working into a 75A-1. The antenna is a 13-element yagi up to 40 feet fed with RG17/U.

Sioux Falls VHF Convention

The VHF Convention held on April 10 and sparkplugged by K0CER was a signal success. Without a doubt it was the greatest collection of active v.h.f. and u.h.f. Do-ers that I have ever attended. Almost anyone there has been at one time or another setting records or establishing precedents on v.h.f. for many years. Many of them traveled three and four hundred miles to come to the convention. Plans for the second annual VHF Convention at Sioux Falls, South Dakota are under consideration. Get in touch with K0CER. Don't miss it!

144 Mc. and Up

The microwave bug has really bitten Ray, WA9FUH. He has recently organized the Milwaukee Amateur Microwave Association and the boys in that area are looking for any other groups that might be interested in a moonbounce effort on the 3300-3500 Mc. band. Anyone interested should get in touch with WA9FUH. In New Hampshire W1QKA is working on equipment for 2415 Mc.



Oscar III operating position complete with K9AAJ. (If you didn't hear him, you just weren't on.)

Rolly has recently completed antenna feed repairs and has mounted his 4-foot dish about 30 feet up. Present experiments at Nashua include investigation of various types of parabolic antenna feeds for 2415 Mc. At Montreal, VE2LI writes that he has completed a converter for 1296 Mc. and is looking for a 4-foot dish. George is hoping for some tropo skeds after installation of the dish. WA5JAY in Louisiana sez he has finally found someone with equipment for 1215 Mc. in Shreveport, Louisiana. Efforts are now being made to complete Hal's APX-6 so he can make that contact.

From WB2OSA we hear that he has completed his portable TV station and has run it off the car battery. "The transmitter uses nuvistors having $\frac{3}{4}$ of a watt input. Camera and modulator are made up of 40 transistors. D.c. power is converted by a home brew converter." Congratulations Karl, to you and WA2KIX. W3LHF writes us that the "Packrats" are changing the time of their Monday night nets so that a net on 432 Mc. can be included and still finish all the nets within a reasonable hour. Nets are as follows at local standard time: 432.2 Mc., 2200; 221.4 Mc., 2131; 50.2 Mc., 2030; 145.2 Mc., 1930. From Bynr Mawr, Pennsylvania, K3ADS informs us that he has made several two way TV transmissions with K3KFL in Newtown Square, Pa. Larry sez his signals to KFL are strong but he has some hum and signals from KFL are weak, but lock in and test pattern looks good. Can't win 'em all, Larry. But maybe between the two of you, you can. W5LGW reports from Odessa, Texas, that he's working on gear to go moonbouncing on 432 Mc. "In the works" are: a tracking motor and polar mount, a 72-element collinear antenna and a heterodyne mixer to go s.s.b. on 432. Sounds like he's really serious about it! Out at Ukiah, California, WA6ROJ is quitting two meters to go on the higher frequencies. John sez that the line noise, appliance noise, and ignition noise are a real problem plus the fact that he also has trouble from CB transceivers. The two-meter beam is coming down and will be replaced with four 13-element yagis to be used with the 432 Mc. equipment. W8PT tells us that during the tropo opening of March 1 observed on 432 Mc. he worked WA9HUV, W9OKB, W9BTI, W8HCC, K8ZES and W8VOZ. Jack also heard W8DEO, W8EMR, and W8DKU. During the auroral session of March 3, Jack heard all call areas except 5, 6, and 7 via aurora.

The following was received from W8FWF at Garden City, Michigan, and we thought you'd be interested in the work George, et al. is doing. "About six months ago W8VCF, K8TJP and myself, W8FWF, set up operations on 432.9 Mc. using WBFM converted taxicab two-way radio gear. When we first started, our activity was at a low level, so we talked cross frequency to the a.m. boys on 432.0 Mc. who seem to copy us very well using slope detection. Since we are using horizontal polarization we are very successful in working the a.m. group and have worked into Toledo, Ohio on 432.9 Mc., so we know there is some activity elsewhere in the country on this frequency. W8VCF has built and installed a 432.9 Mc. to 146.94 Mc. repeater system at W8CQB's QTH, which is over 1200' above sea level. This repeater allows the group on 432.9 to work from the Detroit area up to the Saginaw, Midland and Owosso areas, a distance of sixty to eighty miles. Our equipment is becoming more refined now with the installation of preamps on the receivers and the erection of new and higher gain antenna systems. W8FWF will be installing a 64-element collinear antenna in the very near future. The group on 432.9 Mc. u.b.f.m. would like to hear from anyone in Ohio or elsewhere, that would like to try and contact them on 432.9 Mc. Please contact George J. Poland, W8FWF, 32219 Rosslyn, Garden City, Michigan. Our activity has grown to twelve stations at last count and more coming on frequency very soon. We'd like to add you too." Very good, George. Continued success with your u.b.f.m. efforts.

WA9HUV writes us that the greater Chicago area now boasts of three s.s.b. stations on 432 Mc., each running power input in the area of a half kw. The stations are: WA9GCZ in Riverdale, Illinois; W9OKB in Niles, Illinois; and WA9HUV in Elmhurst, Illinois. These three had an s.s.b. contact on 432 Mc. around the first of April and probably set some kind of a record for that band. A newcomer to 432 is WA9NKT at Freeport who puts a nice signal into the Chicago area, and W9IDY (Iowa) who has been heard frequently during the winter, can be worked almost anytime now that spring is here. Norm (WA9HUV) sez that over the past three years, starting from scratch, he has built a half kw. 432-Mc. station. Except for his ham-scan everything else is homebrew including baluns, antennas, etc. The low noise preamp uses a 7768 and Norm sez when it is a surplus item he might write about it. DO IT NOW! The amplifier is a 4CX300 and runs quite efficiently class B. Norm sez he didn't have an s.s.b. generator so he built one using seven miniature tubes, crystal filter, etc. Sounds like you do "do it yourself," Norm. Wonder how many more of the 432 gang do likewise. K9DER is kept busy lately by working on his s.s.b. equipment for 432 and 144 Mc. Neil sez he's finding out that there are a large number of vhfers whose equipment will not permit them to copy s.s.b. or c.w. At Tremple, Wisconsin, W9HWQ writes that he and WA9HCZ had (to the best of their knowledge) the first two-way QSO on 432 Mc. in that county. The QSO was over a distance of two miles with WA9HCZ being mobile and power approximately two watts input. K8OST in Minneapolis informs us that his 432-Mc. converter has been completed and he's listening every night. So far, nothing heard. Jim sez he'll soon get a 432 Mc. collinear in the air and he hopes to have his low power exciter finished by the middle of May. Then he's all set to go. Skeds, anyone?

At Watervliet, Michigan, W8PT sez his 4X250 amplifier for 220 Mc. has been completed and is being checked out. "Will run approximately 400 watts on 220.059 Mc. and will be used during Lyrids meteor shower for sked with W0EYE and later with K5TQP and anyone else that needs Michigan on 220 Mc." Nice going, Jack. He also sez that he now has a KWM-1 for s.s.b. or c.w. liaison and a 32V-3 for a.m. or c.w. liaison with anyone interested. K3DNO reports that conversion of his ARR-2 receiver as a 220-Mc. converter is coming, but very slowly. Al suspects that he must have a very bad ARR-2. WA2UDT sez his 220-Mc. converter is now working and he'll soon be making himself heard on that band.

WA2UDT tells us that he is rebuilding his two-meter s.s.b. heterodyning unit, and W5LGW sez his two-meter s.s.b. rig has been completed and tested with W5NTX and W5LID. Two more converts to 144-Mc. s.s.b. From Canton, Georgia, WA4MPD writes that he has just finished installing a two-meter f.m. rig which runs about 40 watts output and is in the process of building a 200 watt linear. Kerry's probably looking for skeds right now. Another f.m.er is W9RSV who sez he recently purchased an 80D transceiver and is setting it up for two meter f.m. and RTTY on 146.70. Dick is also ready to go and looking for skeds, either mode. Others in the Chicago area preparing for f.m. on 144 Mc. are WA9MED, K9FZB, WA9AHZ and WA9BYE. At New Market, New Jersey, WB2-KLD noted good ground wave conditions on two meters on March 3 to the Northeast, March 5 to 3 land and on March 29 an unusually large number of Pennsylvania stations were heard. We hear tell (through K3KAP) that a group of local hams (Corry, Pa.) are making plans for a quad of quads for two-meter use. The boys are going to build them on a group basis and buy material together to save on cost. Let's have further details as you progress, fellows. From Tempe, Arizona, W7AXY has noted no openings on 144 Mc. during the month of March. Don sez that cross polarization problems hamper contacts with other locals although the activity on 145.3 seems good. He also tells us that he is presently working on a nuvistor preamp for 144 Mc. use with the SR-34 transceiver and is trying desperately to find room within the transceiver's cabinet for mounting same. W8MBH informs us that the Michigan Six Meter Club has started a net on 145.350 Mc. every Sunday night at 2130 EST. Fifteen to twenty stations have been checking in. At LaPorte, Indiana, K9EEE and K9ZNK, XYL and OM respectively, are looking for c.w. skeds on 144 Mc. with stations in VE3 land, particularly the Windsor area. Nothing special in the way of equipment sez Dave, just "brute force." K0JWN tells us that two-meter activity is building up in his area, Harrisonville, Missouri. Larry also sez he has completed his three element portable beam for 144 Mc. and looks pretty good although tests have not as yet been completed.

Just about 90% of our 144-Mc. reports this month were concerning Oscar III, and it does our hearts good to learn that so many of the v.h.f.ers did get in there to track it, to listen and to make contacts. Hopefully, most of the Oscar III reports will be published soon, either in this issue or the very near future.

A letter from Hul, ZD8HL (ex VP7CX) tells us that he has gone on a DXpedition to VP2 land, but will be back at ZD8 land by the time you read this. Here's hoping that some of the six-meter gang

has had good luck in contacting him as VP2. Hal sez he hangs around 50.1 s.s.b. and a.m. and will be using a new eleven-element beam when he returns about May 5 to ZD8. QSLs for the VP2 contacts with Hal should be sent to the Hammarlund DXpedition of the month; ZD8 cards go through W2CTN; VP7CX cards to W8LIM. Good luck, Hal, on all your ventures! You've surely given the 50-Mc. gang a shot in the arm and hope things continue in that manner.

VE4RE writes of a visible aurora with no signals heard on March 2. On the 3rd there was an excellent aurora when he worked VE8BY whose signal was 5-9+ on s.s.b. Other s.s.b. signals were heard at 50.125 but no contacts. March 22 produced another visible aurora with no signals heard.

KZ5EX reports that he is interested in trying to put a six-meter station on the air from the Canal Zone. Sunday sez he has only 20 watts output at the present time but has many parts so he can construct a linear. His problem is a converter and would like recommendations as to same. He's also wondering if anyone from the States would work c.w. to a KZ5. Would you? We surely would!

50 Mc.

WB2LDE writes that he recently got on six meters for the first time with a homebrew 6146B and a 6-element beam. John sez he's working a lot of six meter c.w. stations and also goes a.m. now and then. WB2MLK/2 with WA2WMT are planning an assault on 50-Mc. moonbounce using the facilities at WB2MLK. Skip, WB2MLK/2 would like to contact VE3BZS/2 for details of his work. "What happened to the six meter s.s.b.?" So sez K3DNO at Chevy Chase, Maryland. Al sez that rumor has it everyone is moving to two meters. Skip conditions were reported by K3YKC in Washington, D. C. for March 4 when contact was made with WA5HVZ in Metairie, Louisiana. Fran tells us that after this contact he heard WA5HVZ calling a station in New Jersey so apparently the skip lengthened out at that time. At Erie, Pennsylvania, K3USC sez he's going to be operating more c.w. on 50 Mc. He fired up the 10-watt c.w. rig one night and using a 5-element beam worked W2FDI at Victor, New York, s.s.b. to c.w., with good reports both ways. WA4MPD reports that six-meter activity has fallen off in North Georgia. Too much TVI according to Kerry, but he's hoping that come summertime the gang will be back on 50 Mc. He's been keeping busy along building lines by working on an interlaced quad for six and two meters and has completed a control board for complete and flexible control of both six and two meter operations without having to do more than flip *one* switch. Nice going, Kerry! In North Carolina WA4FJM heard WA4LTS in South Carolina on March 6. Odd part about this "heard contact" was that Jim's beam was headed west at the time. From Tennessee we hear that WA4NVN was hearing 9s March 28 on his mobile receiver using a whip as antenna. Must have been pretty good. A new station on 6-meter s.s.b. is WA8PUY, the Eastshore VHF Radio Club in Willoughby, Ohio; and W8HFA in Detroit is operating 50 Mc. c.w. most every night with W8AXM and these boys are looking for more c.w. stations. We hear from W8MBH, also in Detroit, that on March 29 stations from 1 and 2 lands were heard but not worked. WA1BWF/9 at Milwaukee has noted a great increase in six-meter c.w. activity and

hopes the increase increases. Ray operates between 50.2 and 50.25.

2-METER STANDINGS

W1REZ	32	8	1300	W5WAX	11	5	735
W1AZK	28	8	1205	W5VY	10	5	1200
W1JSM	26	7	1330	W5BFP	10	5	2540
W1AJR	25	7	1130	W5EDZ	8	5	1375
W1KCS	24	7	1150	W5YXO	7	4	1330
W1MEH	24	6	1000	W5UNH	6	3	1200
W1MIN	22	8	1200				
W1FDQ	20	6	1020	W6W8Q	15	5	1390
W1AFO	19	7	1000	W6NLZ	12	5	1000
W1AFO	19	6	920	W6DNG	9	5	1010
K1CRQ	19	6	800	K6HMS	8	4	1010
K1AFR	17	6	675	W6JFS	6	3	800
				W6ZL	5	3	1460
W2NLY	37	8	1300	W6KAP	5	3	1300
W2GXY	37	8	1380	K6GTG	4	2	800
W2ORI	37	8	1320	W6MMU	3	2	950
W2HLY	36	8	1020				
K2LML	32	8	1200	W7LHL	10	4	1170
K2GQI	35	8	1365	K7N1	8	4	1220
W2AZL	29	8	1050	W7CJM	5	2	670
K2EJ	27	8	1060	K7CIV	4	3	1236
K2CEH	25	8	1200	W7P	4	2	900
W2AMJ	25	6	960	W7JU	4	2	235
W2ALR	24	8	1100				
W2RXG	24	8	1200	W8PT	40	9	1260
W7PUA/2	23	8	1150	W8KAY	39	9	1210
W42PZP	23	7	1200	W81FX	39	8	1225
W2SMX	23	7	1000	W88DJ	37	8	1220
W2LWI	23	7	1050	K8AXG	34	9	1275
K2HOD	23	7	950	W8GTF	34	8	800
W2DWJ	23	6	860	W8MVE	33	9	1155
W2PAU	23	6	753	W8YIO	32	8	1270
W2FSK	21	6	750	W8LOF	32	8	1060
K2KIB	21	2	700	W8GQH	32	8	1180
W2UTH	20	2	800	W8BAX	32	8	960
W2WZR	19	7	1010	W8LHT	32	8	910
W2RGV	19	8	720	W8NOH	31	8	1000
WA2EMA	19	6	1010	W8FHW	31	8	860
W4PZE	18	6	750	W8SLV	30	8	1080
W2RLG	17	7	900	W8LPD	28	9	850
WA2YXS	17	6	720	K1CRQ/8	28	8	690
K2OEL	16	6	1010	W8W8	28	8	880
WB2CCO	16	6	780	W8DX	26	8	720
K2JWT	16	6	550	W8LJC	25	8	800
				W8WNM	25	8	900
W8RUE	33	8	1100	W8GPN	23	8	540
W8SGA	31	8	1070	W8LCY	22	7	680
W3GKP	31	7	1180	W8LH	22	7	680
W3TDF	30	8	1125	W8NRM	17	7	550
W3KCA	28	8	1110				
W3BYF	28	8	1070	W9WOK	42	9	1170
W3BPH	28	8	1110	W9KLR	41	9	1160
W3LST	22	6	800	W9UIF	41	9	1150
W3LNA	21	7	720	K9AAJ	36	9	1200
W3NKM	20	7	730	W9LAL	35	8	850
W3LZD	20	7	650	W9GAB	34	9	1075
K3QIB	19	7	930	W9OIL	32	8	1090
W3ALP	19	6	600	W9RFM	31	8	850
K3OBU	17	7	930	K9SGD	30	8	1100
W3HHC	16	6	550	W9ZTH	30	8	830
K3CEA	16	6	500	W9BFB	29	8	820
K3HDW	12	6	1015	W9LVC	27	8	950
				W9OJI	27	9	1010
W4HJQ	39	8	1150	W91FA	26	6	900
W4HHK	37	9	1280	W9HPV	25	7	1030
W4WNH	35	9	1350	W9CUX	24	7	1000
W4LTO	34	8	1160	K9AQF	24	7	900
W4ZNI	34	8	954	W9WDD	23	7	900
W4MKJ	34	8	1149	W91F	22	7	825
K4QIF	28	8	1000	W9KPS	22	7	690
K4KXC	27	8	1255	W9ALU	18	7	800
W4MNT	27	8	1170				
W4FJ	27	8	1050	W8BFB	43	9	1350
W4LVA	26	8	1000	W8LE	43	9	1410
W4EQM	25	8	1040	W8HD	31	8	1030
W4RFR	24	9	820	W8MJJ	29	9	1075
W4TLV	23	7	1000	W8ENC	28	7	1250
W4JC	23	6	725	W8PDH	27	9	1300
W4RMU	21	7	1080	W8DQY	27	8	1100
W4OLK	20	6	720	W8RUE	23	7	901
K4YYJ	20	6	720	W8MOX	22	6	1150
W4LNG	19	7	1080	W8IC	22	7	1360
K4HML	18	7	800	W8DZH	21	7	1170
K4VWH	18	6	590	W8TGC	21	7	870
W4MDA	17	6	775	K8ITF	21	6	940
				W8ML	21	6	830
W5RCI	39	9	1280	W8JAS	19	7	1130
W5AUG	33	9	1360	W8AZT	18	7	1100
K5TQP	32	9	1275	K8AQJ	16	6	1120
W5JWL	29	7	1150	W8IFS	16	6	1100
W5DFU	29	9	1300				
W5PZ	28	8	1300	VE1CL	5	5	800
W5LPG	25	7	1000	VE2DR	37	9	1300
W5UKQ	24	8	1150	VE3AB	29	8	1340
K5TQP	22	7	1250	VE3BP	24	7	950
W5SWV	20	5	960	VE3BQ	23	7	1180
W5ML	16	6	700	VE3AQ	18	8	1300
W5KFU	15	5	1360	VE3DER	17	8	1340
W5UCO	13	4	635	VE3HW	17	7	1350
W5FGC	12	5	1390	VE3HO	11	1	915
W5CVW	11	5	1180	K8GUK	2	2	2540
W5NDE	11	5	620				

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

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

When:

No amateur band is so sensitive to the ups and downs of the sunspot cycle as is our 28-Mc. range. Its personality changes like night and day. One-sixty gets a rough ride, too, but no band goes quite so "dead" as ten during sessions of sunspot minima. Yet no other band produces so many quick 50-watt-and-dipole DXCC members when those spots are poppin'.

Relative newcomers to DXdom who have heard 20 and 15 get red hot ain't seen nothin' yet. The ten-watt signals that come barreling through from all continents when 28 Mc. cracks wide open are unbelievable — unless you know old ten. Of course, at its DX best in our latitude ten meters is mainly a daytime proposition peaking in spring and fall. But the attraction of fantastic long-haul possibilities ensures 28-Mc. occupancy almost around the clock. Crosstown roundtables take over when the skip drops out, and you never can tell when a rash of short-skip signals will burst forth to fill your log.

Well, when is all this going to come about again? Apparently we're moving back up the sunspot curve once more. How long do we have to wait for the fireworks? If you have your old DX logs from the early '50s you may gain a solid clew by consulting them. How soon after the 1953-'54 sunspot minimum did you begin to make DX hay on 10?

That research angle is all very well for an old-timer, but the new DX generation has no logs to check. Perhaps we can get a hint from *QST's* DX log, "How's DX?" pages of the period. We'll stick to June issues for brevity and uniformity. We find that 1950 was probably ten's last hot year before the early-'50s doldrums moved in. There are more than twenty lines of 28-Mc. DX news, including mention of W4PJU's 105 countries worked in a few months. The June 1951 column tapers down to 18 ten-meter lines, stuff still being worked but rougher going. In 1952's June "How's" we find only 7 lines on the subject. Alas, 1953's column for June lists no 10-meter reports. Aha — what's this in the 1954 June issue — over a dozen 28-Mc. lines, mainly north-south doings. A fluke? Well, same for the following year, 1955, with the U. S. A. — Europe path still practically closed. Then in 1956 ten meters really broke through for more than forty *QST* lines of stuff on all continents. Ten had returned again, at long last, and was to remain a prime DX hangout on into the '60s.

So, by this rough rule of printers' thumb, we ought to be getting ready for increasing 28-Mc. DX action. The 1965-'66 fall-spring season

should be a teaser; not DX prosperity, yet sufficiently interesting. Then watch out for the autumn of '66!

What:

ARRL Field Day groups will help repopularize 28 Mc. again this month. If the FD dates coincide with some *E_s* propagation (they often do) there will be unexpected excitement at 10-meter positions. Then the widespread quest for multipliers in the next ARRL DX Contest is guaranteed to shake the Rip Van Winkle out of ten, if DX history is any guide. We took a good look at 14 Mc. in depth last month, so now we'll scrutinize other DX bands beginning with — you guessed it —

10 phone. watched carefully by W8YGR, Ks 6KA 9G5V, Was 5AER 9BCK, WB6CUU and listener J. Hall. Among stations recently reported worked, heard, or heard worked are GRs 6BW 7CZ, EA8CR, HK1RCA (28,540 kc.), HP1JC (600) 2100 (SAT), KP4AXM* KZ5-BT, PJ2CR (600), PY2PE*, VK2NN (600), YN6AQ, YV5AGN, ZEs 1AN 1AS 1JJ 2JA 5JS 6JY, ZS6AMQ, 4X4AM, 9J2s 1DT W and WR*, the asterisks for a.s.l.ers
 ----- On ten c.w. W8YGR and WA6VAT find GELAD, KG4AM, LU7AU, OA4PF and YV5BKA (40) 21 available.

15 Novice reports, increasing in volume as a harbinger of steadily improving h.f. conditions, feature WNs 1DAX 2NVJ 2PFD 3BTA 5KAJ 6KKM 7BOA 7BOB and 7BTF with this stanch supporting cast: CE4CT, CoS 2DU 5EG, CP5EZ, GRs 6FM 6HG 7IZ 7LU, GX1NE, DJs 1AK 1RZ 2DI 2IW 4LC 5WD 5YQ 6KQ, DLs 1ER 1TA 1VR 2RW 7CF 8ANA, DMs 3EN 3XJI 4PL, Fs 2US 7GM 8BQ 8QY 8WK, FG7XX, FO8s AA BI, Gs 2DC 2RO 3PL 3RH 4ER, GC4J, G13PGD, HAs 1KSA 5AT 7PG 8WH 0DA 0HH, HB9ACP, HC2SB, HKs 3RQ 4AOY 7YB, HM1BW, HP1s AC IE, HR5NLC, Hs AOH FAE GAR KRT, JAs 1BCA 1GLC 1HKP 1JEJ 1LPZ 1QHI 1RHM 2AJT 2DNA 3EGE 4CRJ 4CUU 5AJY 5OG 5PU 6BFD 7ACM 7CYC 8AZV 8BME 8BQJ 8TQ 8ZO, KG4AM, KH6BX, KP4s BOF BQG, KZ5s CU EH IB JW MC, LU5 2JV 4DGY 6DJX 8DR, OA4s AO PF, OD5AX, OE5BS, OH5PY, OKs 1AJI 1CX 1KKJ 1KTL 1MX 2KGD 2KR 2OQ, ON4s HN NQ, OZ7FD, PYs 1BQO 1GU 1MCC 1NO 2AHM 2BGA 2BYD 2RW 2BZ 2CHR 2CSS 2DEH 2SO 3BQJ 1XN 5ASN 5BRE 5BVU 5VO, SMs 4ATA 5DKH 6CAW, SPs 5YC 6FZ 6ZA 8AJJ, TG9s BAL ST WF, T12SP,



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

VKs 2APK 2SG 3AHQ 4WO 7SM 8KK, VP7BG, WG6-APH, WP4s CKZ CLB CNO, XE1s AAG S, YV5 1AB 1DP 3JZ, ZLs 1HW 2GH 3GO 3IS 3JO, 4X4DH, 5A3TX, 5H3JJ, 5X5IU, 9J2s IE W, 9Q5s AB and PA.
Forty Novice frequencies help WN5 3BAE 5KAJ and 5KWC gobble up GM5GG, CO5BG, HI8s ARM 1PI, KP4AQL, OA9VJ, WP4s CNO CLP CLX, XE1s 1NF 2JS and YV1AB. Obviously we have promising DX talent among our freshmen!

15 phone comes through for Ws 3HNK 4UWC 8YGR, Ks 1QGC 3ZYP 4NFP 5MHG 6KA 7XQG 8G8V, WAs 2URT 1P5A 5AER 6TGH 6WPG 9BGK 9FZQ 9J1Y, WBs 2BEV 2PFG 2OAE 6PAL 6FRP 6FWW 6LHL, L. Stewart and B. Bumm, displaying CE3CT*, CQs 2FA 2UA 7GC 19, 8RA (410) 20, CRs 4A 4BA 4BC (365) 16, 5SP (220) 15, 6BY 21, 6CZ 6FW 6CMI 6HH 7IT, CTs 1PK* 3AM (150) 12, GK9CP* (390) 17, DUIMR*, ELs 2U* (410) 14, 5D 6R* (20), EP2AU*, ET3USA (210) 13, FG7XL* (425) 14-16, FR7ZD, HGs 1AH 1PW* (330) 20, 4NZ, HIs 7XR 8XAL* (420) 21, HM5s BF* 0, BG* 0, HRs 1RP* 2ABC* (420) 17, 4DHS 9B6* (390) 21, ITICFN, JAs 1DQL 1HYF* 1LPZ 1MIHU 1MYR* 1OUR 2BGW, 2BWN* 2CBZ* 2CMQ* 3BUT* 3CYA* 3CZY* 3KAW 3GPY 4BY* 4BFT* 5BDZ 6ENZ* 7BOY* 8AWH 8AST* 9AMW*, KBGCP/KS6*, KC4US* 0, KGs 4AM* 4BU 17, 4CH* 6APH* 0, KM6-BI* KR6OJ*, KS6BO* (370) 21, KV4s BT CN* (270) 15, KX6DC*, KZ5s RI NS* (400) 16, SS, MIB (238) 10, OAs 4ON* (420) 19, 5AH* 8T*, OD5s AA (435) 16, CC CN* CY (320) 13, PJs 2AB (381), 2MI* 3CI* (390) 17, SUIIM (215) 15, SVs 1AB* 6WGG* (390) 16-17, TG9s EL* US, TESIAM* (380) 20, TN8s AA AD BK, VKs 8KK* 9NT* 9TG*, VPs 4LE (235), 6FG 6KL 7CC (380), 7DD, VO8BZ 14, VS9s AE* (395), MIB AWR* (405), XEs 1IK 21, 1JJA* 1OE 2IDK* (400) 19, YA3TNC (390) 13, YNs 3KA 4SMB 4WD*, YSISAM*, ZB2AK, ZC4s BG MO RA TJ, ZD8s BB* (440) 22, HL* (413), 1T* (385) 23, PDR* WR*, ZETJR 15, ZLs 2HE (225) 22, 3KA* 23-0, 2P5s BC CN* JE* (430) 23, ZSs 8G 9G, 5As 3TX* 5TR*, 5H3s JJ* JR* (390) 20-21, 5J4RCA of Colombia, 5N2AA 15, 5Z4AA* (395) 16, 6Os 1KH* 6RW* (400) 20, 6W8BL 15, 707PM*, 7X2VX* (400) 17, 9G1s EC FS (225) 16, 9J2s BB* (395) 19, BK (220) 22, DT WR* (365) 17, 9L1W 14, 9Q5s AA* (435) 19, EB HT (230) 20, KC* RB 19-20 and 9X5VS, asterisks indicating outgunned single-sidebanders, an increasing 21-Mc commodity.

15 c.w. gains ground among five-year licensees including Ws 3HNK 4TVQ 5N8E 8YGR 8ZCQ 9EXE, Ks 1QGC 1ZND 3CUI 4WVX 5MHG 6KA 7XQG 8G8V, WAs 3AZI 1P5A 4SR5 5AER 5HJK 6TGH 6VAT 8MAT 9AVT 9JCA, WBs 2PFG 2OAE 6FWW 6TAM 6MEQ and 1ER who give us the goods on CO8BO (50) 16, CP5EZ (50), CRs 4AE 4BB 5AG 6AI 6AY 6EL 6HG (10) 18, 6JJ 7AD 7IZ (60) 17, 7LV, DM4PKL, EAs 6AM (85) 20, 9AY, ELs 2AD (60) 16, 2AE 8AF, EP2RC, ET3USA, P, FB8s WW XX, FG7XX, FO8s AA BJ, FR7ZD (60) 11, F08AA, HIs 3AGS 8XAL (10), HM5s BF BG, FI1AGA, JAs 1ADN 1HZN 1VX 22, 7BNX 23, K3YMP/KM6 23, KA2KS 23, KG4AM (43), KR6MB, KZ5EH, MP4-QBR QBT, OA1PF 19, OD5s AX CY, OH0NH (65) 11, PJ2CZ, TT8AC (45) 15, UA0s KCA KIA KFG, VR6TC (63) 22, VS6s EY (70) 9, 1B, VS9ADM, WP4s CLB CLK, XE1OE, YV1DP, ZB2AK (60) 10, ZC4GB (10) 17, ZE-1AS, 4S7DA, 5A3TX (23) 0, 5R8AL, 5X5IU, 9J2s BC IE (90) 18, 9K2AD, 9M4s LP LX, 9Q5s QR and TJ (35) 18.

40 c.w., still effective but noisier, lets Ws 1ECH 1RAN 1YNE 3HNK 5LXG 7DJU 8ZCQ 9KXE, Ks 1ZND 3ZYP 5MHG 5JVF 6KA, WAs 2FUL 2AJ 1P5A 4SR5 5HJK 5IPM 6TGH 6VAT 7ASM 8AQE 8JCA, WBs 2OAE 2NLI 6CUI 6FWW 6TAM 6KPN 6KVA 6MEQ, DJ8PN and KA2PT consult with CF8CF (1) 4, CQs 2EJ 2RC 6AH 7GC, CRs 4BB (5) 5, 7CI (8) 6, DM-3ZBM, DUs 1TA 9FB, EL2s AD AE (3) 23, FG7XX, HAs 1KGC 4, 5KFR (10) 0-1, HIs 8C (20) 0, XAL

HKs 3AVK 4ALE 10, HM5s 1CR 14, 1CF 5CM (9) 15, 9HJ, HP1IE, IT1AGA (7) 1-4, JAs 1ADN 1BZR 1EUV 1FDU 1FGW 1IE 1IHE 1IKK 1KDV 1KFN 1KFU 1KKZ 1LW 1MML 1MOH 1MZL 1NLX 1NOG 1NUH 1OHV 1PTI 1QZC 1SLF 1VX 2FTZ 3AIV 3BSD 3EGW 3CZN 3HLQ 4XW 5ACT 5AUG 5BRI 5IP 5SU 5SY 6CNU 6EBY 7AVG 7AXP 7BDW 7BJL 7BXS 7CLE 7ZJ 8AA 8BHI 8BQJ 9AMV 9AKU 9AMR 9AZE 9BHC, Ks 3YMP/KM6 7, 8RAX/KL7 (30) 2, KA2s JH KS TP, KGs 1FL 4AM 8, 6IG Bonins, KR6AK, KS6BN, KV4DB, KW6EK, KZ5EM (50) 23, LZ1s KFG KPW KSD, MP4TBO (55) 21, OE3TL, UAs 9VB 9DX (9) 14, 0DU (9) 12, 0EH 0EW (9) 23, 0ET (9) 22, 0KAE 0KCU (8) 22, 0KFG 0KGB 0KIA 7, 0KKB (9) 12, 0KKK (7) 0, 0KZD 15, 0KZW (9) 9, 0VZ (11) 9, UB5s KJE QS (7) 1, XF, UD6BV, UJ8AR, UW0JZ (9) 8, VK4TE (22, 59) 8 of Willis ile, VPs 1PV 6AK 7TA 8HJ, VRs 1B 4ED, XE2C, YN1AA, ZK1AR, 4X4s NPW NUH, 5As 1TW 3TX, 6O6BW (3) 0, 6Y5MJ, 9Ms 4LP 6JA (5) and 6LX (12).

40 phone reluctantly provides W1BU, Ks 3ZYP 6KA, WAs 5IPM 6RPR 6LII 6TGH 7ASM, listeners W. P. Kilroy and L. Stewart with shots at CN8AQ, JA-2BAY 8, KP4AXL OA4s FA (48) 12, KY 8, OS 8, PY-1NB 8, SV08V (77) 20, VKs 2AV 75s 8, 3BAI (60) 20, VS9s MG (43), PCZ 20, XEs 1AB 8, 1NHG 2RE, Y4A (77) 20, YV5BPI (205) 13, ZLs 1AGO 8, 2BE (73) 8, ZS1s KJ ZII, 5A1TW and 5J4RCA 8, all s.s.b. material.

75 phone, not so fractured by SWCB nonsense as 40, supplies a savory spring haul for Ws 1BU 3HNK, s.w.l.s. Kilroy and Stewart: CN8AQ (3775) 52, CO8RA, CT1C 7-8, DJS 1NY 2GF 8NW, DLs 1UX 1MM 4SD 3UW 6GN 6LL 6QT 7BA 7BB, DMs 6ZAA* (3645) 21, 9MM* (3590) 22, EA1GZ, EHAx, FS 2MO 3II, plenty of Gs, GB2DX, GIs 3CZF 3IIM 3NWV 3OMZ 6TJ, GMs 4BUD 3DPK 3HMB, GWs 3AX 18, 5SA 5TE, HA5KBB 2, HB9s ET MQ RG (3780) 7, XAI, HGs 1EW 3CRC, HK4EB, HX8AL, KG4AM, KM6BI, KV4CF, KZ5W1 6, LAs 50IE 6U, LX1s BW* (3620) 19-20, PH RK (3795) 23, OA1s KY (3788) 4-5, OS (3799) 6, OKs 1AIV 1ANV 3CGR, ON4s VS ZA, OZs 4FA 6OT* 7, PA0HBO, PJs 2AA 2CR 3CD, P2YKVM, SMs 3BIZ 6BCG 6BJI 7ABO 7XV, SP6AKK, TF3CI, TG9EP, TJEJC, UA0EH, UC2DR, UP2KAF, VE8RG, VKs 2AVA 3ATN, VO1FB, VPs 3HJG 5AB (3798) 23, 7CK 9BN 9DI, 9EL, XE1NIN, YO2KAB, YVs 3KV 5AGD 5BMR (3770) 4, 5BIZ 5BPI, ZLs 2AAG 2BGG (3765) 6, 2JR 3BQ 3GN 1AM (3799) 6-7, 4UHTU 20, 4X4DK, 5A1TW (3795) 22, 7X2s RW (3795) 22, VX (3793) 21 and 9M4LP, the few asterisks denoting non-s.s.b.

80 c.w. got going after a late start but now suffers throttling by atmospherics up our way. Before the thunderstorms marched in, Ws 1BU 1ECH 1SWX 7DJU, Ks 3VPN 5JVF 5MHG, WAs 5IPM 6TGH and 8MGD marched off with CO7RM, CN8s AF DR, CR4s AE (8) 8, BB, CT1UT, DL8CM, DM2s ATD YPL, EA8 3KT 9AY, ELs 6AK 8H 9J, EL2AE (13) 6, F8s YJ ZF, GB2SM, GC3TLE, GIs 3 GAL SKII, GW3s ITZ JI, HAsMB, HB9JG, HIs 3PC 8XAL (8) 8, HK6LR, HZ1X, JAs 1BZA 1CG 1CUM 1DRC 1DSV 1EFG 1FFP 1HAU 1HQG 1IDU 1IEP 1KXN 1LTE 1MBN 1NUT 1QIC 1RXI 1YIP 2CAN 2CIR 2EPW 3GD 3DX 2WB 3CDK 3DGE 3HIV 3ITW 4CBI 6AK 6AZN 6BPI 7AO 7BGL, K3YMP/KM6 (19) 11, KG4AM, KP4AXM, KZ5s CU MG TD (10) 11, LAGL, LUs 1DZK (21) 9, 2DKF 6DK (5) 3-4, LX3BD, LZ1E, OE3TL, OH1SH, OKs 1ADN 2KJ3AL, ON5CV, OY7AL, OZs 3FL 7X, PA0s FLX RE, PY5XN, SM6PJ, SP3PL, TF3CJ, UA0s FG KCO KKB, UB5s KAI KZA, WF, UF61A, UP2KBC, UQ2-KAA, UR2NN, VPs 2QL EVN 3ADB 3DQ 3XB 5KO 5ZP, VPs 1PV 1TA 8HJ (10) 8, VS9sAP, W5UW, VP9, XEs 1OK 2NF 2OK, YNs 1AA (20) 10, 1CW (13) 12, 1DP (1) 11, YV5KA (12) 5, Y06SD, YUs 1FS 3AC, ZLs 1AFW 1OY 1BO, 4UHTU, 4X4s DH NY (20) 22, WF (5) 22, 5As 1TW 3TX, 5R8AN, 7X2RW, 9AIs PM TR and 9M4LP.

160 c.w., relaxing after another DXtraordinary season, offered dozens of Gs, DLs 1FF 1KB 9KRA, EHQ, GC3CZ, G3PDM, GW3s FSP 1UUM JI TJE, HB9s GM JG, HX8AL, HP1IE, HR3HH, JAs 2WB 3AA 6AK, OEs 1KU 6HS, OH3NY, OKs 1KIX 1WT 2BHX 3KAG, Ols 1AAG 5ABW (Czech Novices), PA0PN, UAs 3KAA 0KKB, UB5PJ, UO5AA, VKs 3AKB 3AMB 3BM, VO1FB, VPs 2AV 3CZ, XEs 1OK 2OK, ZL3s OX RB, 4UHTU, 6Y5NG, 9L1HX and 9M4LP to W1s BB BU, W9PNE, K5JVF, WA8LI and the late-season 1-8-



VP1GFQ was a successful February Expeditionary effort supported by (front, l. to r.) W5LDH, WA5ATM, W0GFG; (rear) VP1AP, K0GHK, HR3HH and VP1FB. Operating from a 3000-ft. mountain location, they managed more than 2000 QSOs with 35 countries. ARRL Delta Division Director W5LDH reports a valuable exchange of good will with the British Honduras gang in behalf of amateur radio.

J3WU, prominent Kobe DXer, solves the problem of ham-shack space in efficient Japanese fashion. No, the ceiling isn't especially high; he's comfortably seated on the floor thus utilizing space normally wasted by W/Ks who must have their knees under tables. You had better not try a DX test in JA3WU's tradition unless there are several huskies around to help straighten you out.

(Photo via W7DJU)

Mc. crowd VP2VL was country No. 13 for K5JVF, and W9PNE had three QSOs with VK5KO in March GM3IGW hooked 9M4LP, just about as far as you can go short of moonbounce, and a G3PU-ZL3RB phone contact really iced the cake Static is the thing for 160-meter W/Ks during the next few months but there will be serious 1.8-Mc. DX efforts by hardy souls throughout the summer. We'll pass the word as developments ensue.

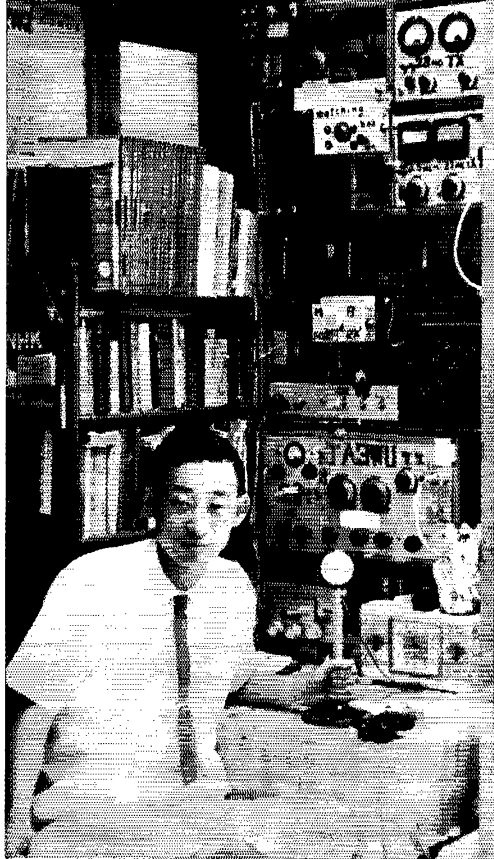
We'll save 14-Mc. notes for next month when Ws 1ECH 1RAN 1YYM 2EAF 3HNK 5OBS 7DJU 7VRO 8YGR, Ks 1QGC 2UYG 3YZP 5DZE 6KA 0GSV, WAs 2WLI 4PSA 4RS 5HJP 51PM 6TGH 6VAT 8KEX 8MAT 9AQE, WBos EFM FRP KPN MEQ and DJ9FN will give us the c.w. slant, while Ws 3HNK 8YGR, Ks 1QGC 2UYG 3SLP 3YZP 0GSV, WAs 4PSA 4RS 5HJK 51PM 6TGH 9AQE, WBos EFM FMJ ITM, W. P. Kilroy and L. Stewart furnish phone facts, together with "How's"ers reporting in the interim.

Where:

AFRICA — Evidently many QSOers of 5A3BC expected A Ring's QSL aide, K2PFC, to respond with QSLs before appropriate 5A3BC logs came through. This is one of several occupational hazards faced by Stateside QSL managers. If you work a DX station who tells you "QSL via so-and-so," allow plenty of time — certainly a month or so — for the DX station's log transcript to reach his QSL agent. Dissemination of "QSLs" without proper log check would, of course, threaten the whole QSL-manager concept and possibly send us back to the old bottleneck. "All IT&AJ cards have been mailed, either through bureaus or, when International Reply Coupons were supplied, direct," notifies K2UYG. "A hint for QSL managers: Arrange to have logs sent to you *regularly* or the whole experience becomes thoroughly unpleasant." "Effective March 22, 1965, K7UCH is QSL manager for ET3USA," writes K1QHP to W1ECH. "ET3USA QSOs prior to that date will be acknowledged from APO, New York, N. Y., 09833." Correspondence to K7UCH should be accompanied by the customary self-addressed stamped envelopes if applicable. K1QHP, op at ET3USA, holds unclaimed QSL stacks for former ET3s FW (K3HQJ), GC (K2PWS), GN HP JF (DJ3GD), JW PP (K4QDC) and RC (EP2RC-KIKOM) 9J2W advises, "The call sign allocation for Zambia consists of the blocks 91A-91Z and 91A-91Z. At present only 9J is used, and all individual amateur call signs are in the 9J2 series. However, any of the other numeral prefixes from 9J1 to 9J0 may be used for special activity stations such as exhibitions, field days, etc., and from time to time the Radio Society of Zambia will organize and operate such stations." This month's RSZ field day work by 9J6AA/p is an example of the latter. W1ECH hears from 5X5AU, "5X58 AU FS GJ IH JG JK and KD are the only stations active in Uganda at present. 5X58 IB and JE have closed and gone. 5X5URC is a special call used by our club for exhibitions etc. 5X58 AM RV and a host of others are pirates. We accept cards for legal 5X5 and 574 stations but we do not accept QSLs for relay to other African states." VERON's *DXpress* hints that VE3CP's address may be a route toward VQ8AMR pasteboards.

ASIA — "My QSL manager is SM5DRB," writes 9M2AA, "although I will certainly QSL direct from here if cards are sent to me with IRCs." W9GXH of Hallicrafters relay from 9M8EB: The 9M2 QSL bureau address is P. O. Box 777, Kuala Lumpur, Malaya. Cards for 9M4 9M6 and 9M8 stations may go via P. O. Box 777, Singapore. AP5CP sent five QSLs, confirming W/K contacts as far back as 1961, along with his card to K0EZH. The latter concludes, "Many DX stations have things a lot harder than we do. We should make QSLing as easy as possible for them." EP2DS (W9AUM) informs ARRL Assistant Secretary W1ECH, "The address to which you can send all EP QSLs is Amateur Radio Society of Iran, APO, New York, N. Y., 09205." "IRCs are a must," declares OA4OS, QSL aide for 4X1BL in this hemisphere. Gus's AC5H and AC8H cards began hitting the mails in late April, according to W2GHK. "We hope to improve KA QSL service both ways," states FEARL president KA2TP. "We'll do our best to pass along all cards received, even to nonmembers (members get prompt mail delivery now)." WGDXC's *Bulletin* has it that W6RKP may be able to help confirm AP2MI QSOs.

OCEANIA — "KJ6DA's QSL manager, WAGOET, has logs dating since December, 1964," notes WA6MIWG.



"He also maintains schedules concerning questionables." 9M8RS (ex-VS4RS) promises direct response to QSLs with IRCs. KR6JZ tells ARRL Assistant Communications Manager W1YYM that W2CTN handles his QSLing effective March 8, this year. "May not be a QSLer of the Month yet but I'm still trying," says K3S5W/KG6. Yes, we know there are plenty of snappy QSLers we don't hear about; that's up to "How's" correspondents. Conrad adds, "My hat is off to W3KT of the ARRL QSL Bureau for outstanding service with a personal touch."

EUROPE — Amateur radio is booming in the Faeroes. From OY7ML: "There now are amateurs for the first time on some of the other 23 islands. Most of our activity is in Torshavn and Klakkevik. The newly licensed OYs are mainly on 40 c.w. and limited to 10 watts but they may be working DX now and then." Interesting travel note courtesy K6KA: "Nell, G2YL, an old-timer DXer, expects to leave England for Montreal in late August. She will go by bus across Canada, down the U. S. west coast, then head eastward." G2YL may arrive Los Angeles by late September. DX clubs and other parties concerned are urged to check with Nell for her more detailed itinerary. ON4QJ tells W2EAF he will hit 20 c.w. from Monaco on the 9th-13th of next month, call info unknown. And F5CP informs W4VPD he plans to sign a 3A2 call on 14,005-14,010 kc. by the 19th of this month with a B&W 5100 and 3-el. beam. K0JPL finds UA2KAK hunting S. Dak. for WAS, while ITIAGA consults WB2MW concerning QSO possibilities with New Jersey's rare Warren county. SV1WW vacations back home in Athens after a school semester in France, according to WB2FMK. OH1s VA VB and WY keep club station OH1IAG workable on 7 and 14 Mc., mostly c.w. Dates to keep in mind: The 11th European (WAE) DX Contest on August 14th-15th (c.w.) and September 11th-12th (phone), and East Germany's c.w.-only WADM Contest, October 2nd-3rd.

HEREABOUTS — VP7TA of Nassau was none other than G3TA, formerly VPs 4WD and 5TA, on location for the filming of James Bond's *Thunderball*. W2KIR found Jack between takes passing time on the low edges of 7 and 14 Mc. "VP2KD is now firmly entrenched on St. Kitts with a TR-3, RV-3 and TH-1 putting out a terrific signal," reports Sammy's friend VE3ACD. The

usual flock of VP9 portables will take to the air on the 13th of this month, RSB's annual field day Ex-KR6GF of the early '60s is about to DX once more as W4CGO Novice notes: WN2PFD cleans up on 15-meter DX with a hand-rotated quad hooked to his DX-40 and NC-100. WN5KAL awaits an HM or OD5 QSL to wind up his three-crystal 21-Mc. WAC. Charles also does well on 7 Mc. with his 720, HE-80 and 14-AVS vertical. WN3BTA gets his share on 15 with a cooled-off DX-100B and dipole, seven countries in his first month on 21 Mc. Brothers WNTs BOA and BOB take turns clobbering the competition on 15. K6VVA/7 will offer Nevada to the DX mob on 14,002 or 14,041 kc. for several days near the middle of this month. W7QB notes a shortage of V.L. QSOs. "In forty years of hamming and lots of DX chasing I've never heard KV4 on c.w. more than four times. How about a DXpedition to the Virgin Islands?" Willamette Valley DX Club's W7GBW, chairman of the Pacific Northwest DX Convention slated for August 14th-15th at Portland, Ore., invites attendance inquiries addressed to registration chairman W7AC. A gala program is in the works for this one. Ham radio lost a fine constituent, and "How's" lost a frequent contributor when W8KML joined Silent Keys in March. Gripes of the Month: W5LXG denounces DX-hunters whose long CQs QRAL DX already available for the calling. K5JVF defends CQ DX on 3.5 Mc. as the only way for an Oklahoman to crack the codfish curtain on 80. W7QB is annoyed by the unrealistic tone reports presented by many W/Ks to the overseas boys with rough, chirpy, crawly, clicky notes. W7DJU takes umbrage at DXers who attempt to break into the QSOs of DX stations, as well as those who swish around and tune up on the frequencies of rare ones while waiting for them to sign.

ASIA — Dispatch from Peace Corpsman 9M2AA at A1poh: "Just moved to northern Malaya where I teach radio and English. I was 9M6AA in Sabah but was able to operate only two weeks. As 9M2AA I'm very active on 20 c.w. and sideland when my school day is completed. I use an SR-160 and inverted Vees. This is a valley location surrounded by rubber plantations, very scenic but not too good for radio because of surrounding 7000-foot mountains. I also have a rig on 160 meters with a thousand feet of wire up but very few contacts so far. I can hear W/Ks on 1.8 Mc. when conditions are good but they only work each other. I am licensed for other countries in this area and, if I can obtain suitable equipment, I'll plan to do some operating from them. I'm very interested in RTTY, too, but I need a hand in getting a printer." You'll probably remember Lance as ZC5AL. WA4PSA finds EP2DM, an exchange student at Georgia's Southern Tech, awaiting official go-ahead for EP2DM/W4 operation. WA6SLE was UH8BO's first U.S.A. straight-a.m. phone QSO, a sort



K3SWW/KG6's picture in last month's column may have conveyed the erroneous impression that being DX is all fun and no work. Here's Conrad readying an outbound batch of QSLs, then flipping the weights to warm up for his next pile-up. You'd be wise to answer his QSLs. K3SWW keeps in great shape, gets around a lot with the Navy, and may just drop in some day to shake your hand.

of first in reverse. "All the JAs I work on 15 phone are running less than 30 watts," observes WA6WPG. "Seems they don't need kilowatts to get out." JT1AG is the most active M.P.R. station by far," remarks K2UYG. "Damiro is the wellspring for most of the new JT activity on the air these days. He usually operates 14,040 or 14,060 kc. at 1200-1300 GMT and 0000-0100 daily. JT1AG is primarily a c.w. man but he does use low-power a.m. on occasion to accommodate the phone gang. JT1KAA is expected on s.s., soon." Consult JA6AZQ for data on WCC (Worked Kitakyushu City), a certification sponsored by Yalata Amateur Radio Club, affiliate of JARRL.

AFRICA — RSZ (Zambia) will operate a field day in a station near Kitwe from 1300 GMT on the 12th of this month to 1500 the 13th. "The call will be 9J6AA/p," advises 9J2W. "Two transmitters will be used. The 'A' station will operate contest-style c.w. throughout the period on all bands 1.8 to 28 Mc. and will be particularly interested in contacting European portables although all other calls will be answered. The 'B' station will concentrate more on local publicity and will operate a.m. and c.w. at a more leisurely pace. All contacts will be confirmed and will count double points for the Worked Zambia Award to be announced shortly." If you QSOd CR6ACB and two other Benguela stations between May 15th and 25th you may be in line for DACB, a diploma issued through Delegado da I.A.R.A., Box 838, Benguela, Angola. This via W8GUC. W2GHIK & Co. indicate that CR5SP may soon undertake DXpeditionary work to rarer Africa areas with a brand new 15- and 20-meter portable layout. CR7GF likewise.

OCEANIA — 9M8RS (ex-VS4RS) renews his Sarawak activity with an SB-100, Eddystone 888-A, homespun 813s linear, verticals and a quad. "I look forward to meeting all the gang again," says Ron, refreshed by a lengthy U.K. holiday. W1YMI hears that K8GBN may sign KB6BN for a spell on 20 c.w. at any time. W9GXH relays 9M8EB's comments from Simanggang. "Ed reports our east coast, with some Nights and Nines, coming through to his area on the long path beginning about 1300 GMT. 9M8EB works satisfactorily into Europe and other parts of the world with his rhombic and Vee. His prime objective is to get a solid signal into North America, however, and this is a real challenge." W7ZQX enjoys the DX end with FAA at Agana from KG6ALK. Ex-9M2JJ and WA1CAW/mm dropped in on K3SWW/KG6 for some March eyeballing.

CR6HG, J. Figueiredo, P.O. Box 85, Benguela, Angola
 CT2AM, P.O. Box 3, Santa Maria Airport, Azores
 EL7D, LITMI, Harbel P.O., Liberia
 EP2DS, G. Slominski (W9AUM), ARSL, APO, New York, N. Y., 09205
 EP2RC (to K1KOM)
 ET3USA (see preceding text)
 FI8AU (to W8HMI)
 HB9XJ, mm (via WA6WTD)
 HI8RBG, P.O. Box 1022, Santo Domingo, D.R.

UT5EW of Dnieprodzerzhinsk, Ukraine, runs a hambrewed 200-watter on 3.5 through 28 Mc. with a variety of skywires. Vladimir has worked about 800 W/Ks. (Photo via ex-U2GU)



HP3Y/mm, Box 536, Vera Cruz, Mexico
 HR2SC, S. Cauahuati, 2nd St. NW 33, San Pedro Sula,
 Honduras
 KB6CP/KS6, Box 8, Pago Pago, U.S. Samoa
 KC66C, USCG Loran Stn., APO, San Francisco, Calif.
 96515
 KJ6DA (see preceding text)
 KP4AD, P.O. Box 1429, Ponce, P.R.
 KR6JZ (via W2CTN; see preceding text)
 KS6BO (W/Ks via K4TWF; others via W1WYN)
 KS6BO, Box 26, Pago Pago, U.S. Samoa
 LX3OT (to DJ0QT)
 MIZG (to DJZG)
 OD5AX (via RSGB)
 OD5BZ, P.O. Box 2806, Beirut, Lebanon (or via W8ZCQ)
 OIIAG, Kiskoon Radiokerho, Box 42, Salu, Finland (or via
 SRAL)
 SVIWW, P. Margaritis, Theotokopoulou, 71 Athens 905,
 Greece
 SV9WGG (via W1ETF; see preceding text)
 TT8AC (via REF)
 ex-TT8AJ (to F5EY; see preceding text)
 ex-U2GU, Mark M. Loseff, Dzerjinskogo 15, corp. 2, kw.
 17, Tula, U.S.S.R.
 UG6DL, R. Maxuduan, Alaverdyan 79/30, Yerevan,
 Armenian S.S.R., U.S.S.R.
 VK9CR, Box 31, Cocos Island, Indian Ocean (or via
 VK6RU)
 VP1WH (via W6SHC)
 VP2KD (via VE3ACD)
 VP4YT (via WB2KXG)
 VP6AK, D. Callender, Bayland, St. Michaels, Barbados
 ex-VP7TA-VP5A, VP4WD (to G3TA)
 ex-VS4RS (to 9M8RS)
 W9MJJ/KV4 (to W9MJJ)
 XE2DDK, R. Santos, Box 2208, Monterrey, Mexico
 XW8BA, U.S. Embassy, APO, San Francisco, Calif.
 96352
 XZ2LA, Box 371, Rangoon, Burma
 YN1CW (via CREN)
 YN9JUL, P.O. Box 25, Matagalpa, Nicaragua
 YV5BIG/YV7 (via K3SLP)
 ex-ZC5AL (to 9M2AA)
 ZP5JE (via ZP5IT)
 4X4BL (No. and S. America via OA4ON)
 5H3JR (via W2SNM)
 5J4RCA (via HK3TL)
 5U7AG, Box 201, Niamey, Niger Republic
 5X5AU (via UARC)
 7X2VX (via W4WC)
 9J6AA/p, c/o Radio Society of Zambia, P.O. Box 332,
 Kitwe, Zambia
 9Ms 2AA 2TS 6AA 8AL, VS5AL, L. Lyman (K8INZ),
 Peace Corps Volunteer, Sekolah Menengah Pertukangan,
 Ipoh, Perak, Malaysia (or via SM5DRB)
 9M1JW (to 9M1JW)
 9M8KZ (to G3KZM)
 9M8RS, R. Skelton, P&T Hq., Kuching, Sarawak, E.
 Malaysia

Contributors of the preceding include Good Samaritans
 Ws IECH 1WPO 1YYM 2KIR 5LXG 5LZG 7DJU 7VRO
 8YGR 9EXE 9NNC, Ks IQGC 2UYG 3SLP 3VFN 4GMR
 5VVF 6GSV 6JPL, Was 4PSA 4VAO 6ALWG 6SLU 6VAT
 6WPG 9AQE 9GSW, WBs 2FMK 6ITM 6MEQ, WN3BTA,
 VE3ADV, 9J2W, L. Stewart, Columbus Amateur Radio
 Association *CARscope* (W8ZCQ), DARC's *DX-MB*
 (DLs 3RK9PF), DX Club of Puerto Rico *Dxer* (KP4RK),
 Florida DX Club *DX Report* (W4LYV), International
 Short Wave League *Monitor* (12 Gladwell Rd., London
 N. 8, England), Japan DX Radio Club *Bulletin* (JA1DA),
 Long Island DX Association *DX Bulletin* (W2FGD),
 Newark News Radio Club *Bulletin* (L. Waite, 39 Hannum
 St., Ballston Spa, N.Y.), North Eastern DX Association
DX Bulletin (K1SHN, W1BPW), Northern California
 DX Club *Dxer* (Box 608, Menlo Park, Calif.), Puerto Rico
 Amateur Radio Club *Ground Wave* (KP4DY), VERON's
Dxpress (PA0s FX LOU VDY WWP) and West Gulf DX
 Club *DX Bulletin* (W5IGJ). Is it your turn to man the
 pump?

Whence:

SOUTH AMERICA — (le! RCY (Venezuela) offers an
 activity to help stave off summer's DX doldrums. The
 Venezuelan Independence Contest, a phone-only affair, is
 open to amateurs world wide from 1000 GMT July 3rd to
 2100 the 5th on 80 through 10 meters. Stations in the Amer-
 icas will swap the usual RS001, RS002, etc., serials with
 stations outside their own countries (stations not in the
 Americas may work only the Americas) for one point per
 contact. Score is obtained by multiplying contact points on

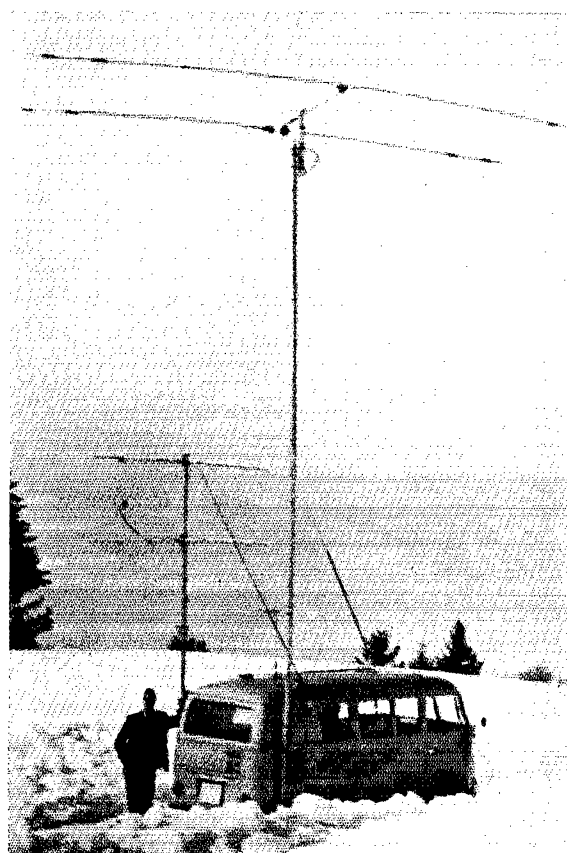
HB0s AFM and AFU have a logical answer to alpine
 DXpeditionary work. They hit 80 through 2 meters from
 this van, and may be back in Liechtenstein at any time
 (Photo via J. Gordon, WPE9HHZ)

each band by the number of countries (each YV call area
 counts as a country) on each band separately, then taking
 the sum. Various awards and certificates will be issued to
 certain high scorers for entries received by RCY, Concurso
 Independencia de Venezuela, P.O. Box 2285, Caracas,
 Venezuela, before September 15, 1965, and accompanied by
 a dollar's worth of International Reply Coupons. . . .
 "VE3EXT reports making 624 QSOs in ten days this Feb-
 ruary," says WITS. "He tells me VP1 is wide open for
 e.w. ops, and there's fine winter weather." W7QB has
 similar word from VP1WH (W6SIC) who observes, "Made
 691 contacts in six days on s.s.b., a.m. and c.w. with 47
 states and 29 countries. We have an NCX-3 powered by a
 400-cycle one-kw. generator on a mountaintop." Bill does
 radio survey work associated with oil-source exploration
 . . . YV5BIG's March DXcursion to Margarita island as
 YV5BIG/YV7 produced a flood of cards for QSL manager
 K3SLP. . . . WA6WPG gets good copy from KC4USP
 on 7218, 14,288 or 21,410 kc. The location is Palmer station,
 Anvers island, near Palmer peninsula, some 800 miles from
 South America, and Jack will be there with Operation Deep
 Freeze scientific Navy personnel for the next year or so.

EUROPE — There's a change in the F7 bureau address
 according to F7CK (W5MMX) through WIECH's
 good offices: F7 QSL Bureau, c/o Base MARS Stn., APO,
 New York, N. Y., 09083. . . . W2GHH's flyer says
 last month's multiband action by 4Us 1-2-3-4-5-6ITU
 commemorates the 100th anniversary of the International
 Telecommunications Union. Special QSLs will be issued
 . . . WIECH is told of a temporary slowdown in con-
 firmations from SV9WGG, Crete. W1ETF holds logs for
 contacts beginning August 24, 1964, and welcomes inquiries
 accompanied by s.a.s.e. . . . All QSLs for OY stations
 can be sent via OY-Bureau, Box 184, Torshavn, Faeroe
 Islands," states OY7ML. "Some new calls here are OYs 2J
 3B 3S 4K1 4M 7M and 7X." . . . If you run into
 stations with DK prefixes they should be new West Ger-
 many types. The DJ and DL blocks are almost full up,
 notes LIDXA's *DX Bulletin*. . . . K3VFN salutes the
 G1 3 gang for generally prompt QSL comebacks. . . .
 W4VPD will handle confirmations for this month's Monaco
 maneuver by P5CP, call undetermined at writing.

SOUTH AMERICA — PY2AT of LABRE points out
 that the number of International Reply Coupons necessary
 for the first weight unit from Brazil is still three, not
 six. PY postal rates have increased, all right, but the value
 of IRCs has gone up proportionately, thus making no change
 in the number required. . . . W1CSP learns from F8TAI
 that the FM7WB active in REF's 1964 DX contest was
 not legitimate. Similarly, WA6SLU hears from Ecuador
 authorities that the call HC8JU appears to be suffering
 unauthorized use from time to time. . . . WB2KXG

(Continued on page 174)



YL news and views

CONDUCTED BY JEAN PEACOR,* K1IJV

Write Soon

WHEN an amateur radio operator discusses his favorite subject, it's usually with great zeal, zest and enthusiasm. No wonder, for we all know the treasures wrapped up in this radio world of ours. What a joy it is to expound upon radio activities to interested friends. On the other hand, every once in a while we all happen upon a non-amateur friend who refuses to be impressed. They think your brand new tilt down tower is ugly and that your prized radio shack could well be converted into a cozy TV room! If, after this, the name dropping technique of some far away places still produces no glimmer of interest, it may prove best to merely wait for a better opportunity.

Such opportunities can crop up in the most unexpected places. For me, it happened in the local Post Office. Unaware that I was being watched, I unassumingly asked the man behind the counter what the postage rate was for mailing a letter to Africa. Being rather new at his job, he kindly yelled to a fellow worker, "What's the postage rate to Africa?" Murmurs of 'hmm, Africa' resulted in the line of people beginning to form behind me. Fortunately, I had also written to a ham in India the same day and needed these postage rates too. Obliging, the booming voice broadcast this fact as he checked on these rates. That did it! Opportunity had

* YL Editor, *QST*. Please send all news notes to K1IJV's home address: 139 Cooley St., Springfield, Mass.



The Chelmsford, Mass. Radio Club takes pride in having provided the first meeting place for Ruth Rand, K1RZO, and Francis McNamara, K1VKT, who were married in November.



The list of March Operators of the Month (see May *QST*) included the call of Gretna Longware, WA2WHE, of Elizabethtown, N. Y. The proficiency she demonstrates often on 80- and 40-meter c.w. has earned for her great admiration among many friends. Gretna's OM is not a ham and her interest in amateur radio stemmed from local CD radio activities. Licensed since 1961, she's another fine asset to our YL ranks.

Photo courtesy of K2IQH.

knocked, for exclamations of Africa!—India! poured forth from two women behind me.

I'd broken through the barrier. Both women were neighbors who had been unimpressed by antennas, radio shack and far away places before. In this case, two letters produced that genuine look of interest we all enjoy seeing. Suddenly, both women now saw my tower as something far nicer than some ugly thing that would look better covered with roses.

Actually, correspondence among YL operators all over the world is on an upward trend. Letters and pictures which sometimes follow a first radio contact are a fine compliment to any QSO and it's no rarity in hamdom to be mailing letters not only to Africa and India, but to any country in the world. Word has spread about the added enjoyment so many YLs have added to a first radio contact through such correspondence.

YLRL (Young Ladies Radio League), through their DX YL adoptee membership plan, has provided the spark for many YLs to strengthen these world-wide friendships. Originally, the adoptee plan started to better acquaint DX YLs with all YLRL members and their activities. The fine exchanges of understanding that have resulted is proof that it's done even more.

A recent article in *Miss Wron's Chatter* submitted by Dee Shaughnessy, W1ZJS, of Upton, Mass., cites but one example of how a DX YL

changed what had previously been merely a country into something very real for her. To quote an excerpt from Dee's article: "I adopted Bobby, ZL7JK, for the first time in 1963. As soon as she had been notified that I had adopted her, she wrote me a letter. That letter showed such warmth and gratitude that I would have considered myself well paid if I had never received another letter, but an exchange of letters followed and in them I learned about her new home in Salisbury on a slope with three or four acres of land around it . . . 'no QRM' she said. She described the loquat, mango, guava, citrus and avocado trees on her land with a fifteen foot hedge of bouganvillea shielding the rear of her house. No longer was Southern Rhodesia a spot on the map for me."

Many YL clubs now sponsor such adoptee memberships and the number of YLs finding the enjoyment to be derived from it all is increasing. So, write soon — untold benefits may be your reward.

Montana Points With Pride

If you have been privileged to QSO Ann Chalmers, K7JBW, of Choteau, Montana, you've met and talked with an extremely versatile YL.

Joe D'Arcy, W7TYN and SCM of Montana, kindly sent the following article which appeared in The Bozeman Daily Chronicle telling of Ann's many activities. "Scandinavian breads are the specialty of Ann Leslie Chalmers of Choteau, Mont., one of six winners of \$500 scholarships in national 4-H bread competition.

The award for Miss Chalmers, a 19 year old Montana State College sophomore, was announced in advance of the Sunday opening of the National 4-H Club Congress.

Miss Chalmers has completed bread projects in each of her nine years in 4-H. She developed breads with low fat and high cholesterol content when her father, Leslie Chalmers, was put on a special diet. She even developed a pizza recipe using no cooking fats or oils of any kind.

Far from spending all her time in the kitchen, Miss Chalmers has had projects in such fields as livestock, entomology and forestry. She once won a \$150 scholarship for developing a special fertilizer mix for barley. Her father operates an 840 acre ranch.

Miss Chalmers, who plans to be a teacher, plays several musical instruments, is a licensed ham radio



Ann Chalmers, K7JBW.



In February, WRONE members and their OMs attended a dinner honoring Blanche Randles, K1IZT. She was presented YLRL's Past President plaque and other gifts in appreciation of her services to all YLRL members in 1964.

"operator and a student pilot."

Ann's father, K7DCB, sparked her interest in amateur radio which led to her becoming licensed in 1960. When home from college, Ann operates mostly on 80 and 20 meters using her dad's KWS-1.

Her interests cover a wide range of subjects and a QSO with Ann should be one that you'd well remember. Montana isn't alone in pointing to K7JBW with pride.

CQ YL

Louisa Sando, W5RZJ, and author of the book *CQ YL* announces that two additional chapters for the book are just off the press. Totalling 12 pages, they are Chapter 6-A, covering the 3rd International YLRL Convention sponsored by WRONE and held at Cambridge, Mass. in June 1960, and Chapter 6-B which covers YLRL's 25th Anniversary Convention sponsored by the Buckeye Belles at Columbus, Ohio in June 1964. Thanks to the YL clubs whose contributions sponsored the printing costs, you may get these chapters as free supplements to your copy of *CQ YL* just for the asking.

If you have a copy of *CQ YL*, send your request for the new chapters to Louisa B. Sando, W5RZJ, 4417 Eleventh St. N.W., Albuquerque, New Mexico 87107. Please include a couple of 5¢ stamps to cover mailing costs. The pages will be mailed flat and are slotted for easy insertion into the spiral binding of the book. If you don't have one, copies of *CQ YL* are still available (\$3. postpaid) and all copies will now include all supplements.

Two supplemental pages (14-A and B; 36-E and F) published in June 1964 are also available free for the asking to any who may not yet have them. These were made possible by contributions received from YLs attending the YLRL Convention in June.

Note: YL clubs will receive bulk shipments for distribution to members. Also, if you attended the Columbus convention, you will be sent copies of these new chapters.

QST



Operating News



F. E. HANDY, WIBDI, Communications Mgr.
ROBERT L. WHITE, WIWPO, DXCC Awards
GERALD PINARD, Club Training Aids
LILLIAN M. SALTER, WIZJE, Administrative Aide

GEORGE HART, WINJM, National Emergency Coordinator
ELLEN WHITE, WIYYM, Ass't. Communications Mgr.
PETER CHAMALIAN, WIBGD, Communications Asst.

The Richmond Amateur Radio Club's mid-April meeting subject "Theory, Extra Class" reflected a popular theme this April. WA4AGB's slogan, announcing this meeting, was *don't get caught with your license down* . . . From the flood and tornado-plagued midwest and from all over the nation came personal letters and clippings. From a letter: Thanks and a well-done to W0BES/KH6 and K4PNG. A severe tornado devastated my hometown. When unable to reach loved ones by commercial telephone, the amateurs contacted worked feverishly and my mind was placed at ease. . . . A heading in the Memphis paper: "Ham operators get good news to worried kin." Another letter: I wish to express sincere gratitude for services rendered by two of your members. . . .

An Idea for Traffic Origination. With daylight time, summer-jobs and vacations shifting some of the net patterns, certain traffickers are asking how to work for BPL-size totals. K3JYZ suggests ARL7'ing authors of articles and letters in *QST*, that is, commenting on them or sending questions to an author by filing an amateur radiogram. ARL7 as a text means, "reply by amateur radio" which may or may not be appropriate in a given case. The full numbered radiogram list (CD-3) will be sent free in response to radio requests.

Those Popular June Activities. *The V.H.F. QSO Party (June 12-13) and the ARRL Field Day (June 26-27)* have been listed for some months in the Activities Calendar. We trust that everyone has requested his log-report forms and is all set. Attention is invited to the fact that in the v.h.f. contest competition is between you and the v.h.f. operators in your immediate ARRL section. The League reserves a winner's certificate for each Section area and the areas are all listed on page six, each issue of *QST*. The June weather is almost always ideal for operating from hilltops so the v.h.f. activity should be one in which many new states and stations can be worked. See the full announcement elsewhere, this month.

Field Day Planning and Purpose. We hope that many individuals and clubs have new 30-

watt rigs or some especially built earlier to be tested in this year's FD. The original concept of the Field Day was a "test of portables" and the rig described on page 58 of April 1965 *QST* makes one approach to the subject. We have often thought there should be a hand-carried battery-powered category to supplement the emergency things that can be done from cars or home stations and we would like to call on all participants this year to conform to the increasing emergency and public service spirit as important to a true Field Day test.

Training oneself and fellow hams how to do a good job in both setting up and operating with a limited power source available and independent of commercial power is basic to the "FD". There's no change from scoring points June 26th and 27th strictly in accord with the rules detailed elsewhere in this *QST*. However, rule changes are under study for '66 since some feel that there should be a special bonus such as a multiplier to all groups and individuals who comply with four out of five or six 'spirit of Field Day' objectives. A list of these might include the following:

- (1) No existing poles, towers or pre-established man-made antenna supports
- (2) One home built transmitter unit in use for each transmitter-class
- (3) On scene to set up not more than three hours before starting time
- (4) No commercial power for any purpose
- (5) No special operating gimmicks such as electronic means to pass transmitters between operating groups while remaining in the same transmitter class.

Our big annual exercise called the Simulated Emergency Test coming in October is aimed at other aspects of public service emphasis such as organized deployments and surprise alerting problems. But the FD should be the place to re-register members in the Amateur Radio Emergency Corps, and to make sure every operator can draft and send a message in proper form! Those more experienced in procedure techniques who know message form, good practice in timing calls to get results, how-to log

C. D. ARTICLE CONTEST

A Communications Department article contest, a continuation of the very successful *QST* Article Contest during the 1961 anniversary year, needs your best ideas (in 800-1200 words) relating to League organization, clubs, training exercises, and operating techniques. Periodically, the best articles submitted for the "CD Contest" will be chosen to appear, with the winner electing to receive (a) a bound 1965 *Handbook* or (b) a *QST* binder, League emblem and the ARRL DX map.

accurately and other pertinent matters should arrange adequate talks and briefing sessions to assist in developing high precision in such matters and presenting sure-knowledge for the newer and less skilled amateur. All operators need to be familiarized with the controls and tune-up techniques on any equipment with which they are not completely familiar. Come another year and we may also provide still another bonus-credit for individual operators who participate in the Field Day. We have the suggestion that this apply for possible individual radio origination (by one who operated for one or more contacts in the group FD) of a message reporting results! It is proposed such a credit *only* be given in the seven days after a FD and only when the message is radio-handled into an accredited NTS net and copy of message and handling data enclosed with FD reports to make a supplemental credit-before-multiplier and the full score finalized to include it. We seek your comment to guide our rules-group but stress that *this year* we ask only that all participants conform closely to the published rules, avoiding excesses in the form of "scheduled" or "manufactured" points.

Clubs as is the custom will make their own decisions as to what transmitter class to enter. We hope they will *not* forget to encourage submission of additional "club aggregate mobile scores." Such are a good way to encourage a check-out of the truly emergency and mobile equipments of all club-connected individuals at the time the FD is going on.

We expect *every* club to originate the one Field Day message now called for and to send it so it rates the 25 points credit as provided in the present scoring pattern. See the FD announcement, page 40 please. There will be many grand operating and fraternal experiences for everyone who goes out in this exercise. We'll look for your FD report and also welcome your comments about these ideas for next year. Which possible items do you feel belong, and those things which you think should be excluded, when possibly setting up something new for next year's rules should we call it a "spirit of FD" multiplier?

Most Common Operating Defects. FCC's reports of the signal difficulties for which citations are given out and Observer reports closely parallel each other as to the types of difficulty amateurs have with their rigs and operating. Here are several of the most common things to watch out for: (1) S.s.b. flat-topping, gain too high (2) c.w. out-of-band work (3) off-frequency phone or s.s.b. beyond sub-band limits (4) key click (5) distorted audio (6) missing and improper station identifications (7) chirpy c.w. (8) c.w. and phone harmonics outside the amateur bands.

— F. E. H.

CLUB COUNCILS AND FEDERATIONS

Affiliated Council of Amateur Radio Clubs, Charlotte Ellis, K7SUR, Secy., 2610 S. E. 6th St., Vancouver, Wash.
 British Columbia Amateur Radio Association, Mary Beth Wasserlein, VE7BSB, Secy., 3792 Point Grey Rd., Vancouver 8, B. C., Canada

Central California Radio Council, Virginia C. Schooley WA6PTC, Secy., 711 E. 15th St., Oakland, Calif. 94606.

Chicago Area Radio Club Council, Inc., Arthur G. Robert, W9YMF, Secy., 15200 So. 108th Ave., Orland Park, Ill.

Federation of Eastern Massachusetts Amateur Radio Associations, Eugene H. Hastings, W1VRK, Secy-Treas., 28 Forest Ave., Swampscott, Mass.

Federation of Long Island Radio Clubs, Warren H. Mayer, W2OUC, Secy., 25 Aldred Ave., Rockville Centre, L. I., N. Y.

Hudson Amateur Radio Council, Arthur R. Rauch, W2DID, Secy., 151 Smith St., Central Islip, L. I., N. Y., 11722.

RESULTS, FEBRUARY FREQUENCY MEASURING TEST

The February 11, 1965 FMT, open to all amateurs, brought entries from 295 participants who made a total of 1012 measurements. Of these 125 ARRL Official Observers submitted 412, and 170 Non-OOs made 630 readings. All taking part have received individual reports of their readings. The standings accredited to the more precise in each group appear below; all listed show ability of the highest order in Frequency Measurement.

Following is a report of the standings of the FMT leaders in this test. In consideration of the minimum possible error, due to 'doppler' and unavoidable factors, we accredited as of equal merit all reports where computations show 1/10ths parts per million or higher accuracy. Our direct comparisons with the umpire's readings otherwise establish this order of listing.

September QST will announce details on the next ARRL FMT.

Observers	Parts/ Million	Non- Observers	Parts/ Million
W1BGW W1TFS		W1PLJ W2FMI	
W4JUI W5FMO		W4FER K4HTI	
K5RWB W6CDO		W5VDC W8KJX	
W8CUI	(0 to .1)	W9BCY W9AIG	
		WA0DKP W6YUQ	
		R. Ireland	(0 to .4)
W3BFF.....	.6		
K0BRS.....	1.2		
W6GQA.....	1.8	K6ALH.....	.6
W1CMP.....	2.0	W9TZN.....	.6
K6EC.....	2.0	W5HTM.....	1.2
W6IBD.....	2.5	W8KZW.....	1.2
K0AZI.....	2.9	K2IYC.....	1.5
W0VBK.....	3.4	K6MZN.....	1.5



Western New York 00 W2BLP participated in three 1964 Frequency Measuring Tests and led his call area in the number of notices sent out during the year.

Michigan Council of Amateur Radio Clubs, Howard W. Rieunan, K8IIN, Secy., 16124 Locherbie, Birmingham, Mich. 48009.

Ohio Council of Amateur Radio Clubs, James W. Benson, W8OUU, 2463 Kingspath Dr., Cincinnati, Ohio 45231.

Puget Sound Council of Amateur Radio Clubs, Donald W. Ashley, W7HMJ, Secy., 1909 So. Franklin St., Olympia, Wash.

Radio Society of Ontario, Inc., A. K. Meen, VE3RSO, Secy., 95 Lord Seaton Rd., Willowdale, Ontario, Canada

Southern Council of Amateur Radio Organizations, Inc., Douglas E. Decker, Jr., WA6TAD, Secy., 5901 Streamview, Apt. 3, San Diego, Calif. 92115.

A.R.R.L. AFFILIATED CLUB HONOR ROLL

Here is the Honor Listing of all those affiliated clubs whose *entire membership* is demonstrated in the '65 Club Annual Report as constituted of members of the American Radio Relay League. We're proud to recognize these "100% clubs" and as an earned recognition will be forwarding to each affiliate so shown in this Honor Roll as *having every club member* an ARRL member our Hundred Percenters Certificate.

The Board's requirements for ARRL affiliation are that only 51% or more of a club's membership be full or associate members of ARRL for continuing affiliation. This is hardly a difficult attainment in most cases, but to work for 100% is something else again. As questionnaire forms are returned from additional affiliates and show 100%, these clubs will be put in line for a further 1965 listing of Honor Roll to appear probably in December '65 QST. Our Honor Roll listing follows:

Aeronautical Center ARC, Inc., Oklahoma City, Okla.
 Amateur Radio Tech. Society of St. Louis, St. Louis, Mo.
 Amateur VHF Institute of N. Y., Maspeth, N. Y.
 Athens Amateur Radio Club, Athens, Ga.
 Beaches Amateur Radio Society, Jacksonville Beach, Fla.
 Beacon Radio Amateurs, Philadelphia, Pa.
 Berks Amateur Radio Club, Shillington, Pa.
 Blue Ridge Radio Society, Inc., Greenville, S. C.
 Central Kansas Radio Club, Inc., Salina, Kans.
 Columbia Amateur Radio Club, Columbia, Miss.
 Delmont Radio Club, Glenside, Pa.
 Dutchess County VHF Society, Poughkeepsie, N. Y.
 East Whittier Radio Club, Whittier, Calif.
 The Electron Club of Denver, Littleton, Colo.
 Enid Amateur Radio Club, Enid, Okla.
 Experimental Amateur Radio Society, Rockford, Ill.

DX CENTURY

Honor Roll

The DXCC Honor Roll consists of the top ten numerical totals in the DXCC. Position in the Honor Roll is determined by the first number shown. The first number represents the participant's total countries less any credits given for deleted countries. The second number shown represents the total DXCC credits given, including deleted countries. Positions in cases of ties are determined by date and time of receipt. All totals shown represent submissions received through March 31, 1965.

W1FH ... 313/339	W7PHO ... 312/330	W8LKH ... 311/331	W0NTA ... 308/328	W2HTI ... 306/321
W4DOH ... 313/337	W4QGW ... 312/329	KV4AA ... 310/334	W7ENW ... 308/332	W7WVE ... 306/323
CX2CO ... 313/334	W1BTH ... 312/336	W2DEC ... 310/326	W8UCV ... 308/325	H89MO ... 306/323
W2ACW ... 313/337	W2ZX ... 312/331	W1ME ... 310/333	W0VYV ... 308/326	W2NUT ... 306/322
W3GHD ... 313/337	W8KIA ... 312/336	OE1ER ... 310/332	W2TP ... 308/317	W0OGI ... 306/322
W1GKK ... 313/338	G3FKM ... 312/329	K2DCA ... 310/327	W0SYK ... 308/326	DL1IN ... 306/322
4X4DK ... 313/331	W9DU ... 312/334	W5ABY ... 310/327	W3RNO ... 308/326	PA0FX ... 306/326
W8PQO ... 313/330	G4CP ... 311/335	W9BFB ... 310/328	W2FZY ... 308/321	W2SSC ... 306/322
G2PL ... 313/336	G3AAM ... 311/335	W7GBW ... 310/334	W4PL ... 308/323	WA2IZS ... 306/323
W9RBL ... 313/338	W8DMO ... 311/333	W8ELA ... 310/333	DL2RW ... 308/325	W6GIL ... 306/323
W2TOG ... 313/332	W3LMA ... 311/333	W6GPB ... 310/331	K6EVR ... 308/325	W1HX ... 306/326
W8BRA ... 313/336	W6AM ... 311/336	5Z4AO ... 310/328	1I1AMO ... 308/327	W1MV ... 305/322
W8UAS ... 313/334	W2UCV ... 311/328	W6EBG ... 310/335	W3JTC ... 307/330	W4OM ... 305/327
W8JIN ... 313/338	W2BOK ... 311/328	VE7ZM ... 310/334	W2FXN ... 307/321	VK3KB ... 305/328
W6CUIO ... 313/338	K3UPG ... 311/335	K2PZ ... 309/327	W4PL ... 307/324	W6WVO ... 305/322
W7GUV ... 313/336	D1BZ ... 311/329	G8KCS ... 309/327	W8IRN ... 307/325	DL3RK ... 305/323
W8EWS ... 313/337	DL3LL ... 311/327	W4TM ... 309/331	W4GXB ... 307/328	W2YTH ... 305/323
PY2CK ... 313/336	CE3AG ... 311/335	W2ZGB ... 309/325	W9AMU ... 307/324	ON4DM ... 305/324
W8HWG ... 313/338	W1CLX ... 311/334	W5AFX ... 309/334	G3FXB ... 307/325	W3NKM ... 305/322
W4GD ... 312/333	W5MMK ... 311/332	W9ODF ... 309/326	W3WGH ... 307/322	K6EC ... 305/317
W2LV ... 312/331	W9NMM ... 311/334	W4TV ... 309/329	K2LTV ... 307/320	K2GFO ... 304/328
W2JT ... 312/331	W8KML ... 311/332	W2KM ... 309/327	K4AIM ... 307/321	W5ADZ ... 304/326
W2BXA ... 312/336	W0QVZ ... 311/332	W4VPD ... 309/326	W5OLG ... 307/328	G3YF ... 304/326
H89J ... 312/336	W8JBI ... 311/330	W2LAX ... 309/326	W4MR ... 307/327	W2HMJ ... 304/324
W2LPE ... 312/333	W4ML ... 311/331	W2WZ ... 309/332	DL6EN ... 307/322	K2OEA ... 304/320
W8BF ... 312/333	W3JNN ... 311/335	W4OPM ... 309/324	W1ZV ... 306/323	W9KOK ... 304/328
W3KCT ... 312/336	1U6DJX ... 311/335	K4LNM ... 309/323	W3ECR ... 306/323	K4RID ... 304/318
W9HUZ ... 312/332	W9AIV ... 311/334	W2WVE ... 309/327	W8NGO ... 306/323	W2PCJ ... 304/321
W8MPW ... 312/330	W5KC ... 311/334	W2AYJ ... 309/328	W2GUM ... 306/328	W2SAW ... 304/321
W1JYH ... 312/335	W5CKY ... 311/330	W2TVR ... 308/326	W8PUD ... 306/323	W5KBU ... 304/322
W6YY ... 312/332	W4AIT ... 311/334	W8DAW ... 308/332	W0PCI ... 306/321	W6OSU ... 304/316
W9NDA ... 312/336	W3GAU ... 311/334	W1HZ ... 308/326	W7AC ... 306/330	W6KEV ... 304/326
W9YFV ... 312/336				W5QK ... 304/315

Radiotelephone

CX2CO ... 313/334	4X4DK ... 312/330	W8KML ... 310/331	W8PQO ... 309/326	ON4DM ... 304/323
W3RIS ... 313/338	W8GZ ... 312/335	W1FH ... 310/331	W2BXA ... 309/331	K4AIM ... 304/318
PY2CK ... 313/336	W7PHO ... 312/330	W2JT ... 310/324	W6AM ... 307/331	G3FKM ... 304/318
W8HWG ... 313/335	W4DOH ... 312/334	PY4TK ... 310/327	1I1AMU ... 307/326	G2PL ... 303/323
W9RBL ... 312/335	W2ZX ... 312/331	W9JFF ... 310/327	W4QGW ... 306/319	W3KCT ... 303/322
W8BF ... 312/333	E24ER ... 311/331	W3JNN ... 310/331	T2HP ... 305/327	G8KS ... 303/317
	W6YY ... 311/331	W0AIW ... 310/331	W9NDA ... 304/324	

New Members

From March 1, through March 31, 1965, DXCC Certificates and Endorsements based on contacts with 100 or more countries have been issued by the ARRL Communications Department to the Amateurs listed below.

8M6FB ... 242	DL6DU ... 137	DJ2NO ... 112	W3MPX ... 102	HASAW ... 102	8I5ZL ... 101
WA2RLQ ... 238	W8HDB ... 134	DJ4OQ ... 108	WA4PHA ... 102	KA2BW ... 102	K1JLU ... 100
K9AIO ... 186	VE4ZX ... 126	W2GTT ... 105	WA8LSO ... 102	MP4BEQ ... 102	W3QZA ... 100
K8SOK ... 180	8P8SR ... 120	DL1CW ... 104	W9EHRK ... 102	4X4JO ... 102	K8DBW ... 100
DL7EG ... 179	OK1JN ... 118	FR7ZJ ... 104	VE6CJ ... 102	K1QPN ... 101	W8BLST ... 100
VE3EJO ... 150	ZS6BEJ ... 115	K5JVF ... 103	DL6KX ... 102	K3BSY ... 101	K6YRX ... 100
8A15CAK ... 146	OE1LZ ... 114	K7CAD ... 103	DL9DX ... 102	K6AJJ ... 101	YU2EC ... 100
					4X4HC ... 100

Fountain City Radio Club, Knoxville, Tenn.
 IRC Amateur Radio Club, Philadelphia, Pa.
 Larkfield Amateur Radio Club, Northport, L. I., N. Y.
 Loudon County Amateur Radio Club, Lenoir City, Tenn.
 Magic Valley Radio Amateur Club, McAllen, Texas
 Mahonoy Valley Brass Pounders Club, Shenandoah, Pa.
 Mid-Island Radio Club, Freeport, L. I., N. Y.
 Norfolk County Radio Association, Norwood, Mass.
 North Augusta-Belvedere Radio Club, North Augusta, S. C.
 Newtown Oldtimers' R. Assn. Toronto, Ontario, Canada
 Order of Boiled Owls of New York, West Hempstead, N. Y.
 Paso Robles Amateur Radio Club, Inc., Paso Robles, Calif.
 Radions, Lancaster, N. Y.
 Roblin Amateur Radio Club, Scarborough, Ont., Canada
 The Rockaway Amateur Radio Club, Rockaway Park, N. Y.
 Scarborough Amateur Radio Club, West Hill, Ont., Canada
 Sheridan Radio Amateur League, Sheridan, Wyo.
 Society Radio Operators, Chicago, Ill.
 South Bay Amateur Radio Society, National City, Calif.
 South St. Louis Amateur Radio Club, Webster Groves, Mo.
 Submarine Base Medical Research Laboratory Amateur Radio Club, Groton, Conn.
 Sun City Amateur Radio Club of Arizona, Sun City, Ariz.
 Thumb Amateur Radio Club, Caro, Mich.

Valley Radio Club, Ironton, Ohio
 Vanderburgh Amateur Radio Emergency Service, Princeton, Ind.
 Veterans Administration Research Hospital Amateur Radio Club, Chicago, Ill.

DXCC Notes

Announcement is hereby made of the addition to the ARRL Countries List of *San Felix Island*, located some 550 miles off the central west coast of Chile. San Felix is territory belonging to Chile. Acceptance of this island is in accordance with point 2(a) of the criteria; see July, 1963 *QST* DXCC Note.

Confirmations for contacts with San Felix Island may be submitted for DXCC credit starting August 1, 1965. Confirmations received for this listing before August 1, 1965 will be returned without credit.

CLUB AWARDS

New Members Radiotelephone

SA16FB.....238	ZL3OY.....117	HK5AOH.....112	W6ABA.....107	9L1HX.....104	VE6CJ.....102
SA15HK.....162	W9JT.....115	D17EM.....111	11KG.....107	W0LWX.....103	W8NNR.....100
VQ4HX.....127	G3LDO.....114	W9GXH.....109	SM5CAK.....104	VE2JD.....102	W0GYM.....100
W8EDB.....119					SV1AA.....100

Endorsements

W6EPZ.....323	K4SCT.....274	W2ZTV.....236	W5RU.....200	K8CK.....170	W1RFQ.....140
W3CGS.....322	W8IBX.....271	W3ZQ.....233	W6OHJ.....200	DL1KS.....170	W0VOQ.....140
W4AAU.....322	W8KMD.....271	K0BIT.....232	K9QIE.....200	SP5GX.....170	K4RSY.....135
W5IGJ.....321	W8QNW.....270	SP9TA.....232	ZS2RM.....200	V7NQ.....170	K4EOP.....131
W8KPL.....321	W8FKH.....264	W5LGS.....231	9Q5AB.....200	W8DDK.....169	DJ0KQ.....131
W2CYS.....320	W4NO.....261	K0URK.....227	ZS61W.....194	D17EM.....169	H4SKDQ.....131
W0VBQ.....320	W8YCP.....261	H89QO.....226	W6OMR.....193	VE3KP.....165	I1HL.....131
G13IVJ.....315	W8EVZ.....260	K1IMP.....223	W1NEP.....192	W9MJC.....164	W1ET.....130
W3KVQ/2.....313	ZL3IS.....259	H89IK.....221	W3PVZ.....191	YV5AO.....163	WA2LMW.....130
K0RAL.....311	SM5BPJ.....257	W1UUK.....220	OK1MP.....191	W1LBA.....162	W0LBS.....130
W2ASO.....310	W4BRAU.....256	K8BZL.....220	K8VSL.....190	W6PFT.....162	J4RBB.....130
W2RGY.....310	W3BVL.....255	W6GNG.....220	W9QQN.....190	Y6GCF.....162	K8RBJ.....130
W5BRR.....310	SP7HX.....254	V4KRL.....220	HK3RQ.....190	K4CEB.....161	W7FUL.....123
W6CHV.....310	K3HQJ.....253	W2OIB.....213	K4GRD.....184	W9GXH.....161	J4RGR.....123
W6NJU.....310	K6CYG.....253	W9QKC.....212	W1AH.....183	SP2HL.....161	VE3ACD.....122
OH2NB.....310	K8VDV.....253	DL1TA.....212	W4HOS.....181	W46IRP.....160	K1NWE.....121
W4AH.....303	W4HEJ.....251	W4GQW.....211	K7AKW.....181	W7YU.....160	W8NFP.....121
W4NS.....300	K1MDD.....250	W1DGJ.....210	W1BFP.....180	W1GOG.....159	W1Z.....120
W8PHZ.....300	W8ETU.....250	W8ZFMK.....210	K8EHD.....180	W9SCZ.....158	WA2ZKO.....120
W8ZCQ.....300	W9WKU.....250	W4VMS.....210	W8MFW.....180	W4CQI.....156	K69SV.....120
W9MQK.....300	K1YRO.....247	G3JLB.....210	W44LYQ.....178	SM3PHT.....155	H89ADP.....120
SM5CCF.....294	W88RG.....246	OH4NS.....206	W41SG.....173	W6BCT.....153	KP4BAJ.....120
DL7EN.....291	W9QMD.....245	SP6AA.....206	W8NAN.....173	W3URE.....152	L8SPF.....120
W4UE.....290	K4JEY.....242	K17DTB/6.....203	H8TU.....172	L1AQ.....152	L8AFA.....120
W7RTH.....290	W6REH.....242	W2FXE.....202	K6QVH.....171	SM6RS.....151	S15CX.....120
W8QJR.....288	W6PZ.....241	W46HRS.....202	DL3ZA.....171	W3FLY.....150	K0PUB.....113
W468BO.....285	H0QD.....241	WAZHU.....201	K1TUQ.....170	K3LL.....150	W1PJ.....111
W6GRX.....281	I1F.....241	K4SHB.....201	W3UHV.....170	K3LJ.....150	W3GJR.....110
K4AJ.....280	VE7PU.....240	W2EVI.....200	W4JFW.....170	K4MOJ.....142	K3SLP.....110
W8CUT.....280	ZS61W.....240	W5QVE.....200	W5CPM.....170	W6RGG.....142	W9QEV.....110

Radiotelephone

W4PDL.....310	W1BIB.....261	W2GPI.....227	W46FPB.....199	K2YLM.....160	K2RAP.....130
ZL1FY.....310	K4VVA.....260	W2ZTV.....226	W468RO.....199	W44LYQ.....160	K4FTZ.....130
W2WZ.....303	K0RAL.....258	W6GMY.....225	SM5BPJ.....194	K6HZP.....160	W9PCD.....130
W3WGH.....300	T1ZLA.....255	K9UKN.....225	VE3BTI.....191	VE7HZJ.....160	W9DNE.....130
W8PUD.....300	K2CNX.....252	W4HUF.....224	W8CUT.....190	G3PTN.....160	W9QQN.....124
G13IVJ.....300	W4ZRAU.....251	ZS6BBP.....224	W4AVY.....186	H83AFB.....160	VE3EG.....122
K0EYF.....293	W6ZTY.....251	V42DI.....221	V04RRL.....181	VE3BE.....159	W1LYT.....121
W91LV.....291	W1MNV.....250	F3MO.....220	K1IDD.....180	FG7XL.....156	W8HXD.....121
K9LUI.....290	O4ACV.....250	W1BHP.....211	W2FXE.....180	W45EFL.....152	K3HYV.....121
DJ2BW.....285	W3BVL.....244	WAZHOK.....211	W9QUU.....180	K9KLA.....151	I1HL.....120
K6LGF.....280	W6HCV.....243	W8NVP.....210	W2VOH.....178	DL2OK.....151	SM6RS.....120
W9BEK.....280	W4FP8.....240	W8QNW.....210	K88OK.....171	W2EXA.....150	W1FZ.....117
W8BEP.....280	W6ZTY.....240	W8VC.....210	K4CAB.....170	W4DL.....150	K4RWSY.....117
K4AJ.....274	ZS61W.....235	O4AKY.....210	SM5ATN.....170	VE3EUI.....150	K6RSY.....113
YV5AXQ.....272	W6REH.....234	W4HKJ.....206	SP9RF.....164	OK1MP.....150	VE3ACD.....112
W2PTM.....271	W9GAA.....233	K1IUDP.....201	W9VMS.....163	W9WKU.....142	K1MOD.....111
W1GKK.....270	W2ODO.....230	W2ROH.....201	PY3AHL.....163	K4FTZ.....140	K2PIU.....110
W4MS.....270	K6CYG.....230	K2OEA.....200	K4BMS.....161	K8AJK.....140	W44WE.....110
G6TA.....269	W0CGL.....230	W6OVE.....200	K4CAB.....161	G3WVWV.....140	K51X.....110
W3CGS.....266	IT1TAL.....230	W7QPK.....200	W4JOS.....161	VE2ANK.....134	

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for March Traffic:

Call	Orig.	Recd.	Rel.	Totl.	Total
W3CUL	294	2116	1879	205	4491
K6BFI	32	2002	1855	90	4039
W1PEX	131	473	404	58	1066
W42RUE	44	548	436	27	1055
W7BA	7	511	380	27	1025
W3BML	47	529	386	4	966
K4VYU	121	409	378	27	935
K4ONK	121	412	368	5	934
K2KQC	23	461	394	54	932
W4CCP	71	450	398	12	931
K6EPT	108	401	307	94	910
W42GPT	23	441	398	32	894
W00HJ	35	405	387	18	843
W2EW	361	225	83	149	818
W6ZBJ	14	399	388	11	812
W7DZX	20	409	362	1	795
WB2HVB	180	332	228	54	794
K9KZB	25	362	345	17	749
W6R9Y	14	344	325	122	745
W0LGR	33	383	305	29	740
W41GQM	25	358	200	154	737
W6GYH	229	242	230	3	704
W44BMC	195	204	251	37	687
W9YH2	5	337	328	9	679
W6B8BO	37	335	298	6	676
K6GFB	583	37	12	25	667
W0ZVL	0	474	7	182	663
W4KTS	24	319	309	10	662
K6RMD	16	323	302	21	662
K2VNL	13	291	328	17	649
W50BD	12	325	304	10	642
K6BDI	197	222	138	84	641
W3VR	69	297	261	12	639
K3ZYP	197	188	59	188	632
W2NKN	20	300	280	20	620
K7JHA	24	309	279	5	617
K6MCA	5	304	299	5	613
W42VZK	109	272	219	10	610
W6BJUH	26	283	244	39	592
W1BGD	13	294	194	89	590
W4ZVD	10	282	280	15	587
W46WPK	2	275	249	25	557
K6G5Y	36	260	260	1	537
K6ALD	13	252	213	50	525
W1TNL	93	217	188	14	512
W4TFL	28	242	225	17	512
W5PPE	16	289	201	6	512
Late Reports:					
W3VR (Feb.)	47	964	933	19	1963
W00HJ (Feb.)	39	110	394	16	859

More-Than-One-Operator Stations

Call	Orig.	Recd.	Rel.	Totl.	Total
W44EV	130	1628	1542	86	3386
W6IAB	725	995	618	379	2717
W6YDK	1142	340	317	23	1822
W4DFU	412	341	258	18	1029
K6VAH	15	458	493	10	1006
K9NBE	979	7	—	—	986

BPL for 100 or more originations-plus-deliveries

W41AF/4 256	W4PHQ 142	K4JIG 111	W5AC 111
W7NPK 241	W4NTR 135	W6LRU 109	W4RQU 108
W44ZD 215	K8TPE 127	K6MB 107	W4NEV 107
W48DPT 192	W4NEY 124	W4ZGT 103	W4ZGT 103
W42PWE 180	K4PLK 120	K6NFT 4 103	—
W45NZ 168	W44OQ 116	W8DAE 102	—
W9NZZ 158	W4SAZ 114	W8DAE 102	—
W6XCK 154	W48PC 113	K2UBG 101	—
K6MHH 145	WIDWA 111	K2VGD 101	—
	K4NCP 134		

More-Than-One Operator

BPL medallions (see Aug. 1954, p. 64) have been awarded to the following amateurs since last month's listing: W1AOG, W82HVB, W6YKS, VE7BDJ.

The BPL is open to all amateurs in the United States, Canada, and U.S. Possessions who report to their SCM a message total of 500 or a sum of origination and delivery points of 100 or more for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt in standard ARRL form.

ELECTION NOTICE

To 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 for at least two years and similarly a full member of the League for at least one continuous year immediately prior to his nomination.

Petitions must be received at ARRL on or before 4:30 P.M. on the closing dates specified. In cases where no valid

nominating petitions were received in response to previous notices, the closing dates are set ahead to the dates given herewith. The complete name, address, and station call of the candidate should be included with the petition. It is advisable that eight or ten full-member signatures be obtained, since on checking names against Headquarters files, with no time to return invalid petitions for additions, a petition may be found invalid by reasons of expiring memberships, individual signers uncertain or ignorant of their membership status, etc.

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

Communications Manager, ARRL [place and date]
 225 Main St., Newington, Conn. 06111
 We, the undersigned full members of the _____
 _____ ARRL Section of the _____
 Division, hereby nominate _____
 as candidate for Section Communications Manager for this
 Section for the next two-year term of office.

Elections will take place immediately after the closing dates specified for receipt of nominating petitions. The ballots mailed from Headquarters to full members will list in alphabetical sequence the names of all eligible candidates.

You are urged to take the initiative and file nominating petitions immediately. This is your opportunity to put the man of your choice in office.

— F. E. Handu, Communications Manager

Section	Closing Date	SCM	Present Term Ends
Idaho	June 10, 1965	Raymond V. Evans	Apr. 10, 1965
Oklahoma	June 10, 1965	Bill F. Lund	Aug. 9, 1965
Western			
Massachusetts	June 10, 1965	Percy C. Noble	Aug. 11, 1965
Kentucky	June 10, 1965	Mrs. Patricia C. Schafer	Aug. 20, 1965
Northern			
New Jersey	June 10, 1965	Edward F. Erickson	Aug. 21, 1965
Southern			
New Jersey	June 10, 1965	Herbert C. Brooks	Aug. 26, 1965
Kansas	June 15, 1965	O. Leland Cheney	Deceased
West Virginia	July 9, 1965	Donald B. Morris	Sept. 18, 1965
Rhode Island	Aug. 16, 1965	John E. Johnson	Oct. 12, 1965
Arkansas	Aug. 16, 1965	Ertis R. Williams	Oct. 13, 1965
Indiana	Aug. 16, 1965	Carnel L. Nichols	Oct. 14, 1965
San Diego	Aug. 16, 1965	Don Stansifer	Oct. 15, 1965
Vermont	Aug. 16, 1965	E. Reginald Murray	Oct. 17, 1965
Hawaii	Sept. 10, 1965	Lee R. Wical	Nov. 11, 1965

ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed by members in the following Sections, completing their election in accordance with regular League policy, each term of office starting on the date given.

Maine	Herbert A. Davis, K1DYG	Mar. 12, 1965
West Indies	Jose E. Saldaña, KP4JM	Apr. 9, 1965
Alberta	Harry Harrold, VE6TG	Apr. 10, 1965
Canal Zone	Thomas B. DeMeis, KZ5TD	May 10, 1965
Nebraska	Frank Allen, W6GGP	June 10, 1965
Oregon	Everett H. France, W7AJN	June 10, 1965
Eastern Pennsylvania	Allen Bremer, W3ZRQ	June 15, 1965

In the North Dakota Section of the Dakota Division, Mr. Harold L. Sheets, W0DM, and Mr. Douglas H. Classon, W0CAQ, were nominated. Mr. Sheets received 62 votes and Mr. Classon received 41 votes. Mr. Sheets' term of office began Mar. 8, 1965.

In the Missouri Section of the Midwest Division, Mr. Alfred E. Schwaneke, W0TPK, and Mr. Chester G. Hallberg, K0TCB, were nominated. Mr. Schwaneke received 124 votes and Mr. Hallberg received 171 votes. Mr. Schwaneke's term of office began Mar. 11, 1965.

In the Minnesota Section of the Dakota Division, Mr. John B. Morgan, W0RA, and Mr. Herman R. Kopsichke, Jr., W0TCK, were nominated. During the process of balloting circumstances required Mr. Morgan, W0RA, to withdraw — so the League has certified the remaining candidate, Mr. Herman R. Kopsichke, Jr., W0TCK, as SCM for the two-year term of office starting Mar. 15, 1965.

WIAW SCHEDULES

Operating-Visiting Hours

Monday through Friday: 7 P.M.-1 A.M. EDST.
 Saturday: 7 P.M.-2:30 A.M. EDST.
 Sunday: 3 P.M.-10:30 P.M. EDST.

The ARRL Maxim Memorial Station welcomes visitors. The station address is 225 Main St., Newington, Conn., about 7 miles south of Hartford. A map showing local street detail will be sent on request.

Operating Frequencies

C.W.: 1805 3555 7080 14,100 50.7 145.6
 Voice: 1820 3945 7255 14,280 50.7 145.6

Frequencies may vary slightly from round figures given, they are to assist in finding the WIAW signal, not for exact calibrating purposes.

Official Bulletins

Bulletins containing latest information on matters of general amateur interest are transmitted on the above frequencies according to the following schedule in GMT:
 C.W.: Mon. through Sat., 0000; Tues. through Sun. 0100.
 Voice: Mon. through Sat., 0100; Tues. through Sun., 0330.
Caution: Note that in the U.S. and Canada bulletin hours usually fall on the evening of the previous day by local time

OPERATOR OF THE MONTH

Have you thought back over the past month and picked out your nomination for "operator of the month?" Considerations to bear in mind include a clean signal, good keying, careful enunciation, correct procedure, judgment and courtesy. The League's Operating Aid No. 11 lists further examples. Send your vote for "Operator of the Month" to the ARRL Communications Department, 225 Main St., Newington, Conn. 06111.

During April the following additional amateurs were nominated in recognition of their extra skills and courtesies:

W1YNP	W6PGM
WB2AOW	WA6PVK
WB2DBW	W7LEC
W2EDT	WA8HYR
K2QJH	K9HJS
W2JU	K9IMR
W2VYS	WA0LLQ
K4KJD	HR6GCA
W4SDR	KH6J
W5CEZ	MP4BFQ
K5HZR	OH2DP
W4GOET	UA1AU
	UW6SC



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 WIAW will be made June 15 at 0130 GMT. Identical tests will be sent simultaneously by transmitters on c.w. listed frequencies. The next qualifying run from W6OWP only will be transmitted May 10 at 0400 Greenwich Mean Time on 3590 and 7129 kc. **CAUTION!** Note that since the dates are given per Greenwich Mean Time, Code Proficiency Qualifying Runs in the United States and Canada actually fall on the evening previous to the date given. *Example:* In converting, 0130 GMT June 15 becomes 2130 EDT June 14.

Any person can apply. Neither ARRL membership nor an amateur license is required. Send copies of all qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at one of the six speeds transmitted, 10 through 35 w.p.m., you will receive a certificate. If your initial qualification is for a speed below 35 w.p.m. you may try later for endorsement stickers.

Daily tape-sent code practice transmissions are available on an expanded basis this season. These start at 2330 and 0130 GMT and are sent simultaneously on all c.w.-listed WIAW frequencies, with about 10 minutes practice *key* at each speed: 5, 7½, 10 and 13 w.p.m. on Sun. Mon. Wed. Fri. (GMT date) from 0130—0220; 15, 20, 25, 30, 35 w.p.m. on Tues. Thurs. Sat. (days in GMT) from 0130—0220, 10, 13 and 15 w.p.m. daily from 2330—2400 GMT.

To make the practice more beneficial the order of words in each line of the text is sometimes sent reversed. The 0130—0220 GMT runs are omitted four times each year, on designated nights when Frequency Measuring Tests are made in this period. To permit improving your list by sending in step with WIAW and to allow checking strict accuracy of your copy on certain tapes note the GMT dates and texts to be sent in the 0130—0220 GMT practice on those dates:

Date	Subject of Practice Text April QST.
June 2:	<i>It Seems to Us</i> , p. 9
June 8:	<i>100 Watts on 6 Meters</i> , p. 12
June 11:	<i>Effective Spectrum Use</i> , p. 17
June 17:	<i>Public Service</i> . . . p. 28.
June 22:	<i>Over-All Design</i> . . . for RTTY . . . , p. 44
Date	Subject of Practice Text from <i>Understanding Amateur Radio</i> , First Edition
June 25:	<i>Shielding</i> , p. 29
June 28:	<i>Coupled Tuned-R.F. Circuits</i> , p. 29

A.R.R.L. ACTIVITIES CALENDAR

(Dates shown are per GMT)

June 10: CP Qualifying Run — W6OWP
 June 12-13: V.H.F. QSO Party
 June 15: CP Qualifying Run — WIAW
 June 26-27: Field Day
 July 2: CP Qualifying Run — W6OWP
 July 10-12: CD Party (c.w.)
 July 14: CP Qualifying Run — WIAW
 July 17-19: CD Party (phone)
 Aug. 5: CP Qualifying Run — W6OWP
 Aug. 19: CP Qualifying Run — WIAW
 Sept. 3: CP Qualifying Run — W6OWP
 Sept. 9: Frequency Measuring Test
 Sept. 11-12: V.H.F. QSO Party
 Oct. 9-10: Simulated Emergency Test

OTHER ACTIVITIES

The following lists date, name, sponsor, and page reference of QST issue in which more details appear.

July 3-5: Venezuela Independence Contest, RCV (p. 106, this issue).

SUGGESTED OPERATING FREQUENCIES

RTTY 3620, 7040, 14,090, 21,090 kc.

WIDE-BAND F.M. 52.525 146.94 Mc.

GMT CONVERSION

To convert to local times subtract the following hours:
 ADST -3, AST -4, EDST -4, EST -5, CDST -5, CST -6, MDST -6, MST -7, PDST -7, PST -8, Hawaiian -10, Central Alaska -10.

A convenient conversion card is available, free of charge, from the ARRL communications Department, 225 Main St., Newington, Conn. 06111.

WIAW NOTE

WIAW now transmits bulletins and code practice on 160, 80, 40, 20, 6 and 2, as detailed above. Additional equipment for the station has been under long-term construction and is to be installed as fast as it becomes available. Note elsewhere on this page the frequencies and times for bulletins and for the two daily sessions of tape-sent code practice so as to make full use of these services.

ATLANTIC DIVISION

DELAWARE—SCM, Roy A. Belair, W3IYE—SEC: K3NYG. PAM: W3CFA, V.H.F. PAM: K3OBU. RM: W3EEB. DEPN meets Sat. on 3905 kc. at 1800 local time. DSMN meets Tue. on 50.4 Mc. at 2100 local time. Dover 8 & 2 Net meets Wed. on 50.4 Mc. at 2100 local time. Kent County Emergency Net meets Sun. on 3905 kc. at 1330 local time. K3GKF continues as our most active OO. W3EEB is equipping his travel trailer with a "Jovstick" for forthcoming trips. K3YHR reported in MDD 31 out of 31 for March, is liaison between MDD and DSMN, and is 2nd Asst. Radio Officer for Wilm. in MARS. K3URP has 39 states and 4 countries on 6 in one year. K3YZF is going RTTY soon. K3OBU reports that a Halo does much better than a whip for 6-meter mobile work. Reserve Aug. 15 for the hamfest at Dover. Traffic: W3EEB 276, K3YZF 119, K3YHR 69, K3URP 33, K3NYG 14, W3IYE 2, W3CFA 1.

EASTERN PENNSYLVANIA—SCM, Allen R. Breiner, W3ZRQ—SEC: W3ELI. RMs: W3EML, K3MVO, K3YVG. PAMs: W3SAO, W3SGI, K3CAH. EPA C.W. Net had 524 QNI with 364 QTC. The PTTN had 410 QNI with 195 QTC. W3RV has sold out. Latest reports have it, he will return with the complete "Benten Harbor" line this time. EC W3QDW noted the increased activity on 2 meters and RTTY in the Scranton area. W3AIZ, after 20 years, is glad to be back with the traffic boys. K3YQJ made WAS and WAC with one KH6 card. Bucks County ARC is planning an expedition to West Virginia for the V.H.F. QSO Party in June. K3WEU is starting an amateur radio course in the Inglis House (House for Incurables) in Philadelphia. Minus all his teeth, K3RUA will miss out on a few months traffic work. W3JXX completed a double conversion type receiver. W3NML design. K3ZUN says he is glad he was introduced to traffic-handling. The traffic clan is not open upon invitation only. Your own initiative and interest is all that's necessary. Check into any traffic net, you will be more than welcomed. W3BUR took in the IEEE and sideband show while working in New York City. Speaking of s.s.b., your SCM finally has been converted to sideband with a homebrew 200-wattor. WA3CPC has just moved from Connecticut to the Shillington area and is operating with a DX-40 and an HQ-145. New Gear Dept.: An SR-200, 300 and 400 to K3NOX; a converted DX-35 for W3MPX will put him on 6 meters; a Gonset III mobile to WA3BZO. A new operator in the Milton area is WA3AML. New club officers: ARTICS—K3OAMP, pres.; K3RSX, vice-pres.; K3WVB, secy.; K3WAK, treas. Lancaster Radio Transmitting Society—K3QCB, pres.; K3RZE, vice-pres.; W3OY, secy.; K3BLC, treas. I take this opportunity to extend my thanks and appreciation to our traffic nets who sponsored my recent nomination as SCM. Traffic: (Mar.) W3CVL 4491, W3EML 966, W3YR 639, K3MVO 373, K3MYS 244, W3QDW 210, K3FHR 190, W3AIZ 178, K3PIE 147, K3YQJ 115, W3ZRQ 110, K3YVG 87, K3HNP 65, K3RUA 56, K3WEU 56, W3JXX 54, K3KTH 53, W3MPX 51, K3RZE 51, W3VAP 44, W3RY 43, W3CBH 38, WA3CKX 29, W3AXA 28, W3ELI 27, W3OY 27, K3ZUN 27, K3HKW 22, WA3BYH 21, WA3CKA 21, K3MNT 20, K3PWW 18, K3LSV 17, W3LXN 14, K3MHD 12, W3ADE 8, K3JHF 6, K4NOX 6, W3BFF 3, W3ID 2, W3PDJ 2, K3VAX 2. (Feb.) W3YR 963.

MARYLAND-DISTRICT OF COLUMBIA—SCM, Bruce Boyd, W3QA—SEC: W3CVE. RMs: K3JYZ, W3CQW, W3UE, W3ZNW. PAMs: W3JZY, K3LFD.

Nets	Kcs.	Time	Days	Sess.	QTC	Ave.
MDD	3643	0000Z	daily	31	384	12.4
MEPN	3820	2200Z	M-W-F	20	21	
MEPN	3820	1700Z	S-S			
MDDS	28200	0130Z	daily	31	62	2.2
MDDS	3650	2200Z	Sun.	4		
MISTN	50150	0100Z	daily			

Traffic Topics: W3CQW reports MDD voted to return to Match-Up next winter. K3ZIX has been active in MDDS and has applied for the NCS job. K3ZYP made BPL for the third consecutive time. K3IQK has shared NCS in MISTN (note comment in April Operating News on MISTN). K3TJE was MDD representative to 3RN

• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

and EAN. K3UXY urges QNI to 80-meter MDDS sessions. K3JYZ gave the Friendship ARC the benefit of his traffic know-how in an FB talk on the NTS. **Appointments:** K3VCG as AEC 80 meters, K3YKC as OES, K3CYA as OO. **Equipment:** K3QDD's RTTY gear won 2nd place in the H.S. Science Fair. K3LFD is improving his c.w. note with a new Globe v.f.o. W3RKK is back on the air replacing his old gear with a TR-3. K3DNO is struggling with a balky ARR-2 on 220 Mc. W3ZNW has trouble with his GSB-100 and is using stand-by rigs. **Sky Hooks:** W3PQ and K3ZSX are improving 10-meter antennas to work MDDS. W3IZY is waiting for warm wx to fix the winter damage to his feedlines. W3FOY has antenna trouble—fixed and mobile. K3NCM is working on his 2-meter antenna to improve reception. **Travel:** W3CQD missed the YLOM Contest while vacationing in Florida. W3HQE was across the pond again but spent some week ends on the air at home. **Clubs:** K3ONU is NCS for the Eastern ARS Net on 3850 kc. Sun. (Mon. 0100Z). K3ORP demonstrated emergency mobile equipment to students at the Greensboro (Md.) JHS. **General Stuff:** W3ECP reports that W3UCC has retired from the Army and is living in Belair. Md. K3URE reports increased traffic activity in the 6-Meter Nite Owl Net. This is a good place for your late traffic from MISTN. WN3RAE has earned a 15-w.p.m. sticker and is making many contacts on 40 after 8 months of transmitter trouble. **Traffic:** (Mar.) K3ZYP 632, K3TJE 223, W3PQ 117, K3IQK 82, K3JYZ 74, K3LEL 70, W3UE 63, K3LFD 60, W3CQW 58, K3LLR 50, W3ZNW 48, W3HQE 46, K3QDD 36, K3GZX 35, W3LBC 35, K3VHS 35, W3EVO 22, WA3BNL 19, W3ECP 18, K3ZSX 16, K3URZ 14, K3KMO 13, W3CDG 7, W3RKK 7, K3NCM 2. (Feb.) K3UXY 53, W3ECP 22, K3URZ 15, K3KMO 13, W3MCG 6, K3ZIE 4.

SOUTHERN NEW JERSEY—SCM, Herbert C. Brooks, K2BG—SEC: K2ARY. PAM: W2ZI. RM: W2BLV. This section comprises the following counties: Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Mercer and Salem. With regret we report WN2MTS, Port Norris, and W2MGZ, Brooklawn, as Silent Keys. WB2GUK, Atlantic City, is building a half-gallon amplifier. He and WB2MRB are teaching code and theory in Atlantic City. WA2VAT, Woodbury, again is active handling traffic in TCC. EAN, 2RN and NJN, N.J. Phone and Tlc. Net totals for Mar.: 31 sessions, QNI 633, traffic 399. W3AX is scheduled to speak at DVRA's Old Timers Nite Roundup. K2CPR, Pennsauken, received 5 new awards, making his total 235. W2RZI, Pennington, reports QRM problems on N.J.N. SJRA's Annual Hamfest will be held at Mollia Farms, Malaga, Sept. 12. W2PAU, SJRA member, now on the West Coast, hopes to return to N.J. soon. W2BLV, WA2EMB, WA2GSO and W2EWN are busy tracking Oscar II. WA2WLN, ORS of Linwood, was top scorer in S.N.J. in the Jan. CD Party. W2TLO, Glassboro, is serving a 4-year hitch in the Air Force. K2NZI/2 plans to start code practice on 60 meters. Gloucester County AREC meets Fri. nights on 50.9 Mc. Its QNI is generally ten or twelve members. In its recent transmitter hunt K2PQD and K2JKA were the first to locate the transmitter. The SJRA and Rancocas Valley ARC plan Field Day participation. Reports from club secretaries are solicited, also reports from Cumberland and Cape May Counties. **Traffic:** WB2GUK 264, W2RG 155, WA2KIP 98, WA2VAT 79, W2MMD 55, K2RNB 22, WA2WLN 18, K2SHE 17, W2ZI 15, K2CPR 12, W2BEI 10, W2HZF 6, WA2KAP 4, W2IU 2.

WESTERN NEW YORK—SCM, Charles T. Hansen, K2HUK—SEC: W2ZRC. PAM: W2PVI. RMs: W2RUF,

W2EZB and W2FEB. NYS C.W. meets on 3670 kc. at 1900. ESS on 3590 kc. at 1800. NYSPTEN on 3925 kc. at 2200 GMT. NYS C.D. on 3510.5 kc. and 3993 kc. (s.s.b.) at 0900 Sat. and 3510.5 kc. at 1930 Wed. TCNP 2nd call area on 3970 kc. at 0045 and 2345 GMT. NYS CN on 3510 kc. Sun. at 1000 and 3670 kc. at 1700 Sat. Congratulations to BPLR K2KQC. Endorsements: W2IDM as EC St. Lawrence County, K2KTK as ORS. W2RQF as OO. W2IDM as OES. The Penn York Hamfest will be held June 19 at Morrison's Rest. off Rte. 17 near Big Flats, N.Y. The RAWNY elected W2GHH, pres.; K2GUG, vice-pres.; WA2EYE, secy.; W2SSG, treas. K2MLX, present call DL4LM/AEILM, writes from Germany to say that he'll be active in W.N.Y. again in Dec. '65. New officers of the Canistota Valley ARC are K2IUT, pres.; K2PFC, vice-pres.; K2TAA, secy.; W2PRJ, treas. WA2ANE, WA2TUI, WA2JWL, WA2KZQ, WB2HLV, WB2AEK, K2MPK, K2S2N, WA1DAG and W2PVI attended the NYSPT&E Net Policy Committee meeting in Utica during March. The Penn York Hamfest Assn. held a banquet at Elmira in March with 65 attending. Fulton ARC reports that 86 people attended its Annual Awards Dinner in March. The program included WA2GRV handing out prizes and K2OVG calling square dances. K2ZQJ took home a prize and K2DUR won the Giant Key and Certificate of Appreciation for his work in club advancement. W2QQ is recovered after recent hospitalization. The Rochester and Niagara Frontier DX clubs will hold a joint Gab and Eatfest in July with NFDXA as host. WA2JBV has a new SB-400 and an SB200. W2ZIA will be operating W2ZIA/ZK1 during May and June on 80- 40- and 20-meter s.s.b. using a KWM-2 and Linear. Has your group finalized your plans for Field Day. This can be one of the highlights of the ham year. Pack up your gear and prove to yourselves and your community that the amateur tradition of emergency portable operation is not a myth. Congratulations to K2GUG on his first transcontinental 2-meter QSO with W6NLZ via Oscar III. Traffic: K2KQC 932, W2GVH 329, WB2GAL 288, W2RUF 241, WA2IHP 182, W2HYM 167, WB2JF 113, WB2HLV 96, K2JBX 84, W2BQS 83, W2FBF 76, W2MTA 70, K2KTK 49, W2FCG 48, WA2TUI 44, K2OFV 41, W2RQF 37, K2RYH 36, W2BFG 34, K2IMI 30, K2MPP 28, WB2NZA 28, WA2POJ 20, K2DNN 15, K2AYQ 14, K2LMS 12, K2MQN 12, W2PZC 12, K2BWK 8, WA2GLA 7, W2PNW 8, WB2NNA 7, W2PVI 3, WB2MLK 2.

WESTERN PENNSYLVANIA—SCM, John F. Wojtkiewicz, W3GJY—Asst. SCM: Robert E. Gawryla, W3NEAI, SEC: K3OTS, PAMs: W3TOC, K3VPI (v.h.f.). RM's: W3KUN, W3MFR, K3OOU, W3UHN. Traffic nets: WPA, 3585 kc. 0000 GMT each evening; KSSN, 3585 kc. 2330 GMT Mon. through Fri. Regretfully this column records the passing of W3AU and W3TXX. K3KAP received his 20-w.p.m. certification from ARRL. The Metropolitan Erie v.h.f. group will operate W3KRPJ/3. The countdown has started for FD. Is your group ready? K3SBC is a tropical fish hobbyist. K3SBT works s.s.b. K3WZT is going maritime mobile. The boys at W3CKV are primed for the upcoming FD activity. W3SMV is refurbishing an old HQ-120X. K3JCC and K3PLU look for WPA contacts while stationed in Germany. So does W3PON/6 living in California. W3ZZO builds new s.s.b. gear. W3NDEN is newly-licensed in Washington, Pa. W3CAV bowled the "elusive" 300 game. W3JW has 228 DXCC countries confirmed. Thanks for the following club bulletins: Coke Center Radio Club, Etna ARC, Uniontown ARC, Somerset County ARC, Steel City ARC, Foothills Radio Club, Inc.

William G. Walker W3NUG, Memorial Award

Between January 1 and January 31 of 1966 1967 and 1968, applications will be received by W3GJY W3UGV or W3UHN for an engraved plaque in memory of W3NUG who passed away November 4, 1964. Candidates must possess any or all of the attributes and qualifications so well demonstrated by Mr. Walker in experimenting, traffic handling and contesting.

Monthly club bulletins always are appreciated, so keep them coming. W3MFB keeps busy with his traffic-handling affiliations. Are you interested in a League appointment? If so check with your SCM or Asst. SCM. 6-meter activity is enlivened by the operations of W3AQY, W3MMJ, W3UGG, K3TDD, K3OUK, K3UIK, W3IBL, WA3BNO, K3WZT (with flea power), WA3CNG, K3WGP, K3SCK, K3MCV, K3ZXK, K3FPX, K3UCS (10 watts on c.w. worked a W2 in New York), WA3CKV and W3KNQ. Two-meter activities are enhanced by the operations of K3GGZ, K3OTS, K3VLQ, K3ENA, W3AGF and K3KAP. The new gear dept. shows the following: W3SPZ and K3QHY new TR3s; W3KYK, K3OTY and K3QHY new SB200s; W3KVK new NCX-5; W3BL new SB-400; W3TOC new NC-303; W3JT and K3YDD new 75S-B; WA3BNO new HQ-110;

WA3BBV new HQ-110. W3NKK owns Erie Electronics in Erie. New appointments: K3GEO as OO; K3KAP as OES; W3TV as OBS. Endorsements: K3VPI as OES; K3OTY as OPS; K3TEZ as OBS. Traffic: W3NEM 375, W3MFB 240, W3KUN 127, K3PYS 101, W3LOS 57, W3GJY 54, K3TEZ 50, W3KJP 36, W3UHN 31, W3SMV 27, W3IY 25, K3ZMH 23, W3JHG 18, K3SMB 17, W3YA 12, K3SOHF 11, W3TOC 11, K3EDO 10, K3OUU 9, W3OEO 6, W3LOD 2.

CENTRAL DIVISION

ILLINOIS—SCM, Edmond A. Metzger, W9PRN—Asst. SCM: George J. Nesbed, W9LQF, SEC: W9RYU, RM: WA9DXA, PAMs: W9VWJ, WA9CCP and WA9KLB (v.h.f.), Cook County EC: W9HPG. Section net: ILN, 3515 kc. Mon. through Sat. at 1900 CDT. Officers of the newly-formed Palisades Amateur Radio Club are W9RAV, K9TXU, K9IEF, WA9LJZ and WA9KIG. W9JUV has worked his 300th country. W9GFF is sharing his rig with his daughter, whose recently-acquired call is WN9OIML. His 10-year-old nephew also received his Novice call, WN9OMN. W9CF has been spending his time taping the Oscar III transmissions. WA9GCM and WA9KKA also report that they have been tracking the satellite. WA9NFS was elected president of the Carl Sandberg High School Amateur Radio Club (Orland Park). WA9MDX has received his General Class license. W9LNQ has a new grandchild (his third). WA9AJF assisted in getting aid to snow-bound motorists in the Mar. 17 and 18 blizzard in Minnesota and the Minnesota papers had good news coverage on this. W9SXL spent a short time in the hospital during March and has recuperated in fine business. The Ninth Regional Net reports a traffic count of 425. W9YYE's NYL has received a Novice call, WN9NVH. W9TCU, W9FKC and WA9FB presented an antenna program at the recent meeting of the North Shore Amateur Radio Club. Reports received indicate that the code and theory classes of the various clubs have turned out a large number of new licensees in this section. WA9BYT, W9RSV and WA9MED helped the Evergreen Park (Chicago) Civil Defense provide radio communications for a street-light lighting parade. Many eyeball QSOs were held at the Dayton Hamvention and a pleasant time was had by those attending from Illinois. WA9MYS is a new call in Villa Park. Field Day promises to be a greater event than ever, according to all the preliminary reports that this column has received, and preparations have been made for several months by some of the clubs participating. The traffic count for the nets are: North Central Phone Net 1472; the ILN, 112; the Interstate Single Sideband Net, 841. New appointments include W9EXE as OO and WA9BVA as OBS. K9NBH, WA9CCP, K9KZB and W9YHZ are BPL certificate recipients. K9OAD is with the Peace Corps (Sabah Malaysia) 'til '66; local radio gang share his QSTs he says. Traffic: (Mar.) K9NBH 986, WA9CCP 931, K9KZB 749, W9YHZ 679, WA9LUG 110, K9BQQ 100, WA9DXA 82, K9BTE 78, WA9UNM 72, WA9BHT 51, W9DOQ 43, K9CYZ 37, WA9AJF 27, W9NXC 27, K9HSC 20, W9MAK 20, W9EVJ 14, W9IDY 11, W9PRN 10, W9LNQ 8, K9DQU 6, W9OKI 6, K9RAS 2, K9UIY 1. (Feb.) WA9GUM 64, WA9LUG 26.

INDIANA—SCM, Ernest L. Nichols, W9YYX—Asst. SCM: Donald Holt, W9FWH, SEC: K9WET. New appointments: WA9JNC as EC of Ripley Co., WA9CHU as EC of Clinton Co., W9SNQ as EC of Jay Co., W9BUQ as EC of Marion Co., K9WET as ORS and OPS.

Net	Freq.	Time	Days	T/c.	Mgr.
IFN	3910	1330Z	daily, 2300 M-F	287	K9IVG
ISN	3910	0000Z	daily, 2130 M-Sat.	615	K9CRS
QIN	3656	0000Z	daily	157	WA9BWW

K9GLL, PAM of the Hoosier V.H.F. Net, reports March traffic as 51. W9QLW, RM of 9RN, reports 100% representation by Indiana in March. Attempts are underway to reorganize RPN. BPL winner: W9NZZ, QIN Honor Roll: K9VHY, WA9FDQ, K9HYV, WA9BWW, W9QLW, WA9VT, K9KTL, K9WVJ, W9ZYK, WA9FGT. The AREC/Alpha Net nets at 2000 EST Tue. on 50.59 Mc. with K9VZQ as net control. WA9YDP is building a 300/400 watt phone-cw rig for 40 and 20. WA9AUM is putting up a 20-meter ground plane for the CD Party. The Tri-State ARS had successful auction for the March meeting. W9QLW received a KYN certificate. The IRCC voted to delay spring and fall meeting dates when Easter or the ARRL Annual SET coincides with the regular meeting dates. WA9MFX is a new General in Bloomington. Amateur radio exists because of the service it renders. Traffic: (Mar.) WA9BWW 487, K9IVG 432, W9AUM 360, W9NZZ 250, W9QLW 222, WA9FDQ 185, WA9AUM 162, WA4RQR/9 155, W9ZYK

104, K9HYV 88, W9BUQ 76, W9YYX 74, WA9AVT 65, K9CRS 65, WA9IZR 55, W9RTH 54, K9VHY 46, W9-SNQ 41, W9CLY 35, W9YB 31, W9DGA 29, K9RWQ 29, W9VAY 28, K9EFY 27, W9FZW 26, WA9GXC 25, K9-KTL 25, K9WVJ 22, WA9GFL 20, W9FWH 18, K9ZLR 18, K9DHN 17, K9BSL 14, K9QVT 13, WA9BGI 12, K9HMC 10, K9LJK 10, K9UXX 9, K9VZJ 8, W9DOK 7, W9DZC 7, K9CEO 7, K9QFV 5, WA9ANF 4, W9AQU 3, W9GYS 3, W9HDP 2, W9JSV 2, K9RAX 2, K9YKE 2, WA9GKF 1, K9TJS 1, K9WET 1, (Feb.) W9VAY 71, W9DGA 34, WA9GXC 20, WA9GNF 12.

WISCONSIN—SCM, Kenneth A. Ebneter, K9GSC—SEC: K9ZPF, RM: W9IQW, PAMs: W9NRP, K9IMR, K9HJS, WA9EJT.

Net	Freq.	Time	Days	Sess.	QTC	QNI	QTC	Mgr.
WIN	3535 kc.	0045Z	Daily	31	312	43	W9IQW	
BEN	3985 kc.	1200Z	M-F	27	285	50	W9NRP	
BEN	3985 kc.	1700Z	Daily	31	323	104	K9HJS	
WSBN	3985 kc.	2215Z	Daily	31	1402	392	K9IMR	
SWRN	50.4 Mc.	0200Z	M-Sat.	18	296	8	WA9EJT	

New appointments: WA9GJU as EC for Winnebago County, K9BERD as EC for Price County, K9HJS as OBS. Renewed appointments: W9LFFY as EC, W9YU as OBS. Net certificates went to W9RTP and W9QQQ for WIN; K9FHI, W9VHZ and W9HNU for WSBN; K9AGT, K9AIF, W9AOW, W9AVM, W9CBE, WA9GBD, WA9GJU, K9HJS, K9KPS, K9KZB, K9WVVI, W9YU and W9GOC for Ben. New officers of the Racine Moggaley Club are W9JPC, pres.; WA9KFL, vice-pres.; WA9DHN, secy.-treas. W9HWQ is working on 6-meter s.s.b. W9VSO led the Wisconsin OOs with 30 notices in March. K9LTF is now on s.s.b. with a new SB-400. The Wisconsin Radio Assn. is building 2-meter transceivers for local use. W9HJD has a new GSB-100. Many stations reported copying Oscar. Traffic: (Mar.) W9CXY 474, W9DYG 417, W9YT 242, K9IMR 188, K9-HJS 156, WA9GJU 99, W9AOW 98, W9NRP 82, K9AIF 75, K9ZPF 53, W9GOC 44, W9IRZ 35, WA9LWJ 35, HWQ 20, W9CBE 19, W9VAY 14, K9GSC 11, K9KPS 9, K9LJK 8, K9LTF 5, W9QQQ 4, W9ONI 2, W9OTL 2, (Feb.) K9LJU 21.

DAKOTA DIVISION

MINNESOTA—SCM, Herman R. Kopischke, Jr., W0TCK—SEC: WA9BZG, RMs: WA9EPC, K9JFF, PAMs: K9FLT, K9VJ, MSB PAM: W9HEN, V.H.F. PAM: WA9CQG. Appointments issued: WA9EPX and WA9CQA as ORSs; WA9LAW as EC for Winona County. Appointments endorsed: W9UMX and W0TCK as OBSs, W9KJZ as ORS. Officers elected at the annual meeting of the Mankato ARC were W9HUU, pres.; WA9DFT, vice-pres.; W0TCK, secy.-treas.; K9ICG, W9EQO, K9KLY and K9YOF, board members. Picnic dates listed so far: Picnic members July 20, Mankato July 27, Duluth Aug. 1, St. Cloud Aug. 8, Minneapolis Aug. 15. The Minneapolis ARC now has 160 members and meets the 4th Fri. of each month at 8 p.m. in the West Central YMCA, 54th & Blaisdell Ave. So. W9OPA is back on the air after a spell in the hospital. SEC WA9BZG reports that we now have 31 ECs and 251 AREC members. If you don't belong to the AREC, contact your EC or the SEC. OBS K9OST is looking for 432-Mc. contacts. OBS V.H.F. PAM WA9CQG mobilized to Mississippi for his vacation. As this is being written Minnesota is in what appears to be the worst flooding in history. Traffic: (Mar.) WA9LJ 104, K9QBI 74, WA9EPC 73, W9HEN 67, WA9LFR 60, K9ZRR 66, K9LTF 52, WA9DKP 49, WA9FDN 17, W9ATO 45, K9FLT 45, WA9JKT 41, KA9BZG 40, W0TCK 40, K9VJ 34, WA9ACI 33, W9MNC 30, WA9CQA 28, K9FWC 27, WA9LX 27, WA9IEF 25, WA9HLL 21, K9PZ 21, WA9DFT 17, W9KJZ 16, WA9CQG 15, WA9JDG 15, WA9FIK 14, K9LJK 13, WA9AAM 12, WA9FCJ 12, W9TAMX 12, WA9EJZ 11, K9ICG 11, WA9JPR 11, K9ZJK 10, K9IGZ 9, WA9DCH 8, WA9JVP 8, W9OET 7, K9EGE 6, K9SRK 4, W9WVT 4, WA9DFT 3, W9FKC 3, WA9LAW 3, K9LWK 3, W9LIG 2, W9SZJ 1, (Feb.) WA9CQG 17, WA9JPR 14.

NORTH DAKOTA—SCM, H. L. Sheets, W0DM—The Forx Amateur Radio Club participated in the Annual Boy Scout Exposition at the Field House at the U.N.D. with a ham station WA9JXT, and hand-out literature. The Forx Amateur Radio Club will hold Field Day at Northwood. WA9JFB is a new call in Fargo. The Forx Area hams helped track down some TV interference from non-ham sources to television sets and received a nice letter of thanks from the neighbors. Old-timers who recently joined the ranks of s.s.b. are W9YEQ and W9BIH. New s.s.b. mobile rigs are reported by K9HXL, K9RSA, W9GFE, WA9-

AAD, WA9BIT, W9WVL, W9EJF and K9PVV. W9-RGT retired from the Post Office Department in December. The new five-element wide-spaced 20-meter beam of W9GZD is giving a good account of itself in the DX bands. W9VFX blossomed out with a new S-Line. W9DMI has been getting excellent results with a new Telorex inverted "V" antenna on 75 meters. WA4GKZ, O is back from Colorado. The Grand Forks Air Base has a new radio club functioning at the base and has been giving code and theory lessons. RACES Net reports 846 check-ins, 178 messages, 20 sessions. Traffic: K9ITP 84, K9QWY 54, WA9JXT/O 32, W0-DM 5.

SOUTH DAKOTA—SCM, J. W. Sikorski, W9ORN—Asst. SCM: Gene H. Melton, WA9DEMI. SEC: W9SCT. RM: K9GYS, W9ZWL and K9GYS made the BPL again. W9FNI has a new TR3 and Interceptor receiver. The Weather Net completed its 10th year of operation when it closed up for the season Apr. 17. W9ZWL has been net manager since it started. The Amateur Club of Hot Springs elected W9HJO, pres.; W9KIRJ, vice-pres. and treas.; WA9FZU, act. mgr.; W9DCO, training mgr.; Bill Irons, secy. WA9OUC reports a new SB-300 in his shack. The Black Hills ARC announces its Second Annual Mt. Rushmore QSO Party to be held July 18 and 25 "from daylight 'til dark on most bands from 75 thru 6 meters." Distinctive QSLs will be given for all contacts. W9ZAL, formerly of Avon, is retired and living in Yankton. Appointments: W9DJO as EC for Spink County; WA9BZD as EC for Day, Grant, Marshall and Roberts Counties. K9FHI has built a new basement shack. Traffic: W9ZWL 663, K9GYS 537, WA9AOY 197, K9VYU 117, W9SCT 73, K9BMQ 64, K9AIE 54, K9CAL 38, WA9RWJ 28, W9DJO 28, W9HJO 27, K9GZV 27, K9TXW 11, K9-RSW 8, WA9CUL 6, K9ZBJ 4, K9HQD 3, WA9FJG 2.

DELTA DIVISION

ARKANSAS—SCM, Curtis R. Williams, W4DTR—SEC: W9NPM, RM: K5TYW, PAM: WA5GPO, NMs: K5IPS, W9NCT, WA5IEQ. Congratulations to W9OBI on again making the BPL. WA5BQI has moved to Jonesboro and reports working some nice DX from his new QTH. RN5 Mgr. K5IBZ extends his thanks to all Arkansas representatives for their help in improving RN5 (top regional net in the nation last year). WA5-GMV is the new Washington County EC. Does your county have an EC? Membership in the AREC climbed to 231 members last month. Will you join now and help us reach 250 members by mid-summer? Net reports:

Net	Freq.	Time	Days	Sess.	QTC	QNI	Arr. Tje.
OZK	3790	0100Z	Daily	31	148	282	4.8
RN	3815	0000Z	Daily	31	124	547	4.0
APN	3885	1200Z	Mon.-Sat.	25	27	895	1.1

Top QNers on the Arkansas Single Sideband Net (RN) were WA5GPO 30, WA5IEQ 28, K5ZFL 25, W5OBI 24, WA5HC 24, WA5IED 21, WA5GMV 20, WA5BRB 20. On OZK the following were most active: W5FUD 30, WA5RDU 29, W5NND 26, WA5HS 25, K5TYW 23, WA5-C5J 19, WA5HNN 19, W5YM 18. Net certificates for OZK have been awarded to WA5HS and for RN have been awarded to WA5IED, WA5HC, WA5ATK and W5HHA. Traffic: W5OBI 642, WA5HNN 304, W5DTR 127, W5YM 121, K9TPM 5 93, WA5GPO 72, W5NND 66, WA5HS 46, WA5IEQ 38, K5TYW 37, WA5GMV 29, W5NCT 20, WA5CBL 14, WA5IZR 5.

LOUISIANA—SCM, J. Allen Swanson Jr., W5PM—SEC: W5BUK, RM: W5CEZ, PAM: W5TAV, V.H.F. PAMs: WA5KHE, W5GQK, W5UQR had good success with Oscar using a skew planar wheel antenna. W5TAV reports phone activities are normal. W5EAV's activity is confined to LAN and MARs. WA5DES sent 24 Bulletins during March on 7 Mc. WA5KHE, V.H.F. PAM for West Central La., reports a.h.t. interest high in the Shreveport, Oil City vicinity. K5KQG and W5TAO are organizing a Twin City radio club in the Thibodaux area. K5KQG received his 20-w.p.m. code certificate. W5FMO is on 3910 kc. every morning. W5ZBC has sold all his gear and concentrates his efforts at the Bossier City High School station. WA5LTF reports the Greater NOARC now has a certificate for all those who work 25 or more stations in N.O. No QLSs are required. W5KKAJ now has WAS and needs an Asian QSL for WAC. K5WOD concentrates all his energy on the AREC. WA5FNB, LAN Net Mgr., has a nice traffic total. WA5-ITW has a new 50-ft. tower. W5IQH is putting RTTY gear together and also is interested in 6 and 2. W5AINQ was a most hospitable host at the Jefferson Club meeting. W5CEZ and K5HAM were in operation during the

(Continued on page 124)

WE BELIEVE that the HRO-500 synthesizer marks the most important advance in commercial receiver front-end oscillator design since the introduction of the crystal-controlled front end tunable IF technique some ten or fifteen years ago. Until that time, amateur receivers were characterized by a tunable high frequency oscillator which was constantly removed from the incoming signal frequency by an amount equal to the IF. The necessity, in such a system, of a different H.F.O. for each band introduced complications — instability introduced by the bandswitch mechanism . . . different tuning rate for each band . . . different dial calibration for each band — which made a finely calibrated receiver well nigh impossible.

THE “crystal controlled front end” solved these problems, but at the cost of expense and redundancy which generally limits its use to ham-band-only receivers. In such a circuit, the H.F.O. is fixed in frequency by a crystal, and each band is then converted to a fixed I.F. by a V.F.O. which covers the same frequency range at all times — thus providing greater stability because of its lower operating frequency and the absence of a bandswitch in the oscillator circuit. An identical tuning rate for all bands is possible, as well as far better calibration, since the V.F.O. range is not changed.

THIS SYSTEM has severe limitations, however. A different crystal is required for each band, and band coverage per crystal is determined by the range of the V.F.O. The multiplicity of expensive crystals required with the system renders it somewhat impractical for wide frequency coverage. In addition, since a different crystal is used for each band, each crystal must be precisely adjusted to frequency to prevent annoying band-to-band recalibration. In a receiver such as the HRO-500, with a 30 Mc. tuning range and a V.F.O. covering 500 Kc, sixty crystals would be required! The number of crystals can be reduced by limiting frequency coverage . . . or extending the range of the V.F.O. (which reduces dial accuracy and stability) . . . or doubling up on crystal harmonics, if possible — but a heaping double handful of crystals is still required.

IN National's HRO-500 receiver, the sixty crystals are replaced by the phase-locked synthesizer — which processes the output from a single 500 Kc master crystal oscillator to generate sixty crystal-stable signals which are used for H.F. injection.

THE ELIMINATION of multiple crystals does a great deal: band-to-band recalibration is virtually eliminated, since the output of the synthesizer is accurate to within 250 cps over the tuning range of the HRO-500; the ease of providing multiple injection frequencies facilitates a smaller tuning range in the V.F.O. — providing greater stability and better dial calibration; cost is lower, since while the synthesizer is a sophisticated device, it is still less expensive to build than is a sixty-crystal front end; and finally — the receiver is more reliable and easier to tune since H.F.O. “switching” with the synthesizer is performed electronically (by tuning the output of the synthesizer to the new H.F. injection frequency) — instead of switching crystals. Of most obvious importance, the synthesizer permits the extraordinary frequency coverage of five Kc to 30 Mc. in one receiver — with dial calibration and stability superior to the finest competitive limited-coverage receivers.

OPERATION of the HRO-500 synthesizer is a novel experience, but extremely simple. The digital *Megacycles* display in the horizontal synthesizer window over the circular *Kilocycles* dial changes in 500 Kc increments as the *Synthesizer Tune* control is rotated. The output of the receiver is muted and the *Phase-Lock* lamp flashes between 500 Kc points to indicate loss of phase-lock. As the next 500 Kc *Megacycles* increment comes up in the window, the receiver “un-mutes” and the *Phase-Lock* lamp goes out as soon as the synthesizer is again phase-locked to produce the new H.F. injection frequency. Synthesizer tuning is not at all critical or touchy — one can twiddle the *Synthesizer Tune* control at any lock point without affecting the stability of the receiver or losing phase-lock.

IN A LATER PAGE we'll discuss the actual circuit of the HRO-500 synthesizer in as much detail as space permits — but in the meantime, the new HRO is on display by your National dealer for you to examine and evaluate for yourself — and we know that you will enjoy a session with the receiver. If no dealer is nearby, why not drop a note (and a check for \$3.00) to our Customer Service Manager for your own copy of the sixty-page HRO-500 instruction manual?

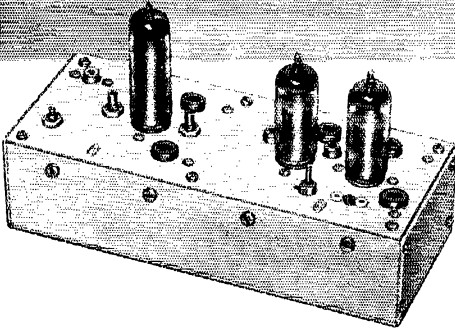
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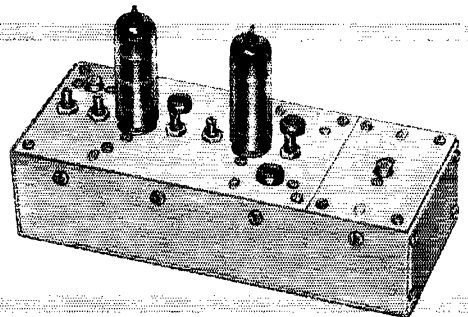
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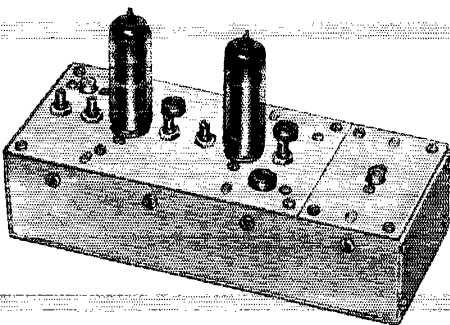
VHF/UHF UNITIZED TRANSMITTERS 50 mc — 420 mc



**AOD - 57
DRIVER/TRANSMITTER FOR 50 OR 70 mc**
The AOD-57 completely wired with one 6360 tube, two 12BY7 tubes and crystal (specify frequency). Heater power: 6.3 volts @ 1.2 amps. Plate power: 250 vdc @ 50 ma.
AOD-57 complete\$69.50

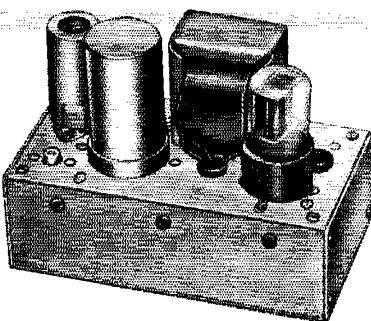
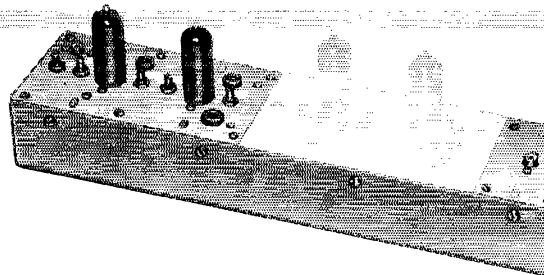


**AOA - 144
MULTIPLIER / AMPLIFIER FOR 144 mc**
The AOA-144 uses two 6360 tubes providing 6 to 10 watts output. Requires AOD-57 for driver. Heater power: 6.3 volts @ 1.64 amps. Plate power: 250 vdc @ 180 ma.
AOA-144 complete\$39.50



**AOA - 220
MULTIPLIER / AMPLIFIER FOR 220 mc**
The AOA multiplier / amplifier uses two 6360 tubes providing 6 to 8 watts output on 220 mc. Requires AOD-57 for driver. Heater power: 6.3 volts @ 1.64 amps. Plate: 250 vdc @ 150 ma.
AOA-220 complete\$39.50

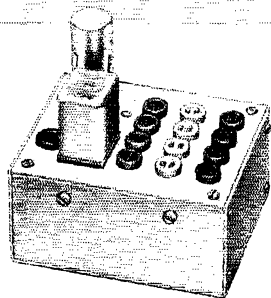
**AOA - 420
MULTIPLIER / AMPLIFIER FOR 420 mc**
The AOA-420 multiplier / amplifier uses two 6939 tubes providing 4 to 8 watts output on 420 mc. Requires AOA-57 plus AOA-144 for drive. Heater: 6.3 volts @ 1.2 amps. Plate: 220 vdc @ 130 ma.
AOA-420 complete\$69.50



AMD - 10 MODULATOR:
The AMD-10 modulator is designed as a companion unit to the AOA series of transmitters. Uses 6AN8 speech amplifier and driver, 1635 modulator. Output: 10 watts. Input: crystal microphone (High Impedance). Requires 300 vdc 20 ma, no signal, 70 ma peak; 6.3 vac @ 1.05 amps.
AMD-10 Modulator complete.....\$24.50

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ARY - 4 RELAY BOX

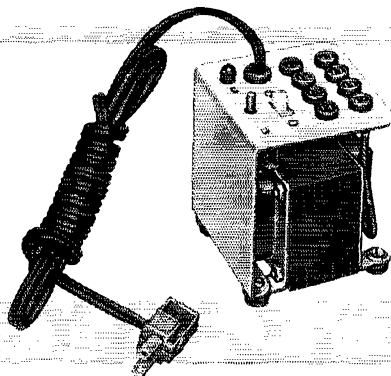
Four circuit double throw. Includes coil rectifier for 6.3 vac operation.

ARY-4 Relay Box complete \$12.50

APD - 610 FILAMENT SUPPLY

The APD-610 provides 6.3 vac @ 10 amperes.

APD-610 complete \$9.50



COMPLETE TRANSMITTER

6 METERS

50 mc

AOD-57



2 METERS

144 mc

AOD-57 PLUS
AOA-144



220 mc

AOD-57 PLUS
AOA-220



420 mc

AOD-57 PLUS
AOA-144 PLUS
AOA-420

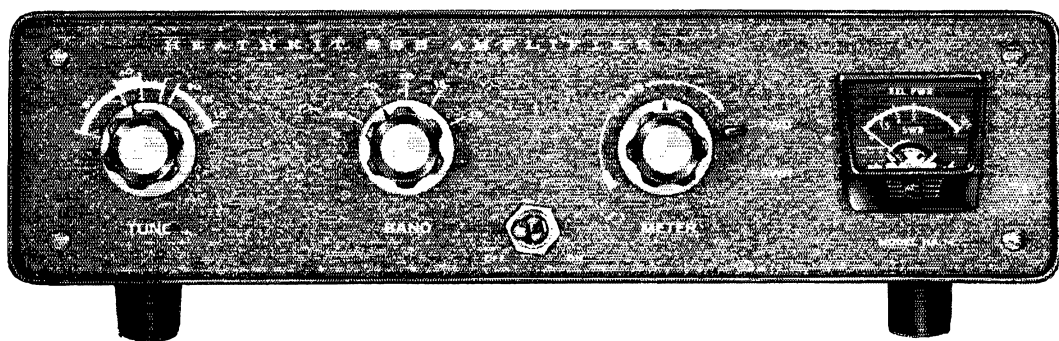


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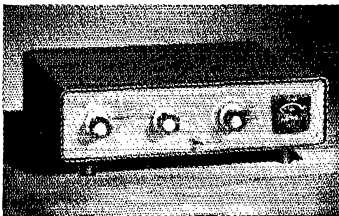
- Provides 1000 watts P.E.P. input power • Tunes 80 through 10 meters • ALC output to exciter • Built-in antenna changeover relay • Built-in SWR meter aids antenna adjustments on the road & monitors for maximum efficiency
- Pretuned broad-band input circuit requires no tuning • Engineered with a pair of rugged tubes ideally suited to mobile operation (572-B's or T160L's) • Full provision for control of "remotely" located AC or DC power supply

Here's A Kilowatt SSB Linear Amplifier That Sets New Standards For Size And Price! It can be installed under the dash of nearly every model of car with your exciter, providing a complete under-the-dash mobile station. This full KW SSB linear measures just $3\frac{3}{16}$ " H x $12\frac{3}{16}$ " W x 10" D. What's more, the *KW Compact* goes for only \$99.95!

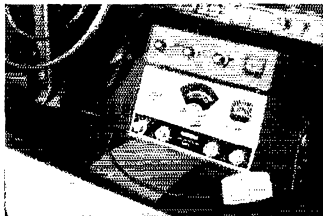
Heath Engineered To Set The Pace For Both Mobile And Fixed Amateur Stations . . . A kilowatt in a car means real sock for mobile and emergency communications—where antenna efficiencies are normally low. In fact, we've included a panel-mounted SWR meter, enabling on-the-spot antenna checks and adjustments . . . a real convenience feature! But the *KW Compact* is not just a mobile rig . . . Picture it on the top of your operating desk. Nice? Then order yours today. Priced less power supply options below.

Kit HA-14, 9 lbs. \$99.95

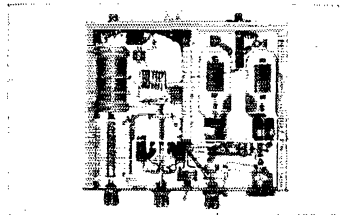
HA-14 SPECIFICATIONS—Band coverage: 80, 40, 20, 15, and 10 meters. Maximum power input: SSB, 1000 watts P.E.P. Driving power required: 100 watts P.E.P. Duty cycle: 50% [SSB voice modulation]. Third order distortion: —30 db or better at 1000 watts P.E.P. Output impedance: Fixed at 50 to 75 ohms unbalanced. SWR not to exceed 2:1. Input impedance: 52 ohms unbalanced; broad-band pretuned input circuit. Meter functions: 0-6 relative power & 1:1 to 3:1 SWR. Front panel controls: Tuning, band switch, relative power sensitivity control, meter switch (FWD & SWR), power switch (off, on). Tube complement: Two 572-B (or two T160-L) in parallel. Power requirements: 2000 VDC at 500 ma SSB peak, —110 VDC at 60 ma, and 12.6 VDC at 4 amperes. Cabinet size: 12-3/16" W x 3-3/16" H x 10" D. Net weight: 7 lbs.



Picture a "KW Compact" on your operating desk. Handsome design, small size. Ideal for portable operation, too!

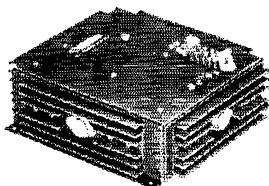


A kilowatt in a car? The "KW Compact" leaves room to spare.



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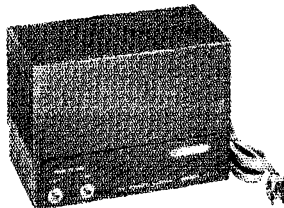
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Kit HP-14, 10 lbs. \$89.95



Heathkit HP-24 AC Power Supply

The Heathkit Model HP-24 AC power supply is controlled from the HA-14 SSB Amplifier, permitting it to be conveniently placed in any location. Provides all necessary operating voltages for the HA-14. Features complete circuit breaker protection. All solid state. 120 or 240 VAC, 50-60 cps operation. 9" W x $6\frac{3}{4}$ " H x $4\frac{3}{4}$ " D.

Kit HP-24, 21 lbs. \$49.95



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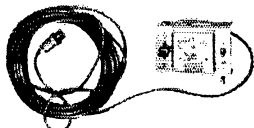
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complete with
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(Continued from page 118)

Calcasieu Area Council's Annual Scout-O-Rama. The S.W. La Amateur Radio Club is furnishing communications for the Jean Lafitte National Sports Car races in L.C. K5OKR is always available for traffic for her area. W5EID received his 25-w.p.m. CP sticker. W5-GHP still is working traffic on LAN, RN5 and CAN. W5UJK, at last report, was in Bangkok on his round-the-world trip. W5JFB is busy with Osear experiments; he also uses a Skeelwed Wheel. The Bossier City gang has planned at least one outing a month to increase its effectiveness. W5CST, (NOARC treas., reports some nice additions to his DX list. K5HFI is a new OES; W5FBO, W5HGX and W5LTF are new OBSS. I hope each of you have expressed your opinions in a constructive light on the FCC proposals. The Delta Division was a huge success with many good thoughts and ideas exchanged. Traffic: W5CEZ 392, W5GHP 275, W5FNB 180, W5IQH 91, W5MXQ 46, K5OKR 36, W5-FMO 32, W5DES 24, W5ZBC 22, W5EA 18, W5PM 15, W5TAV 15, W5EID 14, K5KQG 2.

MISSISSIPPI—SCM, S. H. Hairston, W5EAM—SEC/RAI: W5JDF. Congratulations to W5INZ on making the BPL. Six meters is active now in Jackson with K5PJY, W5AKZU, K5ZQZ, W5FOS and others on. K5JBA/5 is very active from State College. W5BW continues with a good signal from Biloxi. The Natchez ARC is working hard with Field Day plans. Welcome to W5CAM from "Miss." C.W. Net, Stan is running a Viking II and an NC-173. K5MDX continues to score well in contests, making 280,000 points in the ARRL DX Phone Contest. W5IMU really is working with W5JDF, W5INZ, W5CLS, K5VBA/5, W5FTI and others in Mississippi. Bob has a new HA-5VFO, an HA-1 keyer and an HQ-170. Several appointments are open. W5INZ and K5VBA/5 are new ORSS. Traffic: W5INZ 454, W5DF 250, W5GHE 176, W5CLS 110, W5IMU 104, K5JBA/5 27, W5BW 12, W5CAM 3.

TENNESSEE—SCM, William A. Scott, W4UVP—SEC: W4RRY, RM: W4MXF, PAMs: W4GQM, W4ALS, W4RMJ.

Net	Freq.	Time	Days	Sess.	QNI	QTC
TSSB	3980	1830C	M-Sat.	27	1355	186
ETPN	3980	0640E	M-Fri.	23	474	100
TN	3635	1900C	M-Sat.	27	248	105
TSN	3635	1800C	MWF	8	73	17
TPN	3980	0645C	M-Sat.	31	1037	198
		0800C	Sun.			

Tenn Slow Net meeting MWF. Our many thanks to K4WWQ, who has resigned as PAM of TSSB after doing an excellent job for three years. March QNI was the highest in the history of TSSB. W4GQM is a new PAM. Congratulations to W4GQM, K4JIG and W4PHQ on making the BPL. W4VHN reports *Tennessee Ham* is slowly growing. Write him for information on this Tennessee publication. K4RIN reports 43 states and 8 countries on 160. The Kingsport RC Club will start technical improvement meetings twice monthly. Memphis has over 100 in the Technician Class. Traffic: (Mar.) W4GQM 737, W4OGQ 389, W4FX 327, K4JIG 193, W4-PHQ 153, W4IBZ 128, K4SXD 112, W4PQP 84, W4JYU 81, W4MXF 80, W4HRG/4 62, K4LSP 62, W4IYP 62, W4TZ 46, W4OXL 38, W4YAU 32, K4WWQ 29, W4-WBK 23, W4PFP 21, W4TYY 21, K4EWI 20, W4OXL/4 18, W4RMJ 18, W4LLJ 16, W4FZZ 15, W44NUJ 13, W4VTS 13, K4ERY 12, W4FVW 11, K4UW 11, W4NIC 10, W4AKHD 8, W4VNU 8, W4FHQ 6, K4-RIN 5, W4SGI 5, W4IGW 4, W4ITZ 4, K4LTA 4, W4-YBT 4, W4BSH 2, W4IUM 2, W4JZ 1. (Feb.) W4-GQM 418, W4PQP 80, W44NJU 16, W4IUM 6.

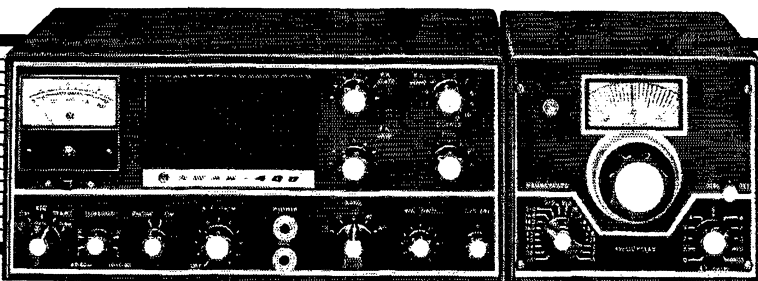
GREAT LAKES DIVISION

KENTUCKY—SCM, Mrs. Patricia C. Schafer, K4-QIO—SEC: K4GRN, PAMs: W4BEJ, W4ARDE, K4-YZU, V.H.F. PAMs: W4IUW, K4KZH, RM: W4-LCH. Appointments: W4IJR as EC, K4KZH as V.H.F. PAM.

Net	Freq.	Days	Time	Sess.	QNI	QTC
FAKPN	3960	M-F	0630	23	273	55
AKPN	3960	Daily	0830	30	539	50
KTN	3960	Daily	1900	31		
KYN	3960	Daily	0900	62	687	463
			1900			

K4YZU called a meeting of KTN participants in March at which net problems were discussed. K9ALP/4 has been enjoying 160 this past winter. W4ADH attended the Delta Division Convention in March. W4JUI is busy monitoring Citizens Band frequencies. W4VEC is teaching theory while W4CDA takes on the role in the class sponsored by the Danville Club. With the

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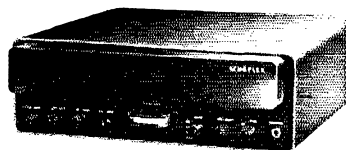
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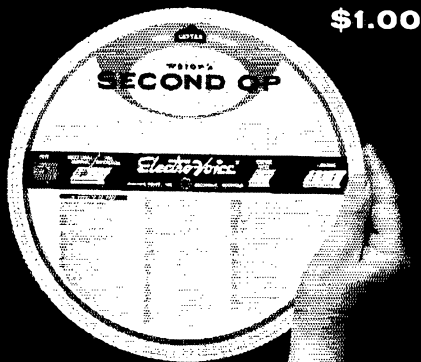
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SETTING NEW STANDARDS IN SOUND

warm weather maybe everyone can get up those antennas that were knocked down in the bad weather. Ky was represented 100% on 91K in March with WA4LCH, K4DZ and K4OZG high QNL. K4DMU is student teaching as part of his college curriculum. WA4EMM has relocated in Louisville and shortly will be Kentucky's representative on the Eyeball Net. Traffic: WA4LCH 469, WA4AGH 236, WA4DYL 242, W4BAZ 185, WA4-BSC 174, K4DZM 84, WA4RDE 72, K4QIC 70, W4OYT 60, WA4GMA 49, W4CDA 31, WA4KFO 30, WA4ELK 29, W4KJP 25, WA4VEC 17, WA4MEX 16, K4VDO 15, K4LOA 14, W4BTA 10, WA4CTD 10, WA4QLK 9, W4-ADH 6, W4PLN 4, W4YNT 3, K410F 2.

MICHIGAN—SCM, Ralph P. Threanu, W8FX—SEC: K8GOU, RMs: W8EGI, K8QLL, W8ELW, K8KMQ, PAMs: W8CQU, K8LQA, K8JED, V.H.F. PAM: W8-PT. Appointments: W81UC and K8QIB as 6Cs; W8-FAW, W8VPC, K8YEK as OOs; W8CQU as OPS and U.P. PAM; W8BEZ, W8BQK, W8HKT as ORSs, Silent Keys: W8FY, W8KML, W8UUI (ex-W4 M.), K8ZVG, W8AGBI, W8RAE is the new plant manager for Electro-Voice in Sevierville, near Chattanooga, Tenn. New officers: Cherryland ARC—W8PFG, pres.; K8QXZ, vice-pres.; K8LYB, secy.; W8ALG, treas. Lake Huron RC—K8LEA, pres.; K8GSW, vice-pres.; K8EFG, secy.-treas. Huron Valley RA—K8PBA, pres.; K8-YTB, vice-pres.; WA8CDR, secy.; WA8IAQ, treas. K8-JDM, trustee. Ford ARL—W8AVI, pres.; K8LIB, vice-pres.; K8SSZ, treas.; WA8NQR, rec. secy.; K8KJZ, corr. secy.; WA8GLY, editor. Grand Rapids Jr. College RC now has WA8MITY, with a Seneca on 6 and 2, an NC-300 with 6-meter converter, and five-element Telorex 6-meter beam up 130 feet. W8CQB and W8VCF set up a 432.9 Mc. W8EM repeater station at W8QB's QTH, with an antenna elevation of plus 1200 feet. W8EJR built a nice scope, but the receiver isn't doing so well. W8CAM still sends code practice on 1804 kc., 7 to 7:30 p.m., Mon. through Fri. K8NEY did a fine job on his new SB-300. WA8AMA has a new tower. W8BYR has a new four-element quad. K8GNU has a new console and W8RWK has a new SB-200 final. WA8JKL now operates a new TR-3. WA8DGM has a new Seneca. Code practice is sent every night on 145.368 Mc. by WA8BUX and K8YJO. K8NUI is working on a repeater station for 146.940 Mc. WA8EMJ worked XE2OK and VP3CZ on 160-meter c.w. The U.P. Hamfest will be held in Escanaba July 31 and Aug. 1. W8ZMN built his linear. W8IOC is on 2 meters. W8TRM has a new HW-12. K8KIT got her Wolverine Award certificate. W8YLA and W8YWF are recovering from surgery. WA8INZ now has an HW-12. W8DTZ, presy. of Genesee County RC, really is pushing 'em now. New Generals: WA8IKP and WA8OFC. OFC is the grandnephew of W8LU, who recently became a Silent Key. WA8IGY and WA8NT are new Generals. The Hillsdale ham family consists of Pop WA8DCK, Mom W8PNN, daughter General Class WA8KUO, K8BPT and K8ZJU have a new NCX-5. W8IWF has an SR-160. WA8XNO built his own 250-watt rig. The new QTH for WA8IV is 12200 Madonna Drive. RED 1, Lansing—his first move in 40 years. WA8MWS has a new SR-160 and K8SWQ has an all-new Heath SB line. K8TFF has a new HQ-180A. K8JED says the BJR Net is going to report its traffic. I've been waiting 6 years for that! Traffic: (Mar.) K8LNE 338, WA8CTE 335, K8KMQ 312, WA8ECN 302, K8QKY 270, K8JNW 260, K8HIL 177, K8GOU 147, W8EJR 134, K8TFF 131, WA8BQK 121, W8YJ 112, WA8CNF 104, K8BYX 84, W8ELW 84, K8LQA 74, W8-RTN 56, W8BEZ 53, K8BZL 51, K9RHU/8 51, K8JED 47, W8HKT 44, W8FUI 42, W8FN 41, W8LPL 30, K8QLL 30, WA8IBM 29, WA8WD 27, WA8XNO 27, K8VCB 25, W8YNY 24, W8IBB 21, W8AVD 20, W8UC 20, K8EBX 19, W8WVL 18, K8ADD 17, WA8LRC 17, W8DRQ 16, WA8HGE 16, K8ZXR 16, K8PY 15, W8AHV 12, WA8-GBX 10, K8VDA 10, WA8LEE 9, WA8DZP 5, WA8GRI 8, W8APG 7, K8JJD 7, K8MFO 7, W8PSB 5, W8SWF 3, W8TBP 3, WA8AM 2, WA8CTC 2, W8DSE 2, WA8GEX 2, K8LOS 2, (Feb.) K8TJD 141, K8MFO 16, W8SH 10, WA8EDK 6, WA8IYR 4.

OHIO—SCM, Wilson E. Weckel, W8AL—Asst. SCM: J. C. Erickson, W8DAE, SEC: W8INP, RMs: W8RZX, W8DAE, K8LGB, PAMs: W8VZ, K8BAP, K8IBK. Your SCM entered VA Hospital in Cleveland Mar. 22 and had a cataract removed successfully from the right eye Apr. 1. The Seneca RC held its annual auction, Lima Area ARC's 1965 officers are WA8FHC, pres.; K8CEP, vice-pres.; W8DDG, secy.; WA8BJT, treas.; WA8AYS, act. mgr. W8NN is conducting theory classes. The South East ARC held an election of officers according to its Ham-Fac. Toledo's Ham Shack Gossip says G5LC paid another visit to the Toledo Mobile RA; Toledo's radio clubs held their Annual YL Nite Dinner and their tenth annual auction with more than 1500 hams attending; Toledo RC elected as 1965 officers W8BQU, pres.; K8RZT, vice-pres.; W8QUR, treas.

MODEL 106B—6-Element, 10 Meters ▶

MODEL 403B—
3-Element, 40 Meters ▶

MODEL 205B—
5-Element, 20 Meters ▶

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secy.; K8DTL, corr. secy.; K8GOP, treas. Buckeye Belle's 1965 officers are K8RZL, pres.; K8CEN, vice-pres.; WA8FSX, secy.; WA8CJP, treas. Genoa RC had two demonstrations, Antenna by W8MUK and Antenna Scope by K8KYB; a 160-meter transmitter hunt was held; K8ZUS is going to school in Germany. The Babcock & Wilcox RC heard W8PAL talk on antennas and reflected power. Lancaster & Fairfield ARC's *The Rag Chewer* states there may not be a hamfest unless someone offers to be its chairman; classes are being held in code and theory and K8TQJ visited in Texas. Springfield ARC's *The Qser* informs us W8BMC dealt with multiplex systems and s.s.b. modulation and demodulation of many transmissions on one line and the club is holding a hamfest July 18 at Clark County Fairgrounds. Parma RC's *P.R.C. Bulletin* tells us an auction was held and toured WHK's studio. Canton ARC's *Fordline* informs us three Ohio Bell movies were shown and an auction was held. Massillon ARC's *MARC News* states the club heard WA8LRM speak on Transformers. Columbus ARA heard W8PYR speak on Know your Microphone. The *Buckeye Net Bulletin* tells us that W8OPU ad W8OPV moved to California. Tusco RC's *Beam* reports the possible passing on of the Knucklehead certificate, so those who have this certificate should be proud. Mt. Vernon ARC heard W8PEN speak on How to Solder Aluminum. V.H.F. High Banders' *The High Banders Log* tells us the club held an auction. Appointments made in Mar. were WA8CFJ and W8LAG as OBBS. Six Meter Nomads' *The Amateur Extra* says WA8NIL returned from Florida and the club held a potluck supper. We regret to report the death of a promising young sophomore at Duke, K8MTY, who was killed in an auto crash on the West Virginia Turnpike Mar. 26. Hill was well known in North Carolina traffic circles from his NCS jobs on the North Carolina C.W. Net. W8AQ reports that W8ASW showed slides he took in Thailand at a meeting of the Medina Co. Radio Club. W8DJD won the Grand Prize in the Hallcrafters Contest. K8HVT was in BN on leave from the Air Force. He has been at Stead AFB, Nev., and is going to Japan on his next move. Traffic: (Mar.) W8DAE 382, K8VBO 324, WA8CKY 281, WA8HVR 260, W8RYF 228, K8VBH 199, WA8CJF 196, WA8GYT 170, W8FSM 170, W8RZX 117, K8PBE 100, W8QCU 88, W8LAG 83, K8LBU 79, K8DHF 70, W8TV 70, K8YDR 69, K8DIU 68, WA8AUZ 46, WA8FTX 29, K8LGA 28, K8HVT 23, WA8AJD 18, WA8FKD 18, WA8MAZ 17, K8LGB 14, W8LZE 10, K8WFG 8, W8FEQ 7, WA8JXM 6, WA8AJZ 5, K8DDG 4, W8DJD 4, K8RND 2 (Feb.) WA8GYT 195, WA8HVR 98, K8LGA 31, K8UBK 11.

HUDSON DIVISION

EASTERN NEW YORK—SCM. George W. Tracy. W2EFU—SEC. W2KGC. RM. WA2VYS. PAM: W2JG. Section nets: NYS on 3670 kc. nightly at 2400 GMT; NYSPTEN on 3925 kc. nightly at 2300 GMT; ESS on 3590 kc. nightly at 2300 GMT; Emergency Coordinators on 146,500 kc. Fri. at 0130 GMT. Endorsements: WA2VYS as RM and WB2IZY as OES. The New York State County Net (NYS/CN), each Sun. on 3510 kc. at 1000 local time, is looking for representatives in Albany, Putnam and Orange Counties. This net is a backup for the State Civil Defense Command Net so why not look in? K2LSX is interested in the possibilities of establishing an RTTY net. If you have gear, drop him a line. Congratulations to our two HFL winners for March traffic, WA2UZK and WB2NKN. For the high hands, K2SJM is sporting a new TA-33. WB2HZY, who reports WA8-33/29, also copied the Oscar III beacon. WB2HYA is real proud of his new CP-30 sticker for the CP certificate. The Schenectady Club featured W2GTB and W2ZHL, who spoke on interference complaints and how to clean them up, respectively. WA2AHC is the new PR man for the club. The editor and DX editor of CQ Magazine were featured speakers at the New Rochelle Club. WA2VYS was runner-up for most valuable station on NYS during 1964. The net handled 5678 total traffic for the year. New officers of the Albany Club include K2BUF, pres.; WA2BLC, vice-pres.; WB2BZE, secy.; WA2YRF, treas. Ask your Civil Defense Director or Radio Officer for a look at the new statewide RACES network published by K2SFY. Traffic: WB2NKN 620, WA2UZK 610, K2SJM 88, K2TXP 57, W2ANV 53, WA2JWL 50, WB2FXB 47, W2PKY 38, WA2SZ 36, WB2HYA 35, WB2DXL 33, WA2LJM 33, WB2HZY 22, WB2PEN 19, WA2FMD 11, WB2FOA 10, WA2ZPD 6.

NEW YORK CITY AND LONG ISLAND—SCM. Blaine S. Johnson, K2IDB—Asst. SCM: Fred J. Brunjes, K2DGI. SEC: K2OVN. Section nets:

NLI	3630 kc.	1915 Nightly	WA2EXP—RM
VHF Net	145.8 Mc.	2000 TWTh	W2EW—PAM
VHF Net	146.25 Mc.	1900 FSNM	W2EW—PAM
NYCLIPN	3932 kc.	1600 Daily	WB2HVB—PAM
NLS (Slo)	3630 kc.	1845 Nightly	WA2RUE—RM



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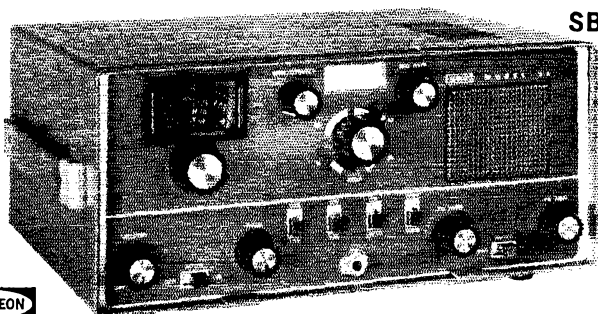


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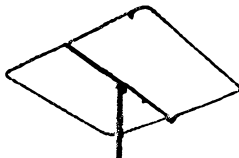
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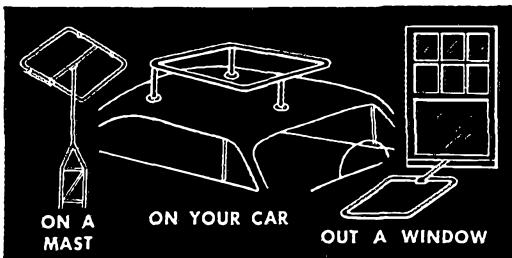
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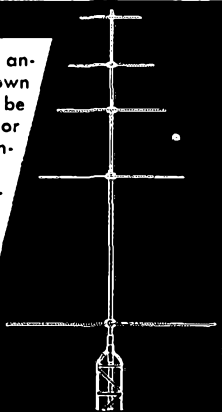
The 6 meter Squalos are completely universal for mounting anywhere. They are packaged with rubber suction cups for car top mounting and a horizontal center support for mast or tower mounting. The 10-15-20 and 40 meter Squalos are designed for mast or tower mounting. Squalo is ideal for net control, monitoring, or general coverage.



MODEL NUMBER	DESCRIPTION	NET PRICE
ASQ-2	2 Meter 10" square	\$ 8.45
ASQ-6	6 Meter 30" square	12.50
ASQ-10	10 Meter 50" square	19.50
CSQ-11	11 Meter 50" square	19.50
ASQ-15	15 Meter 65" square	23.50
ASQ-20	20 Meter 100" square	29.50
ASQ-40	40 Meter 192" square	66.50

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#65

NYC-LI AREC Nets: See Dec. 1964 column for schedules. Say, Field Day is right around the corner. Right? So, be sure that operators, equipment and site are all set up. And, don't forget the bug life, skeeter lotion or sassafras for the parched throats. For the new fellas, show 'em what the poison ivy looks like and caution 'em not to go teasin' the hornets, who are particularly hostile this time of year. Look at who got BPL this month: WA2RUE, WA2GPT, W2EW, WB2HWB, K2-UBG, K2VGD and WA2TQT. You know that rascal, W2EW, just made his 60th consecutive BPL! You know what that means? Well, he's made BPL every single month for the past 5 years without a miss and that is a bodacious effort for Public Service! He, and the others, can't continue to do it all so why not join one of the above nets and pull your part of the load? K2UBG tamed the frisky kv. final and is back at full strength. K2VGD was cavorting with a 66-ft. vertical until the XYL descended with both feet and now the 15-ft. horizontal will have to do! WA2QUJ reports the student governments of Lincoln HS in Brooklyn and Blair HS in Md. are exchanging messages via NTS, WB2AEK is on with a new NCX-5, but so is WB2EXI! K2SJP not only has an NDX-5, but an NCL-2000 behind it and a 250-ft. vertical behind that! WB2HYK is in the top 2% of his HS class. Now that's something to shout about. WA2PAIW recorded 35 passes of Oscar with his little tape recorder and is now on with a Clegg-Zeus. W2SKX is taking Naval Reserve training at NSS transmitters at Annapolis. W2IAG reports that the AREC of Queens, Nassau and Suffolk all linked together on 10 meters. W2GP has gone back to 160 meters and he says it reminds him of the early '20s. WA2UWJ is touring Canada with Mom, WB2GQJ, and Pop, WB2GQC. WB2NHX has a new TA-33 Jr. and new 30-ft. tower for the Valiant and a new call, WN2ROB, for his OM. WA2URT is working ZL3-Land with his two-element quad. W2QPQ, long time prime mover of RACES in Queens, has moved to Chicago. New officers of the Crossband Comm. Club are WA2IOT, pres.; K2ZXX, vice-pres.; K2ZKE, treas.; WB2DVK, secy. W2ADO was awarded a charter member certificate of the NY-SCN. Appointments: K2UBG as ORS; WA2UWJ, WB2-EMJ and WB2LGR as OPS; WA2UWJ as OBS; WB2-JVF, WB2RAH and WB2COW as OESs. New officers of the Port Washington Brotherhood RA are WB2ATZ, pres.; WB2AUB, operations mgr.; WB2HTF, tech. dir.; WA2TXQ, trustee; WB2GIG, act. mgr. WB2NVR and WB2MEH are new members of the Nassau 10-Meter AREC. Suffolk County boasts of a 35-station wide-band fm. group on 146.94 Mc. Would make a lovely outlet for NTS traffic, wouldn't it? The Federation of Long Island Radio Clubs has a new set of officers: K2RPW, pres.; WA2TAQ, vice-pres.; W2OUQ, secy. The FLIRC is planning a hamfest in this section around Aug. or Sept. Look for it. Matter of fact if your club doesn't belong, why not look into it? Maybe you can help with the hamfest? Traffic: WA2RUE 1055, WA2GPT 894, W2EW 818, WB2HWB 794, WB2EUH 413, K2UBG 378, WB2MHT 343, K2VGD 222, WB2DBW 216, W2GKZ 154, WA2TQT 127, WB2IQG 91, WA2JUJ 87, WB2OTT 69, WA2LJS 58, WB2AEK 53, WB2MLN 53, WB2LFL 50, W4TRU/2 48, W2DBQ 38, K2AAS 37, WB2LGR 34, WB2-HYK 33, WA2VNZ 32, WA2OOL 29, K2SJP 25, WA2-VKE 23, WA2PAIW 20, W2SKX 17, W2IAG 15, WA2-PJL 11, WA2RMP 11, WA2DTY 10, WB2NSQ 5, W2LKG 4, W2GP 3, WA2TKS 3, WB2AWX 2, WB2EXI 2, W2PF 2, WB2PUK 1.

NORTHERN NEW JERSEY—SCM, Edward F. Erickson, W2CVW—Asst. SCM, Louis J. Amoroso, W2-LQP. SEC: K2ZFI. NNJ Amateur Radio Public Service Corps Section networks:

NJN	3695 kc.	7:00 P.M. Daily	WA2BLV—RM
NJ Phone	3900 kc.	6:00 P.M. Ex. Sun.	W2PEV—PAM
NJ Phone	3900 kc.	9:00 A.M. Sun.	W2ZTJ—PAM
NJ 6&2	51,150 kc.	11:00 P.M. M-W-Sat.	K2VNL—PAM
NJ 6&2	146,700 kc.	10:00 P.M. Tu-Sat.	K2VNL—PAM
NJNN*	3725 kc.	7:20 P.M. MTWTh	WB2KXG—RM
	1814 kc.	6:30 P.M. Tu.-Sat.	WA2UOO—RM

*Novice & Slow Speed. All times local. AREC net schedules are available from K2ZFI, WB2FVO and WA2SRQ are ORSs. New officers of the Stevens Radio Club (W2BSC): WA2EDJ, pres.; WA2IYB, vice-pres.; HK1JZ, treas.; WB2CRX, secy. WA2VID received a new keyer for his birthday. WB2HLH has installed Drake receiver crystals for the N.W.N.J. AREC nets. K2KDQ has a new beam on 2 meters. WA2ZKT is full Radio Officer for Branchburg Township RACES. The Jersey City RC meets the 4th Mon. of each month in the Red Cross Bldg., 612 Bergen Ave., J.C. WB2LDE is working 6-meter c.w. with a homebrew 6146 rig, Ameco converter, and six-element beam. WA2QPX is working at shortwave station 4VEH in Haiti. WB2LAM is a new

22'er



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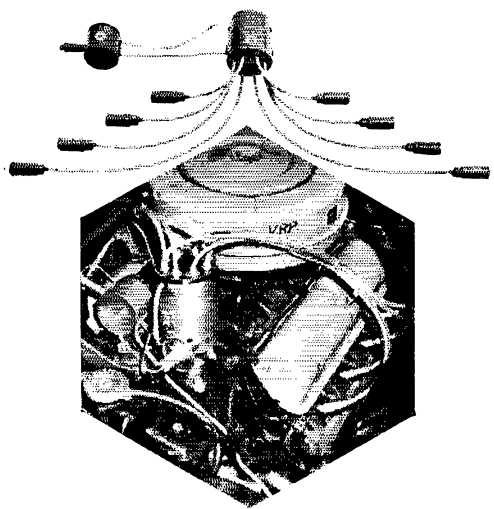
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 - 12AX7 AF Amplifier
 - 6AQ5 Rec. Audio/Modulator
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 - 6KE8 VLO/Buffer
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317 ROEBLING ROAD, **Webster band-spanner**, SO. SAN FRANCISCO, CALIF.

Technician in New Market. WB2IYO would like to start a local 2-meter net. W2COT is trying out 5-meter s.s.b. W2QNT is building a home in New York State. K2EOL is back on 2 meters. K2SJB has joined RACES. Members of the South Amboy ARA recently toured K2USA at Fort Monmouth. The Edison Radio Club is issuing a new award for working its members. Contact WA2FNN for details. WA2KHL is working on a vertical and handling traffic between studios at Rutgers. K2YFE is operating from KL7WAH and is looking for skeds on 20- and 15-meter s.s.b. W2NKK has been appointed Deputy Director of c.d. in Scotch Plains. W12KLI has completed a 220-Mc. rig. WB2CQZ, WB2MXZ, WB2DDA and WB2JCP report reception via Oscar 111. WA2DEW is a member of the QTC Traffic Net and also is looking for c.w. on 6 meters every evening 0300-0400Z. W2VMX is looking for crystals for the low end of 160 meters. If you are interested, don't forget to file your comments with ARRL and/or FCC on Docket 15928. To comment intelligently, sound reasoning should accompany your views. The new schedule of operating activities is available from this office upon request. Traffic: (Mar.) K2VNL 649, WA2VID 587, W12AEJ 333, WA2PWI 203, WB2KSG 148, WB2HLH 116, WB2TCH 105, WA2GQZ 97, WB2GFY 83, WB2FIT 78, W2CVW 70, W2EWZ 38, WA2WAJ 38, WB2IVO 36, K2ZFI 36, W2TFM 23, WA2CCF 24, WA2SRK 22, WB2IYO 17, K2DEL 16, W12KRC 16, K2KDQ 14, W2PEV 14, K2SLG 14, WA2KHL 13, WA2KVQ 12, W2DRV 9, WB2KXG 9, K2BEV 7, WA2TWS 7, WA2ZKT 6, W2ZAL 5, K2AGJ 4, W2CFB 4, WB2DDA 3, WB2LDE 3, WA2UDT 2, WA2VYN 1. (Feb.) WB2IYO 9, K2BEV 5, W2ONL 5, WA2KHL 4, WA2TTL 4.

MIDWEST DIVISION

IOWA—SCM, Dennis Burke, W0NTB—Asst. SCM: Ronald M. Schweppe, K0EXN. SEC: K0VBM. RMs: W0LGG, W0TUU. PAMs: K0BBL, W0LSF. New GOs: W0ATA, W0DIT. One of our OGs sent the great W0EE a cautionary for elix so do not think you are being picked on if you get one. Great days are ahead for amateur radio now that everybody is awake. With the assignment of two-letter calls I hope to come up with W Zero Able Able. Congratulations to W0NWX, W8ZH, W1LQY, W1BDI, W5NW, VE3CJ, (Midwest Division Director, President, Vice-President, the high brass from Headquarters, and Canadian Division Director) and all who participated and enjoyed the festivities and fun at our Midwest Convention held in Des Moines, Iowa, Apr. 3, 4, 5. Let us not forget the management of the Kirkwood Hotel. This is not a commercial business they do not need this publicity but merely a "thank you," for being a wonderful host. Roughly six hundred attended. Most amateurs left the Convention with serious thoughts about shadows cast by coming events but spring is here. God is in Heaven and all is well with the world. W0NWX reports three contacts via Oscar 111, also two reports from other stations. Central Iowa ARC elected W0ENG, pres.; WA0KZP, vice-pres.; W0EFL, secy-treas. Net reports: 75 Mater, QNI 1458, QTC 158, sessions 27, 160 Meter, QNI, 992, QTC 9, sessions, 31, Hamilton County, QNI 294, QTC 2, sessions 31, TLN for Feb., QNI 176, QTC 9, sessions 24. Traffic: W0LGG 740, W0NTR 86, W0USL 38, WA0CBM 29, W0BKR 16, WA0DYV 13, W0QVZ 13, K0EXN 12, K0KBX 12, K0KAQ 9, W0YDV 9, W0LWJ 8, W0REM 8, K0VBM 8, W0GPL 7, W0FDM 6, K0QKD 6, WA0FEN 2, W0NWX 1.

KANSAS—Acting SCM, Robert M. Summers, K0BXP—SEC: K0BXP. PAMs: K0EFI, W0BOR. V.H.F. PAMs: K0VHP, W0HAJ. The following are net reports for the month of Mar.

Net	Freq.	Time	Days	Sess.	QTC	QNI	Ave.
KPN	3820	1245Z	M-W-F	18	26	305	16.94
KPN	3920	1400Z	Sun.				
NCSs:	K0GII, K0UER, W0ORB, W0KOL, K0EFL						
QKS	3610	0030Z	Daily	22	23	92	4.18
NCSs:	W0BYV, K0BXP, W0VBQ						
HBN	3880	1805Z	Daily	23	112	698	30.3

C. Leland Cheney, W0ALA

Our Kansas Section and a myriad of friends mourn the passing of our section leader who died Apr. 10, 1965. He had served a number of terms as SCM and was known personally throughout the state. Lee had held the calls W1EPT and W1EUW earlier, worked for Boeing, was a member of the Wichita Amateur Radio Club, Air Capitol ARA and IFEE as well as other civic and fraternal organizations.



a new LOOK

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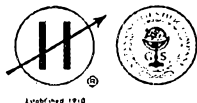
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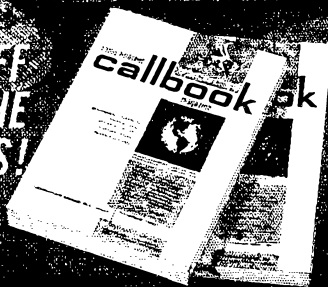
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Newly-elected officers of the Caney Valley Radio Club are KOOFS, pres.; KOGLW, vice-pres.; WOCMB, secy.-treas. (Congratulations, Traffic: (Mar.) WO0HJ 843, KO0H 106, WOBYV 37, WA0CCW 23, KOJMF 13, K0EFL 12, KOJKA 9, WOZUX 4, KOVQC 2. (Feb.) WO0HJ 859.

MISSOURI—SCM, Alfred E. Schwaneke, WOTPK—SEC: W0BUL. I appreciate your support in the SCM election and hope to justify your confidence in me for the next two years. Appointments renewed: WOGCL as ORS; KOONK as PAM and EC. KOHNE is a new OO in Mexico. I had the pleasure of guest-speaking at the Mar. 28 eating-meeting of the East Central Mo. 2 Meter Net (145.8 Sun. 0200Z) at St. Clair at which 22 active 2-meter hams were present, representing the net coverage from St. Louis to Salem and St. James. Missouri was well represented at the Midwest Division Convention in Des Moines. SEC W0BUL spoke on the emergency organization in the section at the ARPSC meeting. K0TCB reported on the EC and traffic exercises in the K.C. area, where y.h.f. nets and NTS have been tied together. WA0FLI joined the R.O. of Wouff-Hong at the convention. Net certificates for MON go to WA0FKD, WA0ILQ and KOYGR and for MNN to WA0FKD, W0WGB, WA0IKK and WOJKF. KOAEM will be NCS for MON Wed. WA0EMX made the U.S. National Honor Society. KOYIP has a new Twoer. W0UCK built 4-811As linear. WA0IDR.O has a new HQ-110A. W0EEE is off awaiting a new receiver. KOJPL worked FA0 on 80-meter c.w. The Hambutchers Net will hold its picnic June 20 at Warsaw. Net reports:

Net	Freq.	Time	Days	Sess.	QNI	QTC	Mgr.
MEN	3885	2345Z	M-W-F	13	221	17	W0BUL
MON	3550	0100Z	Tu.-Sun.	27	172	113	W00UD
MNN	3580	1300Z	M-Sat.	27	130	80	W00UD
SMN	3580	2200Z	Sun.	4	21	21	W00UD
MoSSB	3963	2400Z	M-Sat.	27	613	121	W00MM
PHD	50.4	1245Z	Wed.	5	61	2	WA0FLI
PON	3810	2100Z	M-F	23	369	171	W0HVJ

Traffic: (Mar.) KOONK 934, WA0FKD 303, WA0ILQ 253, W00UD 128, W0HVJ 127, W0ZBR 97, W0EEE 84, WOZLN 88, KOEQY 43, KOAEM 35, W0BUL 30, W0HTO 27, W0RTO 27, KOJPS 19, WA0EMX 18, WA0DGT 15, W0KIK 15, KOVOP 13, KOJPL 7, KOYGR 7, W0BLV 5, KOFCP 3, W0GQR 1. (Feb.) KOAEM 156, WA0EMX 18.

NEBRASKA—SCM, Frank Allen, W0GGP—SEC: KOJXN. Appointments: KOJXN and WA0BID as PAMS; WA0ILXN as OPS. Monthly net reports: Nebr. C.W. Net, WA0GHZ, QNI 227. 1st session, QNI 158, 2nd session, QTC 108, NACN, Nebr. AREC C.W. Net, WA0EEL, QNI 67, QTC 1, West, Nebr. Phone Net, W0NIK, QNI 660, QTC 49, Wx 3015, 100% check-ins: W0BFN, LOD, HOJ, NIK, KOAIE, TUI, BMQ. AREC Net, W0IRZ, QTC 114, QTC 3, Nebr. Morning Phone Net, KOUWK, QNI 695, QTC 35, Nebr. Emergency Phone Net, WA0BID, QNI 1351, QTC 133, Nebr. Storm Net, KOJXN, QNI 1709, QTC 85, AREC 6-Meter Net (Lincoln), WA0EUM, QNI 51, QTC 1, W0VEA reports completion of a 2-meter lunch box. Remember these upcoming events: Chadron Picnic, June 6, Scottsbluff Picnic, June 20, Central Nebraska Steak Fry, July 25. Traffic: W0LOD 159, WA0GHZ 146, WA0DQU 137, WA0BID 90, WA0EEL 75, WA0BIF 58, KORRL 50, WA0BOK 41, KOJFN 40, W0NIK 38, K0KJP 34, K0FRU 31, W0GGP 31, W0BFN 30, WA0HRX 29, W0FQB 26, W0MTI 24, W0YFR 24, W0BFV 20, WA0JAV 19, W0VEA 18, W0VRE 17, W1JCP 0 15, WA0AES 14, K0DGW 14, KOAL 14, W0EGQ 11, KOJIT 11, WA0GVJ 10, W0RJA 10, WA0KEJ 9, W0BOQ 8, K0ECH 8, KOHNT 8, W0WZR 8, WA0GRJ 7, W0FHF 6, WA0ERL 5, WA0ETE 5, KOUWK 5, WA0CFZ 4, WA0EJN 4, W0HOP 4, W0BYD 4, WA0AOKA 4, K0SCN 4, WA0IXP 3, W0CIW 2, WA0DFS 2, W0FTQ 2, WA0JUF 2, W0QPF 2, K0VTD 2, W0WKP 2, WA0BYK 1, WA0IXD 1, W0NOW 1, K0ULQ 1.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, Fred Tamm, K1GGG—SEC: W1EKL, PAM: W1ZFM, H.F. PAM: W1YBH, V.H.F. PAM: K1RTS. Net reports for Mar.

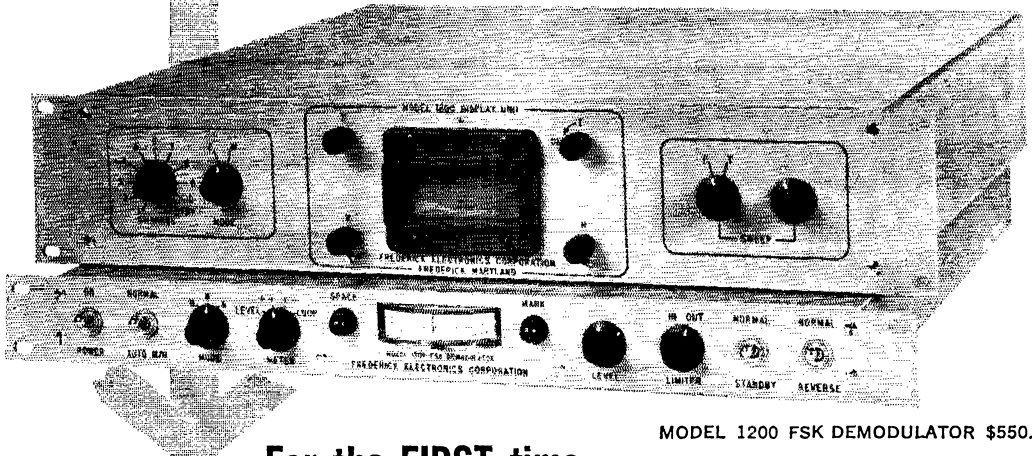
Net	Freq.	Time	Days	Sess.	QTC	QNI	Mgr.	
CN	3640	1845	Daily	31	272	345	W1ZFM	
CPN	3880	1800	M-Sat.	1000	Sun. 31	201	434	W1YBH
CTN	3640	1800	Sun.	4			1	W1RFJ
EC	3880	0900	Sun.					W1EKL

The 12th Annual CN/CPN Dinner was held Apr. 3 at the Fairway Restaurant in Bridgeport and over 60 members and guests enjoyed a pleasant evening meeting old and

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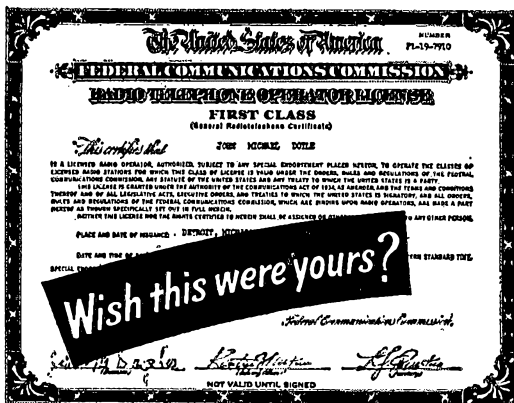
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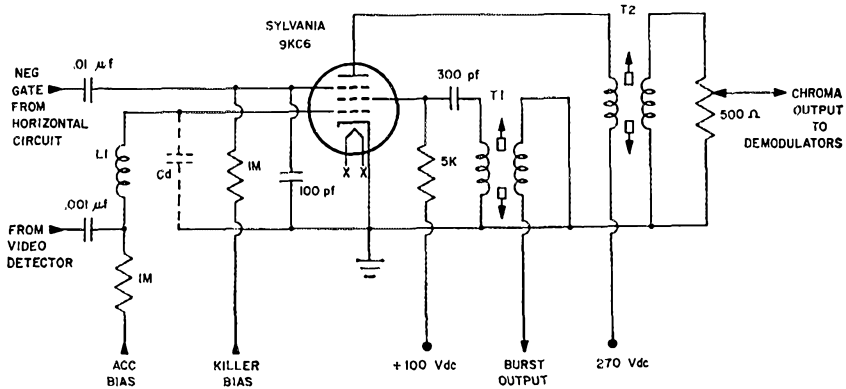
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new friends. WJIBQ is doing a recommendable job editing Hamden ARA's bulletin *Horoscope*. K1PKQ has a new Valiant and WA1ALZ is getting ready for RTTY with a new Model 15. K1FQT and K1WKK also were bitten by the RTTY bug. WA1CXE is a new General in Trumbull. K1GUD/6 is back from a tour of duty in Viet Nam. A 20-40-meter beam in a VW? How? Ask W1YNP, who lugged one for 150 miles. K1QPN has another hobby—making maple syrup. W1ENQ and K1YON are on 6 meters in East Hartland. W1ECH/6 DXCC is 209/193 with 120 meters in 7 months with 150 watts. New AREC members: WA1BER, WN1DUV, WA1DZL. Endorsements: W1EQV and W1EFW as OOs; W1EFW as ORS. Reports received: W1EQV, Oo, WA1CPU, OES, W1BGD made the BPL again. K1PQK reports C1EN held 27 sessions with 776 stations QNI. High QNI CN: W1ZPM, K1FQT, K1STM, CPN: 31 sessions in Mar., total traffic 201, average per session 6, average daily attendance 14, attendance leaders K1OQG 29, W1FUW 27, K1YGS 27, W1YBH 26, W1LHU 25, K1SRF 25, K1AQE 24, K1LFW 23, K1OJZ 22, W1GKF 21, K1EIC 20. A new station is WA1ROQ. Cronwell, Section Net certificates went to K1LFW and K1SRF. Again active after an absence are K1PKQ and W1OW. Traffic: (Mar.) W1BGD 500, W1ZPM 292, K1LFW 214, W1NJM 214, K1OQG 202, W1EFW 185, K1STM 173, K1FQT 115, K1EIR 107, K1RQO 89, K1EIC 83, K1GGG 52, W1CTI 51, W1YBH 47, W1RDI 43, W1RFJ 43, K1SRF 24, K1WXX 24, W1QV 23, K1YGS 20, K1PKQ 15, W1CUH 14, W1GKF 13, W1BNN 12, W1SGZ 12, WA1BER 8, W1ECH 2, W1FVU 2, WA1ALZ 1. (Feb.) W1EFW 70, W1CTI 50, W1CHR 4, W1FUW 2.

EASTERN MASSACHUSETTS—SCM, Frank L. Baker, Jr., WA1LP—WA1OG, our SEC, received reports from W1s AKN, QMN, K1s B1F, 1CJ, W1BYP is a new OO, W1s BVP, VAH, K1OJQ and WA1AQ are on 28.55-Mc. c.w. W1KWW and W1PNZ are Silent Keys. The EM1NN had 81 QN1s, 48 traffic, 14 sessions. W1BNU now is in Indian Rock, Fla. W1CED is working DX on c.w. K1ZHS is fixing the rig. K1OCC has his old call W1ACK, back. W1ASB is heard on 75. The EM1OMN had 4 sessions, 39 QN1s. The T-9 Club met at W1ISX's QTH. W1HIL is back on 15. Lou McCoy spoke at the Framingham Club. WN1DWS is a blind fellow in Townsend. WA1DZY is WI1KY's son. WI1GR is on many bands. K1WYS is in the Air Force at Orlando, Fla. K1VJ made the BPL in Feb. W1PEX made BPL again. W1LJO is one of W1QV's Asst. Directors. New VL hams: WN1EBB, WN1DYY, WN1DYQ, WA1DZE, WN1DXL, WA1DQA. W1HIL finally worked ZS6W on 14-21 Mc. W1EKG went to New Orleans. W1HXX has a new mike. W1QV is on 20-meter c.w. some. W1HLD has a long wire on 10. W1BGW was in the BARTG Contest. W1s DFR, CFN and DRO are in our EM1NN. P1MS K1VHO and W1UUR are going to make another try at getting our MASS. Phone Net going on 8842 kc. WI1KY was auctioneer for the Milton Club. The Wellesley Club also had an auction. K1ZUP is on many bands and mobile. W2QHQ was busy with "Open House" at M.L.T. and W1MX. W1PY, who got his license in 1913, has an SX-117 and an HT-44 transmitter ready to go on the air. K1YVY gave a talk on v.h.f. experiments. W1DBY, our Chelmsford EC, says there is a healthy feeling between the radio amateurs and the townspeople and c.d. W1HXX is on 50.55 Mc. in his plane. W1PZ is on 50- and 20-meter phone. W1CAS is in Air Force MARS. WA1BNZ is on 20-80-meter c.w., 75 phone. The North Shore Club held an auction. W1OGK is acting pres. W1JFS has had his call for 30 years. W1EPE retired. W1PFA/FP8BH spoke at the Quannapowitt RA on his expedition into FP8-Land. The Danvers ARA met at W1HVN's and had a film on Freedom 7 flight. The Needham Net reports 4 sessions, 22 QN1s, 7 traffic. W1AZU did a nice job telephone relaying daily for members of the crew of the *T.S. Bay State* on its annual cruise from Caribbean areas on 15 meters, reports K1B1F, who was on board with a DX-100, an S-85 and a Gotham V-80. K1VOK will be on more now. WN1DED enjoys handling traffic. K1FEV is s.s.b. on 6 with a six-element beam. WA1DJC is working DX with his DX-40, looking for a sked with Santiago, Chile. W1DYI helped WN1DYI get his DX-40 on 80. W1HGT now is in Brookline on 160 through 10. New officers of the M.L.T. Club, W1MX, are K4RNH, pres.; W2QHQ, treas.; K1SLL, secy.; K3OAE, sta. mgr.; K1VFX, act. coord. The club has a Model 15 RTTY. K1LZV has a Knight T-150A and has been on 40 and 80 c.w. WN1DCT has a DX-60, an HE-40/HD-11 and a dipole for 40-80. W1ZQQ is a new OO. W1AEC has a new slot antenna for 2, and an HW-12 is on 75 s.s.b. W1FJI is on 3720 kc. nightly from 1000 to 2300. W1OHI is s.s.b. with a new GSB-100. K1OIC has an HT-37. WA1APX worked 4U1TU. Look for WA3BQX, ex-K1BUR, on 3960 kc. Sat. at 9:30. The Capeway Radio Club members get on. W1ZST is group manager.

CHROMA BANDPASS, BURST SAMPLING AND COLOR KILLER CIRCUIT



The tube on the flying trapeze

We're constantly intrigued by the flexibility inherent in the basic structure of the electron tube. Find a need and the chances are that a tube can be designed to fill it.

A new chroma bandpass circuit developed by Sylvania for color TV receivers is a good example of what we mean. The circuit, together with the newly designed Sylvania 9KC6 dual-control pentode, functions as a chroma bandpass amplifier, a burst amplifier and a color killer. A neat start for one tube---and it's done with the greatest of ease.

The fact that one tube now does triple duty where two tubes were previously used---and does it better---is an important factor. But the interesting point is the manner in which the Sylvania 9KC6 performs. You will note from the accompanying schematic that there are two control grids. The grid No. 1 to plate transconductance is 24,000 micromhos! The grid No. 3 to plate transconductance is 500 micromhos. Both grids exert control over plate and screen current.

In the circuit shown, automatic chroma gain bias can be applied to one grid while the second grid controls color killer action. The second grid also provides a more economical method of controlling chroma gain. The second control grid switches the plate current on to supply a chroma signal to the color demodulator during color reception, and turns the plate current off (with no change in screen current) during the burst signal interval. The amplified burst signal is removed from the screen by means of the tuned circuit, T1. You will note also that, because of the high grid No. 1 to plate transconductance, sufficient gain is available for the 9KC6 to operate directly from the video detector.

Though the Sylvania 9KC6 was specifically designed for color TV receivers, its use is not limited to color receivers. For instance, in a black and white TV receiver, a detected video signal of only 1.5v. p/p on Grid No. 1 will provide approximately 110v. p/p video output. Such capabilities suggest that the tube may also find application in commercial electronics or amateur practice.

All of which prompts us to ask: What will a tube do next?

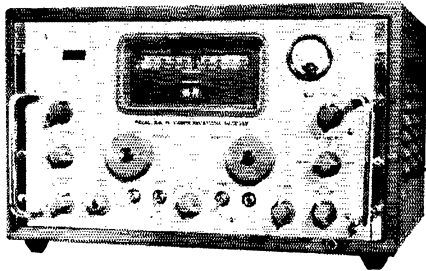
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Mr. Kurth, of National Co., spoke at the Yankee RC on "Present Day Receiver Design." Many on the North Shore are on 10 mobile. Appointments endorsed: K1-ZHS, W1FJJ, W1DIY as ORSs; W1DOM as PAM for 2; W1DOM, W1DIY as OPSSs; W1s CAS, ZLX, DIY, K1-MEM as OBSSs; W1s PST/ASA, DBY, 1PZ, NZP, EIQ, HRY, RM as ECs; W1HXK as OO; K1VPJ as OES. The EM2MIN had 23 sessions, 278 QNIs 150 traffic. New officers of the T-9 RC are W1IIB, pres.; W1MIVQ, vice-pres.; W1ISX, treas.; W1ITY, secy. The 6 Meter Crossband Net had 22 sessions, 378 QNIs, 19 traffic. Traffic: (Mar.) W1PEX 1066, W1AIRC 293, W1EMG 277, W1ZSS 194, K1ESG 170, W1ADAG 166, W1OFK 136, K1ZHS 76, W1DOM 60, K1VPJ 57, K1FZE 48, K1WJD 44, W1AOG 39, W1LES 29, W1MX 23, W1ZLX 20, W1CTR 15, W1RQL 15, K1BIF 14, K1MEM 12, W1AICRR 11, K1VOK 11, K1CAMS 10, W1NIDE 10, K1FEV 9, K1-GKA 9, W1YAC/1 9, K1BGG 8, W1NIDEC 5, W1DIY 5, W1AIDJC 5, W1HTG 4, W1IIP 4. (Feb.) W1EMG 127, W1AICEV 7, W1MX 5.

MAINE—SCM, Herbert A. Davis, K1DYG—SEC: K1QIG, PAMs: K1RXL, K1ZVN, RM: W1A2NPU, V.H.F. PAM: K1OYB. Traffic nets: Sea Gull Net, 3940 kc, 1700 to 1800 and 2000 to 2100 local time Mon. through Sat.; Pine Tree Net, c.w., daily on 3596 kc.; Two-Meter Net, phone and traffic 145.08 Mc, Thurs, 1930 to 2030. C.d nets meet Wed. and Sun. W1JIS is a Silent Key. He was the old-timer who took the honors many years at the Augusta Hamfest for being the oldest ham there. He was active in most of the nets and will be sadly missed by all who knew him. Many stations are on with new s.s.b. gear and it looks like an upswing in that mode. There is a net on s.s.b. nights at 2000 around 3940 kc, that could use the help of these stations. By this time the weather should be good for mobiles and possibly some emergency work. And it will not be too long before most of our southern exposure friends will be back with us for awhile. Down in the c.w. band the Pine Tree Net with a small group of hams is keeping the state active by handling traffic in and out of the state through the IRN, EAN and the NTS. These fellows deserve a lot of credit for the good job they have done. If anyone has the time for any of the nets it will be appreciated by all concerned. Traffic: K1TMK 193, K1NAN 83, W1AIDK 86, K1-UXZ 4.

NEW HAMPSHIRE—SCM, Robert C. Mitchell, W1-SWX/K1D5A—SEC: W1ALE/W1TNO, PAM: K1APQ, RM: W1DYE.

Net	Freq.	Time	Days	Sess.	QNI	QTC	Mgr.
GSPN	3842	2300Z	M to F	27	422	32	K1APQ
GSPN	3842	1330Z	Sun.	---	---	---	"
VTNHN	3685	2230Z	M to F	23	102	56	K1UZG
NHPON	50.82	2100Z	M to F	23	194	48	K1BGI
NVAREC	50.82	0100Z	Mon.	5	70	5	K1DWBK
CBP	28.6	2315Z	Thurs.	5	30	0	W1JB
NM&K	28.73	2100Z	Tue.	5	16	3	W1RCC

WINXX is now a N.H. resident. K1WFE is the NYL of W1TFS. A new 2-meter man is K1VLX, W1BQA was in the Novice Roundup. Rare DX by W1AJJ after 40 years was FG7XX. W1AICP was issued a GSPN certificate. Endorsement: W1ALE as SEC/OBS, W1GOC is active from North Conway. W1CBB is airing Bulletins daily. W1RCC has a new keyer. K1APQ is having antenna problems. K1PCY and K1GQH are Manchester's most active stations. K1HRE operates from the fire station at Keene. W1KOC, mobile, is heard often rambling about New England. W1PWF and K1BGI keep N.H. traffic flowing on the VTNHN. Your SCM visited the Manchester Radio Club. Topic of the evening was new FCC proposals. W1EKO is getting married. Traffic: (Mar.) K1BGI 108, W1ALE 58, W1SWX 17, W1EVN 8, W1AJJ 4, W1RCC 3, W1ET 1. (Feb.) W1AJJ 4.

RHODE ISLAND—SCM, John E. Johnson, K1AAV—SEC: W1YNE, PAM: W1TXL, RM: W1BTY, V.H.F. PAM: K1TPK, RIN reports 23 sessions, 107 QNI, 72 traffic, RISPAN reports 31 sessions, 808 QNI, 106 traffic. The Cranston Radio Assn. has started classes to study for the Amateur Extra Class license. Contact W1BTY for information. The W1AQ Club of Rumford issued WRI certificate No. 82 to W3DKT and No. 83 to K2-CPR. K1UXS and W1DJO were elected to club membership. Plans for Field Day are well established and K1AMG has been elected Field Day chairman. W1YKQ has just completed a new 6-meter transmitter. W1YNE is now on 75-meter s.s.b. with an HW-12 and has started an RTTY station. K1USD also is on RTTY. K1TPK received a Section Net certificate for his work on the 6-meter crossband net. The R.I. Emergency Net meets Mon. at 2000 local time on 51.5 Mc. All amateurs interested in joining the AREC may send their applications directly to the SEC or SCM. The W1OP Club

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CASE HISTORY #159

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CASE HISTORY #248

"I just wanted to let you know how pleased I am with my Gotham V80 antenna. I have worked a W.A.S. of 46/43, a WAC of 3/3, and DXCC of 14/12 in about 12 months." G. W., Maryland.

CASE HISTORY #111

"The V160 did a beautiful job on a VEJ for me. Also, I forgot to take it down during the hurricane of last week. It is just as straight as it was when I bought it." D. S., New Jersey.

CASE HISTORY #613

"I have never been happier with any antenna than I have been with the V80. I have worked all bands with it and have had tremendous success—i.e., DL4s, ZS3, etc., all solid copy." R. D. S., Penna.

CASE HISTORY #483

"My V80 is working wonders. I am able to maintain a 1:1 SWR all across the 40 meter band. After many years on 10, 15, and 20, the XYL and I are getting great kicks out of some of the lower bands." J. A., New Mexico.

CASE HISTORY #146

"I have had very good luck with mine (my V80) feeding it with a Johnson Adventurer; works fine on all bands." B. J., Nebraska.

CASE HISTORY #535

"Being an owner of your V80 vertical I would like to let you know of the excellent results I am getting with it, both working the DX and the local stations on the lower bands. It certainly is an excellent antenna system." F. H. Jr., New York.

CASE HISTORY #84

"A few months ago I purchased your V40 vertical and have achieved outstanding results on the air." K. G. B., North Carolina.

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of Providence has started code and theory classes. Contact WIBIL if you would like to join in them. Traffic: WITXL 512, WYNE 95, WIBTV 86, WYKQ 57, KIUSD 52, KIVEY 39, KITPK 29, KIVYC 25, KIBRJ 9.

VERMONT—SCM, E. Reginald Murray, K1MPN—SEC: WIVSA. RM: WIVFZ. Mar. net reports:

Net	Freq.	Time	Days	QNI	QTC	NCS
Green Mt. Net	3855	2130Z	Dy, ex Sun.	394	19	WIVM/C
Vt. Fone Net	3855	1300Z	Sun.	135	—	WIUCL
VTNH Net	3685	2230Z	M thru F	102	58	KIZUG
Vt. CD RACES	3993	1400Z	Sun.	47	11	WIAD

All nets operate on summer time. The Burlington Amateur Radio Club once again will sponsor the Annual International Field Day Hamfest July 4 at Champlain Valley Fair-grounds in Essex Jct., Vt. W1HRG is chairman. His address is 333 Dorset St., S. Burlington, Vt. Franklin County Amateur Radio Club's new officers are K1RMH, pres.; K1RMF, trustee; K1WVA, treas. and trustee; Concetta Cornforth, clerk. Traffic: K1-BQB 400, K1UZG 54, K1LLJ 27, K1MPN 8, K1IJJ 7.

WESTERN MASSACHUSETTS—SCM, Percy C. Noble, W1BYR—C.W. RM: K1IJV. 75-Meter PAM: K1VHO. Hampden County 10-Meter Phone Traffic Net Manager: K1PKZ. Many thanks, gang, for the reports this month. K1PZR is now on from Mannheim, Germany, under the call DL4EH. W1EOB is working days again so we expect to hear lots more from him. K1RYT is running a very active code and theory class. Because of a general transmitter breakdown, K1VFN is now constructing a new rig. EC K1SSH is looking for members on h.f. and v.h.f. for his Worcester County AREC. Interested? Send him a card, phone, or even use radio! WMN (nightly at 7 P.M. on 3560 kc.) handled 112 messages during the month. Stations in the net arranged according to activity: K1IJV, W1DWV, K1WZY, W1-ZPB, W1BYR, K1ZBN, K1LBB, K1SSH, K1YMS, W1-DWA, W1EOB, K1VFN, W1MND and K1ZZL. W1DWA gets traffic back by originating traffic, and traffic is the backbone of every traffic net. Sure wish more of you would do likewise! W1UIS was the speaker at the Berkshire County Amateur Radio Association. W1JVR and K1BGF are on 2. W1GTO still is laboring on his 6-meter transistor converters. Wis COI, DGT, GTO, MRP, COV, UUK and ZHJ were active during the first ARRL C.W. Test weekend. K1OOV gets FB reports from VK and ZL with his 3.5-Mc. fixed beam. K1MRP, K1JGV, K1ZJJ and W1UUK still are battling out the DX. Likewise, brother COI, W1MWE and W1BKG keep a weekly sked with their brother, K6CHA, in California. W1BYR is trying out a new Gotham vertical. Traffic: (Mar.) K1IJV 173, W1DWA 151, W1BYR 105, K1SSH 58, K1RYT 57, W1UZY 51, K1LBB 37, W1ZPB 21, W1-DVW 19, K1YMS 13, K1WZY 10, W1EOB 3, K1VFN 1. (Feb.) W1UZY 50.

NORTHWESTERN DIVISION

IDAHO—SCM: Raymond V. Evans, K7HLR—PAM: W7GGV. New FARM Net officers include W7-JFA, mgr.; W7DWE, K7NEY, W7JHM, K7ZSW and K7OAB, net control stations. K7QIE, formerly of Idaho Falls, now is operating as DL4AN and looking for some of the Idaho gang on 14.280 Mc. week ends. W7DQU was busy tracking Oscar and made a tape used by radio station KID along with a story about Oscar III. FARM Net: 22 sessions, 547 QNI, 63 QTC. Traffic: K7HLR 206, W7GMC 57, W7GGV 7.

MONTANA—SCM, Joseph A. D'Arcy, W7TYN—Asst. SCM: Harry Roylance, W7RZY. SEC: W7KUH. PAM: W7YHS.

Montana S.S.B. Net	3910 kc.	1800	MIST M-F
Missoula Area AREC Net	3895 kc.	0900	MIST Sun.
Montana State Net	3520 kc.	1900	MIST T-Thurs.
Montana PON	3885 kc.	0815	MIST Sun.

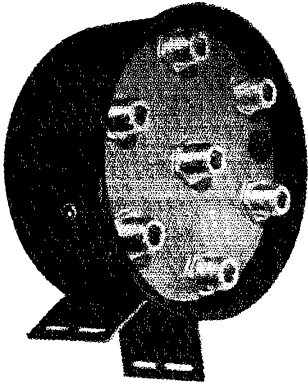
Endorsements: K7UPH is OBS; K7ZIX as RM. New appointment: K7YEM as ORS. Our new Asst. SCM, W7RZY, is interested in getting more ECs throughout the state. Please check to see if there is an EC in your county. If not get in touch with Harry and he will gladly get you lined up. New officers of the Old Faithful Radio Club are W7DOV, pres.; W7LPL, vice-pres.; K7SVR, net, mgr.; W7RZY, secy.-treas. The Montana S.S.B. Net averages over 800 check-ins per month. W7ZHA has his MISEE from Montana State College and has moved to Seattle. W7BNG has moved from Bozeman to California. WN7CAB has returned from a trip to Europe. Montromics has moved from Bozeman to Seattle leaving much talent in the Bozeman area. Only 10 of the 40-odd employees wished to leave our Big Sky Country. The Butte Amateur Radio Club is

DK

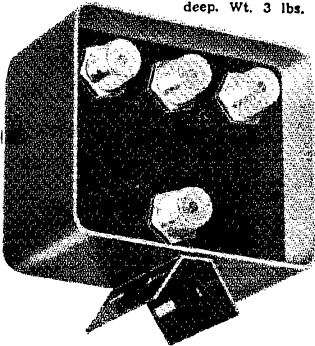
Industrial — Military Relays By

DOW-KEY

For Most Every Switching application



Size: 5 1/4 dia., 2 1/2 deep. Wt. 3 lbs.



Size: 4 x 3 1/2 x 2 1/2. Wt. 1 lb. 8 oz.

MULTI-POSITION SWITCHES

FOR REMOTE SWITCHING OF r.f. SOURCES

DK71 SERIES

SINGLE POLE, 6 THROW COAXIAL SWITCH

DK72 SERIES

SINGLE POLE 3 THROW COAXIAL SWITCH

MODELS DK71 & DK72 - MULTI-POSITION COAXIAL SWITCHES

Switches for remote switching of r.f. sources. Designed for mounting on mast and remote switching of 6 antennas in DK-71 and 3 antennas in model DK-72. You reduce cost and simplify installation by running one coaxial cable instead of several to your antenna array.

These are not rotating or stepping switches, but the common connector may be switched from any one position directly to another position. They may be operated so that multiple positions may be connected simultaneously to the common connector.

SPECIFICATIONS: Frequency range 0 to 500 mc; power rating 1 kw; VSWR less than 1.1:1 at 100 mc; isolation greater than 40db at 100 mc; life expectancy over 1,000,000 operations; duty continuous; 50 ohm impedance.

COIL VOLTAGES — 6, 12, 24, 28, 32, 48; 110 and 220 DC, 50-60 cps AC.

RECOMMENDED COIL VOLTAGES — 12, 24, 28v DC or AC. (others available)

COAXIAL CONNECTORS — Type UHF standard. (Type N, BNC, TNC & C available)

MOUNTING — Mounting bracket and straps included.

MODEL DK71 — with UHF Connectors, each **\$49.50**

MODEL DK72 — with UHF Connectors, each **\$22.95**

With N, BNC, TNC or C connectors, each **\$55.50**

With type N, BNC, TNC and C connectors -- **\$26.95**

Additional charge for 110 and 220v DC models and with 72 ohm impedance.

Unconditionally Guaranteed for one year.

Specify coil voltage and connector other than UHF.

Dow-Key products available at your distributor or write:

Manufactured by DOW-KEY COMPANY, Thief River Falls, Minnesota



DK2-60B SERIES

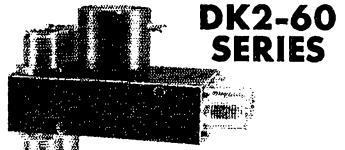
DK2-60B

Connectors UHF. Size 2 3/4 x 3 3/4 x 1 1/4. Wt. 12 oz.

A DPDT SWITCH INTERNALLY CONNECTED IN DE-ENERGIZED POSITION

Ideal for switching in and out a power amplifier between an exciter and antenna. Frequency range 0 to 500 mc. Power rating 1 kw. VSWR less than 1.15:1 from 0 to 500 mc. Isolation greater than 30 db @ 500 mc. Loss less than 0.03 db @ 30 mc. Life over 1,000,000 operations. 50 ohm impedance.

Available in all standard AC, DC voltages ----- from \$19.00 ea.



DK2-60 SERIES

A DPDT SWITCH for SWITCHING 2 COAXIAL LINES SIMULTANEOUSLY

Frequency range 0 to 500 mc. Power rating to 1 kw. VSWR less than 1.15:1 from 0 to 500 mc. Isolation greater than 30 db @ 500 mc. Loss less than 0.03 db @ 30 mc. Life over 1,000,000 operations. 50 ohm impedance. Size: 2 3/4 x 3 3/4 x 1 1/4. Wt. 12 oz.

With UHF COAXIAL CONNECTORS ----- from \$19.00 ea.



DK60 SERIES

DK60-G2C

HEAVY DUTY SPDT COAXIAL RELAYS

50 ohm impedance. 1 kw rating. Life expectancy 1,000,000 operations. VSWR less than 1.15:1 from 0 to 500 mc. DK60-G, DK60-G2C feature patented automatic receiver protecting connector for positive isolation of r.f. from receiver greater than 100 db isolation between receiver from 0 to 500 mc.

DK60 SERIES, AC or DC UHF connectors ----- from \$12.45 (4 models, N, BNC, TNC or C connectors available)



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NEW MANUAL COAXIAL SWITCHES

(Not Water Switches)

DK78-2, 1P2T; DK78-3, 1P3T; DK78-6, 1P6T; DK78-T, Crossover Switch. Have excellent r.f. characteristics. Dial, plate and knob. 3" dia., 1 1/4" deep. Wt. 10 oz.

DK78-2 and DK78-3 ----- each \$12.75
DK78-6, and Crossover Sw., each \$15.75

TRI-EX'S
NEW
IMPROVED
THD-471
GUYED TOWER

shown with internal
rotator, 2" mast,
Tri-Band Beam

Choose from 8 models, 4 with 20 ft. sections, 4 with 10 ft. sections — all hot-dipped galvanized, inside and out, *after* fabrication.

**GET THESE
FEATURES**

- Tower Heights to 88 ft.
- Easy to Erect
- Cranks up & down
- Geared winch
- Aircraft raising cable
- Ball-bearing pulleys
- Precision formed guides
- Hinged base plate

PRICES START AT
\$12790

FREE BROCHURE

Tri-Ex TOWER CORPORATION

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winding up this year's code and theory class. We hear that K7TZZ has a pipeline into Europe from Butte. W47BJV is now on 20- and 40-meter c.w. with an HT-9 and an S-85. Of the Montana 2-meter gang among the first to hear Oscar III were W7EGN, W7FL, W7CJB, W7CJN, W7EQP and W7TYN. W7EGN, at Whitefish, was heard in Fairbanks, Alaska via Oscar III. The Helena gang had its Annual Get-together. W7PFQ did a real fine job along with K7YLR and W7-HIZ. The Anaconda gang took a trip to Helena for the Old-Timers Night and a discussion took place concerning 2 meters. It looks as though some DX records will fall on 2 meters. Traffic: K7PWY 79, K7SVR 33, K7EWR 25, W7NPV 21, K7UPH 8, K7YNZ 8.

OREGON—SCM, Everett H. France, W7AJN—RM: W7ZFH, New appointee: K7DYK as OBS and OO. Activity reports: K7JHA is active on RN7 and OEN and has added a Johnson KW matchbox to the station. W7ZB is on the air with a Viking 500 and says it is time for c.w. K7ZML, a newcomer on OSN and active on MARS, is using a Gonset GSB-100, a G-76 and a G-63. W7DEM reports activity on OEN and two MARS nets. Ex-WN7ADT, WN7ADW and WN7ADY are now WA7s. K7YQM has 75-meter mobile. WA7ABL has moved on the Rogue River below Grants Pass. W7KTG, as OO, sends in another two-page report on observations; he also is active on 2-meter MARS and is using a Twoer on mobile. Report on Oscar III fans: K7DYK was busy receiving and tracking since Orbit No. 8 Mar. 10 and says XYL WN7CBE now is an avid Oscar fan. W7ACZ and W7GWT also conducted receiving experiments. W7AUB worked W9TGB, W6GDO and several others. W6GDO was using a dipole propped on a stepladder. The Clackamas County Amateur Radio Society has established a net on 2 meters, 145.8 Mc. for training, at 8 p.m. Mon. K7IFG is the new net manager for OSN and reports Mar. sessions 23, attendance 139, high 9, traffic 50, high 7, average 2.17. BRAT awards to W7ZFH, K7IFG, K7WD, K7PLP, EC Multnomah County, Portland area, reports: AREC members — full 100, supporting 33, mobile units 52, Aest, ECs 16, participation in nets on 75, 6 and 2 meters. Traffic: (Mar.) K7WD 232, W7ZB 132, K7IFG 121, W7ZFH 43, K7ZMR 18, K7JHA 11, W7DEM 7. (Feb.) K7ZMR 8, W7DEM 6.

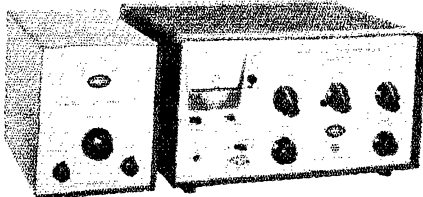
WASHINGTON—Acting SCM, Everett E. Young, W7HAMQ—SEC: W7HAMQ, RM: W7AIB, PAM: W7LFA. Washington traffic nets:

NTS WSN	0200Z Daily	QNI 357 QTC 194	3535 3970
WARTS 0130Z Mon. Thru Fri.	No Report		
Noon Time Net	3970 1830Z	QNI 1191	QTC 636
N.W. Side-Band	3945 0200Z		
N.W. Slow-Speed	3700 0300Z	QNI 254	QTC 69
C.B.N.	No report		

K7NZO is working hard on AREC-YLRL. W7BA and W7DZX still are beating the bug, for the moon? K7YLM now /6, checks in NWSB with a Swan 350. The Basin ARC sponsored the Moses Lake Hamfest with 50 hams and families present. Five years gets W7GYF 80-meter WAS. W7JC is chasing 80-meter DX. K7CHH is QRL school. W7DDY got some DX on 40-meter c.w. K7YVC is heard on 80. W7AIB reports better conditions for NTS. W7JEY is on both WSN and RN7. W7AMC, is trouble-shooting. K7CTP, reports traffic generally down for March. W7AIB, with K7ZPM, has WSN on the traffic go. All Washington section amateurs can be proud of this manner of operating and reporting. W7RJW is the new EC for BEARS (King County), replacing K7AZI, resigned. W7ER is converting the ARC-1. NW Chapter QCWA Annual Meeting committee chairman W7QA reports all OK. W7LHL is heard on the East Coast on 144.1 Mc. K7VNI is taking home the marbles of the Mount Baker Club Bunny Chase, but W7EIL is leading the hound dogs after six goes. W7TIZ is the daddy of a YL. K7YOS and WA7-ASN are heard on 20. W7GHS skeds his brother-in-law, WB2ABH, in N.J. Also W7SLB regularly skeds his brother, W7PUA/2, in N.J. on 80-meter c.w. W7IDL sends along an FB OO report. This section needs more OOs. W7OS states that the RC of T may provide space for QCWA old-time gear display. W7RVL is i.m. expert in W7NCW-Land. Listen for him Wed. on 50.3 Mc., also 29.6 Mc. The Radio Club of Tacoma celebrated its 50th anniversary with 50 in attendance. Wanted: One EC for Snohomish County. K7OFW is RTTY from Richland. K7KSF scored high in the YL/OM Contest. W7OEB, now SB 300-400-200 is active as OO and ORS and in the N.W. Wx Net and Navy MARS. K7VNB has been elected Dir. of NTN. Walla Walla monitors 29.6 Mc.-3987 kc.-148.760 Mc. daily. W7DP is building fast now. Traffic: (Mar.) W7BA 1025, W7-DZX 795, K7JHA 617, W7NPK 252, K7CTP 200, K7-

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NEW VFO FOR TX-62 OR VHF TRANSMITTER



The NEW **AMECO** TX-62

In response to the demand for an inexpensive compact VHF transmitter, Ameco has brought out its new 2 and 6 meter transmitter. It is easy to tune because all circuits up to the final are broadbanded. There is no other transmitter like it on the market!

SPECIFICATIONS AND FEATURES

Power input to final: 75W. CW, 75W. peak on phone.
 Tube lineup: 6GK6—osc., tripler, 6GK6 doubler, 7868 tripler (on 2 meters) 7984-Final. 12AX7 and 6GK6 modulator. Crystal-controlled or external VFO. Crystals used are inexpensive 8 Mc type.
 Meter reads final cathode current, final grid current and RF output.
 Solid state power supply.
 Mike/key jack and crystal socket on front panel. Push-to-talk mike jack.
 Potentiometer type drive control. Audio gain control.
 Additional connections in rear for key and relay.
 Model TX-62 Wired and Tested only \$149.95

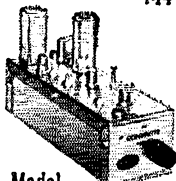
NEW AMECO VFO FOR 6, 2 & 1 1/4 METERS

The new Ameco VFO-621 is a companion unit designed to operate with the Ameco TX-62. It can also be used with any other commercial 6, 2, or 1 1/4 meter transmitter.

Because it uses the heterodyne principle and transistorized oscillator circuits, it is extremely stable. An amplifier stage provides high output at 24-26 MC. The VFO includes a built-in solid state Zener diode regulated AC power supply.

This new VFO is truly an exceptional performer at a very low price
 Model VFO-621 \$59.95 net.

NUVISTOR CONVERTERS FOR 50, 144 AND 220 MC. HIGH GAIN, LOW NOISE



Model CN

Has 3 Nuvistors (2 RF stages & mixer) and 6J6 osc. Available in any IF output and do NOT become obsolete as their IF is easily changed to match any receiver. Average gain — 45 db. Noise figure — 2.5 db. at 50 Mc., 3.0 db. at 144 Mc., 4.0 db. at 220 Mc. Power required 100-150V, at 30 ma., 6.3V. at .84A. See PS-1 Power Supply. Model CN-50W, CN-144W or CN-220W wired. (specify IF.) \$49.95. Model CN-50K, CN-144K or CN-220K in kit form. (specify IF.) \$34.95

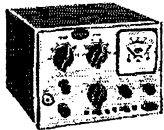
ALL BAND NUVISTOR. PREAMP 6 THRU 160 METERS



MODEL PCL, Wired, \$24.95
MODEL PCLP, with built-in power-supply, wired, \$32.95

2 Nuvistors in cascode give noise figures of 1.5 to 3.4 db. dependence on band. Weak signal performance, image and spurious rejection on all receivers are greatly improved. PCL's overall gain in excess of 20 db. Panel contains bandswitch, tuning capacitor and 3 position switch which puts unit into "OFF," "Standby" or "ON," and transfers antenna directly to receiver or through Preamp. Power required — 120 V. at 7 ma. and 6.3 V. at .27 A. — can be taken from receiver or Ameco PS-1 supply. Size: 3"x5"x3".

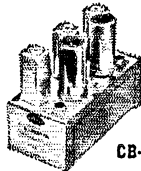
COMPACT 6 THRU 80 METER TRANSMITTER



Model TX-86

Handles 90 watts phone and CW on 6 thru 80 meters. Final 6146 operates straight thru on all bands. Size — only 5" x 7" x 7" — ideal mobile or fixed. Can take crystal or VFO. Model TX-86 Kit \$89.95 — Wired Model TX-86W. \$119.95. Model PS-3 Wired \$44.95. Model W612A Mobile Supply wired \$54.95.

CB-6K — 6 meter kit, 6ES8-rf Amp., 6U8-mix./osc. \$19.95
 CB 6W — wired & tested ... \$27.50
 CB-2K — 2 meter kit, 6ES8 1st rf amp., 6U8 — 2nd rf amp./mix. 6J6 osc. \$23.95
 CB-2W — wired and tested, ... \$33.95
 Model PS-1 — Matching Power Supply — plugs directly into CB-6, CE-2 and CN units. PS-1K — Kit ... \$10.50
 PS-1W — Wired \$11.50



CB-6

EASY TO UNDERSTAND AMECO BOOKS



Amateur Radio Theory Course \$3.95
 Amateur License Guide50
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 EL 3 1.75 EL 4 1.25
 Amateur Log Book50
 Radio Electronics Made Simple 1.95

CODE PRACTICE MATERIAL



Ameco has the most complete line of code records, code practice oscillators and keys. Code courses range from start to 18 W.P.M. and are on 33, 45, or 78 r.p.m. records. Model CPS oscillator has a 4" speaker and can be converted to a CW monitor.

Write for details on code courses and other ham gear.

Ameco equipment at all leading ham distributors.

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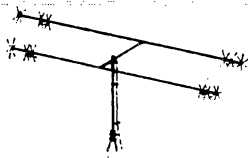
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QUALITY ANTENNAS FOR . . .

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featuring heavy wall
aluminum and stainless
steel construction
throughout



6 - 10 - 15 - 20
METERS

The time proved B-24
4-Band antenna combines
maximum efficiency and
compact design to provide
an excellent antenna where
space is a factor. New end
loading for maximum radiation
efficiency. No center
loading.

Oper. Freq.	6-10-15-20 Meters
Power Rating	600 Watts AM
Turn. Radius	7'
Total Weight	11 lbs.
Single Feed Line	52 ohm
SWR at Resonance	1.5 to 1.0 max.

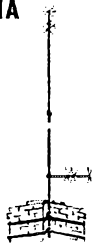
Model B-24
Net \$59.95

MULTIBAND COAXIAL ANTENNA

For 6 - 10 - 15 - 20 METERS
Needs no ground plane radials. Full
electrical 1/2 wave on each band. Excellent
quality construction. Mount with inexpensive
TV hardware.

Power Rating	600 Watts AM
Total Weight	6 lbs.
Height	12'
Single Feed Line	52 ohm
SWR at Resonance	1.5 to 1.0 max.

Model C4 Net \$34.95



40 plus 10
METERS

New end loading for
maximum radiation
efficiency. No center
loading employed.
Element length only
20'... boom 10'.

Oper. Freq.	40 and 10 Meters
Power Rating	1000 Watts AM
Single Feed Line	52 ohm coax.
SWR at Resonance	1.5 to 1.0 max.
Total Weight	22 lbs.

Model B 4010 Net \$79.50

RUGGED 6 METER BEAM

Rugged construction with no holes
in elements or boom to weaken
antenna. Heavy wall aluminum and
stainless steel throughout.

Power Rating	1000 Watts AM
SWR at Resonance	1.4 to 1.0 max.
Impedance	52 ohms
Longest Element	9'8"
Boom	12'



Model B6M5
Net \$24.95 each
Two for \$44.50

Write for Mini-Products' Miniaturized Antenna Catalog.

If there is no stocking distributor
near you... order direct
from factory. Free shipping
to your QTH and we will pre-
pay the costs in continental U.S.A.

DISTRIBUTORS WANTED
IN KEY AREAS.
Write for details to
Tom Venable, K3JZ, Sales
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• LEADERS IN COMPACT ANTENNAS •

TCY 151, W7APS 142, W7BTB 101, K7IAE 46, K7ZPM
46, W7JEY 45, W7GYF 33, W7AIB 22, W7AMC 22, K7-
YVC 6, W7JC 4. (Feb.) W7GYF 22.

PACIFIC DIVISION

EAST BAY—SCM, Richard Wilson, K6LRN—SEC:
WA6OLF. It would sure be nice to see some more
QNTs to the various nets. Some areas are completely
lacking in coverage. If some brave soul would take it
upon himself to QNI once or twice a week and have
another station in the same area check in on alternate
nights this would assure this person's area of coverage.
At least the RN8 man wouldn't get stuck mailing in the
traffic. In the East Bay section we need more QNTs to
NCN, for instance from the Southern Alameda County
area, that is from San Leandro south to the Fremont-
Newark area including Hayward and Castro valley. In
Contra Costa, the Richmond area and the entire coun-
ties of Napa, Solano and Lake are not covered. Some
of these areas get considerable amounts of traffic which
have to be mailed because someone is too lazy or does-
n't care. If you don't like code, QNI the Santa Clara
Valley section net on 146.7 Mon.-Fri., which covers
the four most populous Bay area counties, or the East
Bay Two-Meter Net on 145.5 Mon.-Fri. covering the
East Bay and up into the Sacramento Valley and San
Joaquin Valley. Or if you are a 75-meter phone man
try the Northern Calif. Traffic Net on 3.905 at 0200Z or
Mtn. 3.854 at 0300Z. At any rate, try to QNI a net and
become familiar with net procedure and handling a
message in ARRL form. Perhaps I shouldn't dwell on
this one subject but I feel that it is quite important
that everyone do a fair share of public service opera-
tion. Maybe you think that traffic-handling is too diffi-
cult or inconvenient or unnecessary. Then join and
actively support your local AREC/ARPC organization
or do something besides sit in your black crackle towers
and clutter up our ham bands with idle chatter. Prove
to the public that the radio amateur does more than
just talk and QRM TV's. How about surprising us
some night when NCS says QTC Napa or Vallejo by
saying "QTH here is Napa and I will QSP." Remem-
ber—NCN 0300Z-3.635 Mc. every night of the year.
WB6ETY, WA6WNG, K6CKT, WA6CVU and K6JZL
are regulars on NCN. W6NBX QNTs occasionally. W6-
OJW, of Dixon, and WA6KLL, W6TXY, W6TYM and
WA6RSG, of Livermore, participated in the Oscar III
program with the Livermore group QSOing on orbits
160 and 161 with a composite transmitter running 800
watts out. K6GK is on vacation and will be attending
the LMRE convention then will be off to Europe. WB6-
ILH is having trouble getting the rig on 80. WA6ANE
and WA6RSG are new ECs. WA6ZTY has a TX-62.
WA6QZA has a new Galaxy 5 and 80 meter antenna
but it sounds like XYL WA6PTU is getting more use
from it. Traffic: WA6WNG 111, K6LRN 57, K6GK 45,
WB6CSD 27, WA6PTU 9, WA6QZA 8, WB6ETY/6 4,
WA6ZTY 4.

HAWAII—SCM, Lee R. Wical, KH6RZF—Asst. SCM/
SEC: Ernie J. Kurlansky, KH6CCL. PAM: KH6ATS.
RM: Vacant. V.H.F. PAM: KH6ECT. EC: KH6FJL.
OOs: KH6KS, KH6BZF. OPS: KH6ATS. OBSs: KH6-
ATS, KH6DXB, KH6EIT. OESs: KH6BAS, KH6UK.
QSL Mgr. KH6: KH6DQ. KH6FGA has a new s.s.b.
setup, with an SBE-33 and the SBE afterburner to
boot. KH6CRV has been heard on 40 using KJ6BZ
telephone relaying to the mainland. KH6s KS and BZF
have returned from the South Pacific on business.
KH6GG and KH6CUP are spearheading the Hawaii
State Convention coming up July 17, 18. Mark your
calendars. We hope to see all the outside island fellows
in Honolulu. As it stands now the Hawaiian Village
Hotel will be the convention headquarters. Lots of
things are planned and manufacturers representatives
will display their gear. KH6CUP and KH6GG have
some surprises planned. Come one, come all. See you.

NEVADA—SCM, Leonard M. Norman, W7PBV—
SEC: W7JU/K7JU. Ray has had four consecutive years
of reporting his SEC duties without a late or missing
report. K7ZRR is active on 40 meters with an HW-22.
W7BSE and W7BSF also are active on 40 and 80
meters. Oscar III was the main activity in Southern
Nevada in March with lots of signals being heard. K7-
ICW has a Parks 432-Mc. converter and a TR/RV-3.
K7RKH has a 628-1 on 6 and 2 meters. K7ZOK is
running 250 watts s.s.b. on 6 meters. K7NYU is RTTY
on 2 meters. W7OX/W6FB has returned to 6-band.
W7VIU had a heart attack but hopes to be on the
air again soon. W7CFF has an SB-300 almost com-
pleted. W7PBL has moved into a new QTH running
a gallon on all bands. W7BQQ is piping his signal into
a 1200-ft. VU antenna. W4CJD/7 is packing for a move
to N.C. W7NTW is home again in Las Vegas. K7TNY
has moved to Gardlen Grove, Calif. Traffic: W4CJD/7
52, W7JU/K7JU 9, W7PBV 4.



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	470.....	3.....	33	
6252.....	200.....	2.....	67	
6360.....	175.....	1.0.....	16	
6907.....	470.....	3.0.....	24	
6939.....	470.....	1.2.....	6.0	
7377.....	470.....	1.4.....	12.5	
	960.....	1.5.....	5.0	
7854.....	175.....	3.5.....	163	
8458.....	175.....	1.2.....	30	

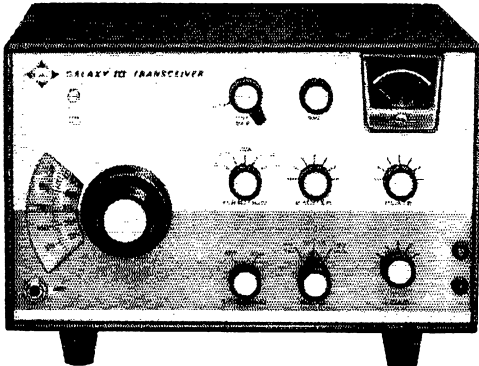
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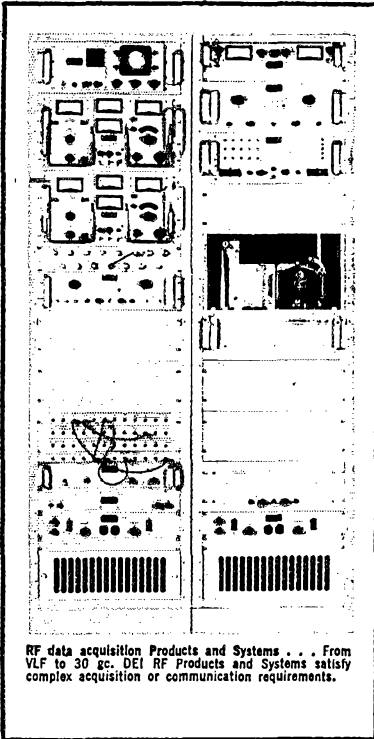
SACRAMENTO VALLEY—SCM, John F. Minke, III, WA8JDT—SEC: WA6WME, ECs: W8JDN, WA8-MMO, WA6TQJ, RM: W8CMA, GRs: W6CMA, K6-ORT, K6YZU, OPS: WA8TQJ, WA8YKR, OBSs: W6-AF, WB6EFM, K6HHD, WA6LCL, WA6SLU, WA8TQJ, WA6YKR, OCs: WA6DBL, W6GDO, K6HEZ, WA6LCL, W6WLI, W6ZJW, OESs: W6GDO, K6HEZ, W6PIV, WA6YKR. We still need ECs and a PAM, The Yolo County, C.D. ARC has new officers with WA8TQJ as RO, WB6AQR and WA6DDO are Asst. ECs and WB6-FAA is secy. Area representatives are W6PJB, Esparto: WA6DDO, Davis; WB6AQR, Woodland; WB6GCH, West Sacramento. The Oroville Amateur Radio Society (OARS) is affiliated with ARRL and has 21 members, 16 being League members. W6AF rebuilt his kw. amplifier. There are approximately 550 members in this section. Sacramento County consists of 55%. The only county without a member is Alpine! The Seardeph Radio Club recently toured NPG and VOA at Dixon, which was coordinated by W6CLB. North Hills Radio Club and Aerojet ARC have been engaged in gavel-snatching. The purpose—to create interclub visits. WA6YZD now is operating on the Sacramento ARC 2-Meter f.m. repeater. The Sacramento ARC meets the 2nd Wed. of each month. The Sierra Foothills ARC meets the 3rd Wed. of each month in Auburn. For you 160-meter fans! The Golden Empire Amateur Radio Society Net meets on 1920 kc. The GEARS from Chico is quite active on this band. If you have not made reservations for the convention, better do it now! Traffic: (Mar.) K6YBV 126, WB6MAE 56, WB6EFM 9, (Feb.) K6HEZ 22.

SAN FRANCISCO—SCM, Hugh Cassidy, WA6AUD —SEC W6KZF advises the use of the last page of your log for listing emergency phone numbers. W6CYO, WB-PVC and K6TZN have turned up with new SB-34s. W6YKS was home on short leave before reporting to Ft. Leonard Wood. WA6MIDL has sold his gear and joined the Air Force. WB6DGJ got married and has a new QTH in Eureka. WA6WPO has a new HW-12 rig for s.s.b. WA6RQJ, WA6NDZ, WB6CKT and W6ARQ reported many trackings of Oscar III. WB6CKT and W6ARQ report hearing all call areas plus VE-, KL- and KH-Land via Oscar. The HAMS club in San Francisco is working on up-dating its emergency plan. ZLINH was the guest of W6HST up on Mt. Tamalpais in March. WB6GVI has a Navy RBC-5 receiver and plans to be on s.s.b. this fall. OO W6GQA was a big help to a Novice seeking help with a harmonic problem. New members of the AREC are WB6LRN, WN-6MPJ, W6CXU and K6BAQ. W6UDL and XYL WA6-ALK have new antennas up and W6UDL is checking into the traffic nets. WB6KHI got a Public Service award for handling emergency traffic from Chile. W6-FDU lost out on school and activity when an appendectomy caught up with him. K6LHN plans to desert c.w. for s.s.b. with an SR-160. The Marin Club put up a new antenna for W6SG. Ken Manders is the Field Day chairman for the HAMS club. W6PPB and K6VID are the all-hands staff at the transmitter of KVIQ-TV at Eureka. W6AFQ plans to retire in August and has bought a new transceiver for his travels. K6GGI, at age 74, still is going strong and stands by for emergency work during the day on the emergency frequencies. Traffic: W6YKS 31, WB6GLD 26, W6UDL 10, WA6AUD 8, WB6GVI 6, WB6KHI 4, W6GQA 3, W6-ARQ 2.

SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6JPU—K6M5M is building a repeater to put on Mt. Breckenridge to link Los Angeles with Bakersfield on 2-meters f.m. WB6HVA is on 20-meter c.w. WB6LTI is on 75-meter s.s.b. with an HT-37. W6KTW made 259 contacts on c.w. during the last contest. W6QMJ is on 2 meters, and the following are heard regularly on 2 meters: WB6ELQ, WA6SQI, WB6HCN and WB6NSZ. WB6ETQ was busy tracking Oscar III during every one of the passes, and was able to hear it every time. W6-PXP has a Galaxy III mobile. W6JPS has a transmitter on all bands in his house trailer. WA6SCZ and W6NKJ are on 2-meter f.m. W6FUA has a Swan 350. W6JUK was heard on 75 meters using a Swan 350 also. W6NTK has a TR-3 and is active on s.s.b. W6OHT has the S/Line and is heard on 75-meter s.s.b. W6TRP is mobile with a Swan 350. WA6TQL ran into a little tough luck, installed the traps backwards on his beam and had to be taken down. W7AFM is now W6-AKU and is located in Fresno. W6QFR is chasing the hum in his receiver. The Fresno Radio Club parked its trailer in a shopping lot and handled 45 messages with WA6RYN, WB6HVA and W6ADB assisting. Traffic: W6ADB 150, WB6HVA 108, WA6VFN 94, W6ARE 3.

SANTA CLARA VALLEY—SCM, Jean A. Gmelin, W6ZRJ—Asst. SCM, Ed Turner, W6NVO, SEC: WA6-HVN, RAI: W6QMO, V.H.F. PAM: WA6RRH. The Santa Clara Valley Section Net reports 22 sessions,

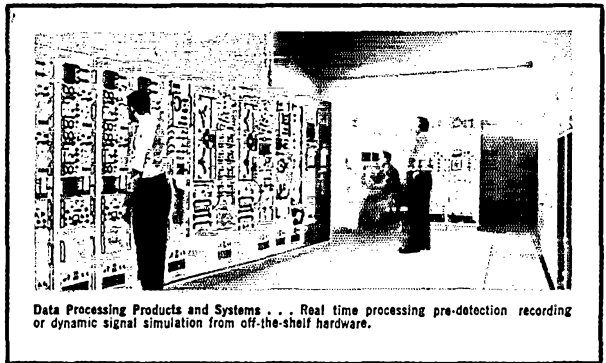
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QNS of 78 and traffic of 32. Net manager WA6RRH reports that activity is picking up and that other stations from outlying sections are now checking in. A Section Net certificate was issued to WB6FES, W6IBW. Palo Alto FC, sends in newspaper clippings from the Palo Alto paper on Oscar Headquarters operations at Foothill College in Los Altos. Included is a fine editorial on amateur radio as a result of Oscar work. The March meeting of the SCARS featured a talk on ancient civilizations of Central America. The PARA is making progress on its new communications trailer project. W6RSY reports that NCN operation is picking up and that the net is operating very efficiently. W6JNK is active from Daly City and sports some "mitee fine" c.w. and RTTY gear as seen on a visit by W6ZRJ. W6AGR is an active ORS from Menlo Park working NCN. RN6 and PAN. W6VZT is handling the Golf Tournament for the National Convention. WA6HVN is holding down as SEC while busy with program and other matters for the National Convention. K6LDYX reports that WA6YGV is the new call of the Naval Postgraduate School station in Monterey. Operation is mostly on 15- and 20-meter phone. W6YBV works RN6 and NCN. W6PHS and W6QMO are heading up a tape punch team of ten RTTYers who are transposing Oscar III data reporting forms into TTY tape which will be used to feed the computer at Foothill College. The effort is sponsored by NCARTS. Jeri also is active as RM and busy with plans for the traffic exhibit for the National Convention. W6DEF handles traffic reporting for the NCN and puts out a nice monthly net report. W6ASFI is active with Oscar communications. WA6JSA, ORS, is working on RTTY autostart and operates in the Oscar RTTY Net. W6AUC is chairman of the board of the Northern California Chapter of the QCWA. The group is planning a breakfast for the National Convention. Russ is active as OO, ORS and OPS. K6MTX works the RATS Net and is glad ARRL is attempting to make better use of NCEP. W6SAW is active as OO and now sports an S/Line. K6YKG is working on improving code speed. K6LPZ, EC for Hollister, now has the 2-meter beam up and is attempting to work into the Bay Area. Bob works MTN and reports c.d. activity slow. K6PJW, EC for San Mateo, reports that the group's 20-meter net is much more successful than the 10-meter operation. W6YHM is making extensive station repairs and will have some new gear on completion. K6EQE operates MTN. Traffic: W6RSY 745, W6JXK 332, W6AGR 202, K6DYX 197, W6YBV 190, W6QMO 171, W6HC 07, W6DEF 66, W6ASH 26, W6ZRJ 25, WA6JSA 22, W6AUC 13, K6MTX 7, W6SAW 6, K6YKG 5, K6LPZ 4.

ROANOKE DIVISION

NORTH CAROLINA—SCM, Barnett S. Dodd, W4-BNU—Asst. SCM: Robert B. Corns, W4FDV, SEC: W4MFK, RM: W4AFJM, PAM: W4AJT, V.H.F. PAM: W4HJZ, WA4ICU says he has completed his spring antenna system overhaul. W4HJZ reports that Oscar III caused a big rise in 2-meter interest this month. Stations known to have made QSO via Oscar include W4BUZ, K4MHS, K4QIF and K4YYJ. K4BGN had to resign as THEN, net manager because of conflict with his work; K4WLV replaces him as net manager. W4EVN says the Lumber River Radio League is being reactivated. K4EX says he is trying out s.s.b. but still likes c.w. best. W4AFJM is Field Day chairman of the Triangle Radio Club and says his DXCC is now 109/92. K4TTN says that after putting up a new 20-meter dipole his first two contacts were in Italy. WA4-GMB reports the Lenoir-Green County AREC Net averages 12 stations checking in each Sun.

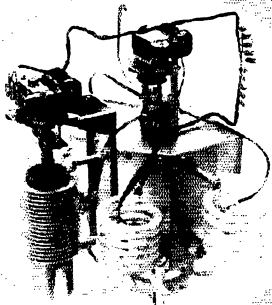
Net	Freq.	Time	Days	QTC	Manager
NCN(E)	3573 kc.	2330Z	Daily	250	K4CDZ
NCN(L)	3573 kc.	0300Z	Daily	128	WA4ANH
NCSSBN	3938 kc.	0030Z	Daily	122	WA4LWE
THEN	3865 kc.	0030Z	Daily	59	K4WLV

Traffic: W4LEV 3386, W4EVN 298, K8NPT/4 282, W4LWZ 233, WA4PDS 224, W4IRE 168, W4BDU 86, K4CDZ 75, WA4LWE 70, K4TEX 68, W4UWS 57, K4CWZ 53, WA4-ICU 50, WA4PYJ 45, WA4BYF 41, WA4ANH 39, WA4-FJM 35, WA4TJE 32, K4EO 26, K4TTN 25, WA4VTV 20, K4GNX 19, W4CGO 18, W4BNU 14, K2OQO/4 11, K4QDO 5, WA4GEU 3, W4AJT 2, W4BAW 2.

SOUTH CAROLINA—SCM, Charles N. Wright, W4-PED—SEC: WA4ECJ, RM: WA4PFQ, PAM: K4LJN (s.s.b.), K4OCU (a.m.).

Net	Freq.	Time	Sess.	QTC	QNI
SCN	3795 kc.	Daily 0000Z and 0300Z	39	43	—
SCEN	3820	Daily 0030Z	30	18	204
SCSB	3915	AI-F 0100Z	—	—	—
		Sat. Sun., 0000Z	—	253	1388
SCFN	3930	Sun. 1330Z and 2030Z	—	—	—

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B. Will really match the 50 ohm output of my rig. (His linear is fussy about this.)

C. Will pass inspection by fussy neighbors and XYL.

D. Won't take any space in my back yard.

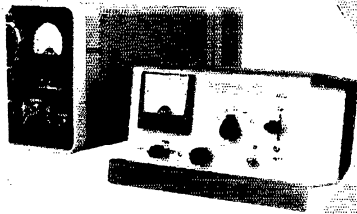
E. Doesn't attach to my new house.

F. Won't occupy any space on my already crowded operating position.

G. I can tune and change bands without moving from my chair. Doesn't dump all the power in traps, poor grounds, water pipes, roof gutters, etc.

H. Drags in Real DX.

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City State

The Aiken Club received local publicity on receipt of a Public Service award for Hurricane Cleo operations. The State Radio Council plaque for high score in the 1964 Field Day was presented to the Spartanburg Radio Club. Sixteen prospective Techs. are taking the radio course in Aiken County. W4NTO receives Oscar III with a new 417A converter; no luck with QSOs so far. W4JA received his second QST cover plaque for his Jan. article on diode rectifiers. New appointments: W4-MAF, W4AZT as ECs; K4JVV, W4WQM as OPSs. Traffic: K4LNI 85, W44PFQ 84, W4AKC 68, K4BBI 57, W4PED 43, K4OCU 34, K4LND 24, WA4NHC 23, WA4QKQ 17, W44OWY 15, WA4JHD 11, W4CXO 10, W4NTO 10, W4JA 7.

VIRGINIA—SCM. Robert L. Follmar, W4QDY—Asst. SCM and SEC; Harry J. Hopkins, W4SHJ, PAM: W5VZO/4, RMS: W4ZM, W4AEUL, W4SHJ, W4QDY, VSRN Mgrs.: K4SCL and W4OKN, VSAM Mgr.: W4-UXL, W44FCS again is on the air with an Eldico s.s.b. rig. W4OWE is running a PL175 at about 600 watts, VSN Mgr. W44EUL is waiting for his new Mustang car. W44DAI checked into 50 NTS nets during March. W44JGA now is using a DX-100B, VSAM Mgr. W44UXL got his tower back up into the ozone. VSRN Early Mgr. K4SCL is building a Heath 6er and has received his 35-w.p.m. CP Award from Hq. W4-RHA is complaining about a low traffic total of 143 messages. K4GRZ reports that BRSN is doing somewhat better; he also is going to help W4ZM with the VN. W4PTR has the tower back up with the beam. W44EHM has been appointed member of the ARC Disaster Committee. EC K4MKO assisted the local sheriff in locating a missing child using 10 portables and 1 base station. W4JXD reports many new joiners in the ARPSOC, the oldest 65, youngest 13. Area 1 EC K4ASU has gained 2 new assistants. Bud has an SR-150 and a Hustler in mobile. The VN Mgr. reports a nice visit by Div. Dir. Anderson, W4MWH, with the PVRC. W4YZC met Andy there after QSOing with him for eleven years. PAM W5VZO/4 gave brief talks to the NVRC and Vienna Wireless Society on NTS and ARPSOC. W44SGD has continued antenna trouble and now is using his 32nd antenna in 4 months! W4DVT worked 40 countries and made WAC on 3.5 Mc. in the DX Contest. W44JXO worked 8 Europeans on 80-meter c.w. with 75 watts and a dipole. W4UJ enjoyed the YL-OM Parties, received YLCC/400, and has issued over 300 Va. Civil War Awards. K4VCY has a KW1-2. K4ITV is building a new house. K4LMB was elected president of the Washington Mobile Radio Club. K4-LJK finds time from V.P.I. to handle traffic. W4OKN now is sporting Va. Cradle of Dem. Award No. 276. Traffic: (Mar.) W4NTR 339, W4DVT 263, W4NLC 213, K4SCL 190, W44UXL 187, W44EUL 177, K4GRZ 158, K4NCP 153, W4RHA 143, W4MKX 105, W44AYP 102, W4OKN 101, W44DAI 90, K4LJK 88, K4ITV 74, W4-SHJ 87, K4FSS 62, W4ZM 58, W4QDY 54, K4YCH 51, W5VZO/4 46, W44FCS 42, W44FCS 42, W44EHM 40, W4ZAU 39, W4TE 35, K4MXF 34, K4PIK 32, W44JXO 28, W4JXD 21, W4UJ 17, K4VCY 16, K4ASU 14, K4-SDS 14, W4MK 13, K4LMB 11, W4LK 10, W4KX 9, W4OWE 9, W4PTR 9, W44JGA 8, W4BZE 7, W4WRG 7, W4ZMT 6, W44JRY 4, W4WBC 4, W44KVR 3, K4-LFP 3, W44HBC 2, K4NOV 2, W44SGD 2, W4YZC 2. (Feb.) W4JXD 47, W44FCS 39, K4VCY 12, W4LK 6.

WEST VIRGINIA—SCM. Donald B. Morris, W8JM—SEC: W8SSA, PAM: K8CHW, RM: W8LMF, S.S.B. Net Mgr.: W8EEO, West Virginia Nets meet on 3570, 3890, 3903 and 3905 kc. W48IMY, net mgr. for WVN (c.w.), reports 24 sessions, 101 stations and 66 messages. W8DRU's 100-watt 6-meter rig in April QST makes excellent reading. K8WWW now is AEC in Kanawha County. K8CHW reports for WVN (phone), 23 sessions, 610 stations and 87 messages. For WVN (PON), K8TPF reports 22 sessions, 166 stations and 131 messages. W8-KGU likes NCS work on WVN (phone). With the fine cooperation between WVN PON and c.w. nets and a well-attended c.w. meeting Charleston has boosted net activity. W8IRN is a new OBS. K8TPF now is Radio Officer for Randolph and W8NDY is RO for Upshur County. The Wheeling Area EC Net is in operation on 29.6-Mc. f.m. K8UHC is well pleased with the new 6-meter converter. W8HZA reports the Kanawha Radio Club has issued 46 Worked West Virginia awards. K8KZR is the new EC for Jefferson Co. W8EEO reports s.s.b. activity is high and more stations are checking into the net with new equipment. Remember: The Huntington-Tri State Picnic, June 6 and the State ARRL Convention, Jackson's Mill, July 3 and 4. Traffic: W8AKUW 249, W8AFC 230, K8TPF 150, W8CKX 72, W8IMY 63, K8WWW 62, K8KST 35, K8CHW 25, W8HZA 21, W8KGU 6, W8AFC 5, W8DAU 4, K8-WM9 4, W8ALI 3, W8SSA 3, W8VOI 3, W8ACP 2, W8AGRE 2, K8ZDV 2, K8BIT 1, W8ANDY 1, K8PJS 1, W8WEH 1, K8ZPN 1, K8ZWM 1.

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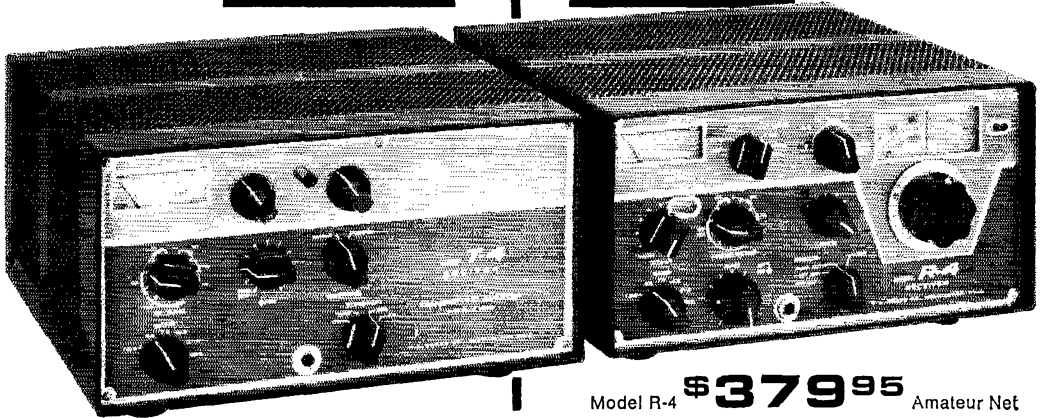
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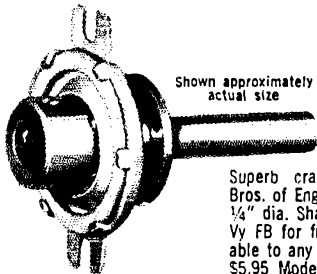
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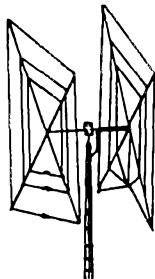
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ROCKY MOUNTAIN DIVISION

COLORADO—SCM, Donald R. Crumpton, KOTTB—SEC W0SIN reports that skip conditions have improved, thus helping all net operations in the state. The main topic of conversation on the ham band seems to be about the new FCC proposal, Docket 15928, along with Colorado House Bill 1192. Most hams seem to wonder why the segregation on the ham bands while we fight it in the South. One of the questions I have been asked many times of late is, "Give me the definition of ham radio or amateur radio." The exact answer to this is not at my finger tips. If we take the word "amateur" just what does it mean? How would you explain the word to someone? Are we getting completely away from the concept of amateur in today's modern radio? In most things you go from amateur to professional but in what spot does this put amateur radio? I for one am 100% for incentive in everything and feel that we need it in ham radio, not a class distinction but the honest desire to improve one's self. To me this is the real incentive. I know some smart people who don't have a sheepskin to hang up. My recommendations are to reexamine every licensed amateur for the class he holds. If he still is qualified the ticket should be reissued. If not send him home to study. Net traffic: Columbian Net: 277. Traffic: K0ZSQ 141, K0DCW 103, W0SIN 33, W0CVS 4.

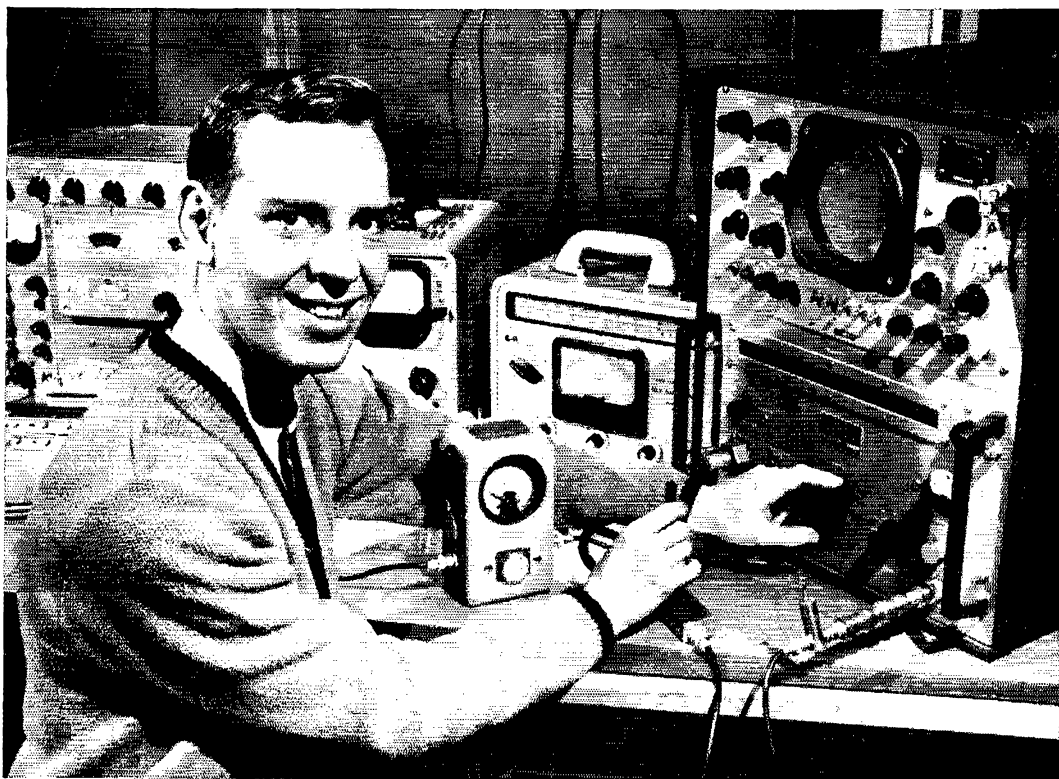
NEW MEXICO—SCM, Newell Frank Greene, K5IQL—Asst. SCM: Kenneth D. Mills, W5WZK, SEC: K5-QIN. This report is sent in early this month, and some of the last-minute reports will be missed. Several clubs were hosts to W0BWJ, our Division Director. Club brought a fine program and lively discussions of the new FCC docket were enjoyed. K5WJW is sporting a new TR-3 mobile. W5BZB startled the Breakfast Club by going s.s.b. The Roswell group auctioned off W5-QKG's "junk box" and raised quite a sum for the widow. Any group wishing to sponsor a state hamfest or picnic, step forward two paces. W5FLG is busting 10 wide open with his mighty 2-watt converted CB rig. W4NKQ/5 is now on 40 from his new QTH in Alamogordo. W5LZX has joined the ham ranks in Tuos. Ash was a native of Los Alamos long before the atomic crew arrived. Traffic: W5WZK 49, W5UBW 42, W5FLG 23, W5LCU 23, W5FPL 17, K5VXJ 6.

UTAH—SCM, Marvin C. Zitting, W7MWR/W7OAD—Asst. SCM: Richard E. Carman, W7APY, SEC: W7-WKF. Section nets: BUN meets daily at 1930Z on 7272 kc.; UARN Sat. and Sun. at 1500Z on 3987.5 kc. W7VSS reports that activity in the Ozden ARC continues to grow. W7RQT has a sixteen-element beam and 20 watts on 2 meters. W7BCL has a new NCX-5 and a new tri-band beam that was put up with the help of K7FST, K7ZRD and W7ADK. W7WQC is back on the air after a long absence. K7TEO soon will leave on an LDS Church mission of W2-Land. K7RAJ won third place in a science fair with his home-brew 6V6 rig. K7SDF is working out FR with an HT-37. K7ERR advises that the Bountiful AREC Net meets at 1900 MST on 146 Mc. each Mon. K7CLS moved to a new QTH in Clearfield about 50 yards from K7JVF! K7SAI has been working DX with 60 watts. W7POU has worked 113 countries and is looking for more. K7-EZR has earned the HUN certificate. Traffic: W7LQE 78, W7OCX 68, W7VTJ 29, W7MWR 8, K7SDF 8, K7ERR 6, K7TEO 4, W7ADK 2, K7SAI 1.

WYOMING—SCM, Wayne M. Moore, W7CQL—SEC: W7YWE, RM: K7IAY, PAMs and OBS: W7TZK and K7SLM. Nets: Pony Express, Sun. at 0800; YO, Mon., Wed., Fri. at 1830 on 3610; Jackalope, Mon. through Sat. at 1230 on 3920 kc. I visited the Casper V.H.F. Society in March and was very favorably impressed with the interest taken in the technical and building aspects of ham radio displayed there. W7YTB gave a very informative talk on oscilloscopes. The Casper Radio Club had a very well-attended pot-luck dinner in March. A couple of new voices on the air—W7BFO of Cody and W7BJZ of Casper. W7TEL has had to resign as EC because of heavy work load and anticipated traveling outside the state. Another reminder to get your group together for Field Day and compete for the trophy being given this year. The program is shaping up for the Annual Hamfest July 3-4 on Casper Mountain. Traffic: K7SLM 51, K7TH 40, K7IAY 26, K7POX 22, W7NKR 21, W7TZK 8, K7VNF 8, K7GBX 4, W7GOJ 4, K7HBB 4, K7VTM 4, W7AEC 2, W7CQP 2, K7LOH 2.

SOUTHEASTERN DIVISION

ALABAMA—SCM, William S. Crafts, K4KJD—Asst. SCM/SEC: William C. Gann, W4NML, RM: W4EXA, PAMs: K4NSU and K4WHW. Several Alabama stations



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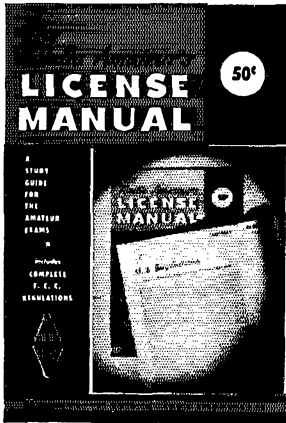
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report experiments with Oscar III. W4ATAJ is a new General in Tuscaloosa and W4AWLD a new Conditional Class licensee in Athens. Had an FB visit with the Mobile Club Mar. 19. The AENO had a picnic Apr. 11 at Springville. RN5, which includes Alabama was top regional net in 1964. April QST shows W4NML 100% in SEC reports for the second year. He hasn't missed a report since becoming SEC. W4NML is a civilian after 20 years in the army. W4ASBD has a new SB-300. W4RLS has a new antenna Christmas tree. March net reports (times GMT):

Net.	Freq.	Time	Days	Sex.	Att.	Att.
					Tfc.	QNI
AENB	3575	0100	Daily	28	4.8	7.6
AENI	3965	0030	Daily	31	7.1	49
AENP	3955	1230	Mon.-Sat.	26	2.3	14.1
AENP	3955	2100	Daily	35	3	16.5
AENR	50.55	0115	Wed./Fri.	11	1.2	24.1
AENT	3970	1630	Daily	34	.79	6.38

AENP evening session and AENT NMs report attendance on the upswing. W44CNH has a new Clegg 99er. Remember the SEC cup for the group with highest Field Day score. Traffic: (Mar.) W44WS 190, W44EXA 131, K4NUW 103, W4NML 74, W4YNG 57, K4WHW 56, K4BSK 51, W44HKZ 45, K4WOP 44, W44HFE 40, W44-FJF 26, K4GXS 26, K4KJD 24, K4NSU 12, W44TK 11, W44EBS 10, K44JF 8, K4FZQ 7, K4ANB 4, W4YRM 3, K4VJL 2. (Feb.) W44SSB 133, W4YNG 46.

EASTERN FLORIDA—SCM, Albert I. Hamel, K4-SJH—SEC: W4IYT, RM C.W.; W4LUV, RM RTTY; W4RWAI, PAM S.S.B.; W4OGX, PAM 40; W4SDR, PAM 80; W4TUB, PAM V.H.F.; W44BMC. Congrats to all who put in so much time with Oscar III and came up with some outstanding results from what I hear. Now let's get with Oscar IV. Who needs it for long haul? The U. of Fla. Engineers Fair produced some heavy traffic for W4DFU. Red Cross ARC, K4-IWT, with AC W4IYT at the helm, did the usual good job of obtaining some favorable publicity for ham radio with stations set up in Dade County. Let's continue in orbit on good public relations. If they know we are there and ready they will use our facilities. How so many hams can be so misinformed so often on so many subjects at one time, and on the air yet, amazes me. Last blast was a comment on the FCC incentive licensing proposal even before the docket information was widely distributed, just after the ARRL Bulletin was sent. Wonder how many red faces were evident after the true dope was released. Sounding off on pure conjecture can be most embarrassing, not to mention the harm it can produce by influencing the thinking of others. Why not button up until you know the score for sure. Traffic: (Mar.) W4DFU 1029, W44BMC 687, W4-KIS 662, K4YSN 412, W41AP/4 332, W44NEY 301, W44VZD 256, W44BAW 207, W44LHK 190, K4BY 188, W44OAO 177, W44JH 158, K4SJH 149, K4COO 148, W44CIQ 136, W44IWO 125, W44BGW/4 118, W4LUV 117, W44FGH 115, W4SDR 99, K4QAY 96, W4AKB 87, K4VNG/4 79, W4TRS 78, W4ACOR 65, K4DAX 64, W4-NBT 64, K4LB 57, K4KDN 54, K4BNE 53, W44QLZ 52, W4OGX 47, W4EHW 41, W4GUJ 41, K4IWT 37, W4-WHK 36, W44JWS 33, W44TZC 33, W4FP 32, W44YD 26, W4IEI 26, W4IE 25, K4YOQ 25, W4MVB 24, W44-RXG 24, W44SCM 24, W4SMK 24, W4BKC 22, W44NBE 22, W4IYT 20, W4QBY 20, W4TJM 20, W44YG 19, K4-ERE 15, W44JZT 15, W44FVP 11, W4SCY 11, K4MTP 8, K4JZI 4, W44PWF 2, W4VWL 1. (Feb.) W44LHK 81, W44COR 56, W4IYT 32, W4FWZ 27, W4QBY 23, W4BKC 20, W44DFZ 10, W44VMT 8, W44JZT 7, K4OSQ 2.

GEORGIA—SCM, Howard L. Schonher, W4RZL—SEC: W4SAZ, RM: W4DDY. PAMs: W4EHT, K4-YZE, K4PKK. The North East Georgia Emergency Net meets each Sun. at 1300 GMT. GTN meets on 3718 kc. at 2200 GMT; Ga. S.S.B. Net at 0100 daily on 3975 kc.; GSN at 0000 and 0300 GMT daily on 3595; the Savannah River Net Sun. at 1800 GMT on 3805 kc.; Georgia Cracker Net on 3995 kc. Sun. at 1300 GMT. The Georgia State ARRL Convention will be held in Atlanta June 5 and 6. A fine program has been planned so be on hand and enjoy the activity. Cobb County AREC Nets meet on 145.350 Mc. Wed., Fri. and Mon. at 0100 GMT. W44VMF is doing a little hauntings in between school activities. W44PSA was first in phone and third for c.w. in the Tennessee QSO Party. W4HYW was unable to make the Columbus Hamfest because of work load. K4FRM worked in the DX Test and hopes to get the antenna up for 75 and 80 again. K4KHH reports good signals from Oscar III. K4YZE also reports good results. K4JCK returns to Griffin. A new call is W44-UET. W44JSU hosted the Ga. S.S.B. Assn. board and net controls in May. W44GAY placed first on c.w. for Georgia in the Tennessee QSO Party. Traffic: W4SAZ 315, K4FLR 208, W4DDY 167, K4MCL 107, W4RZL 110.

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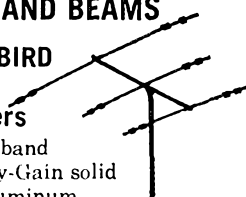
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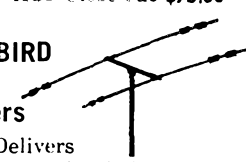
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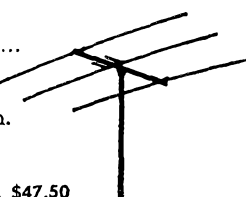
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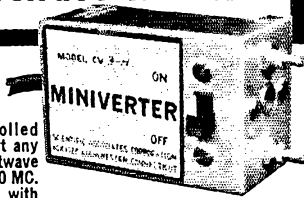
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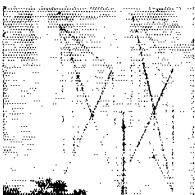
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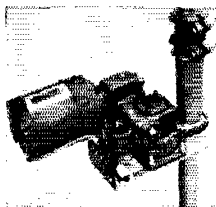
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For Safe, Easier, Installation**

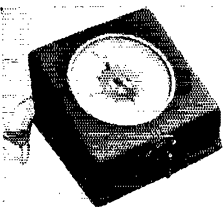
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WESTERN FLORIDA—SCM, Frank M. Butler, Jr., W4RKH—SEC: W4MLE, PAM: K4NMZ, RM: W4BVE. Section net reports:

Net	Freq.	Time	Days	Sess.	QTC
QFN	3651 kc.	2330-0300Z	Daily	62	615
WFPN	3336 kc.	2300Z	Daily	31	201

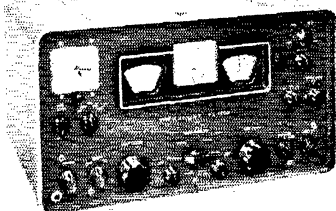
Pensacola: W4GPH retired recently after many years as editor of the Pensacola Journal. K4BZJ, W4OOW, W4-SRM and W4UCY are heard on 29,560 kc. W4UUF, K4FTI and W4LLM work into Ft. Walton regularly on 145.2 Mc. K4SMB is selling his linear and going QRP. K4BDF, K4COV and W4BYI handle traffic for the Weather Bureau on 3836 kc. Fort Walton/Eglin AFB: While visiting Eglin, K7UGA, Barry Goldwater, was presented with honorary membership in EARS by club officers K1CTG, W4VMR, W4MMW and W4RKH. W4-TFL says his fine traffic total cost him many hours of sleep. W8WDD built a co-linear 2-meter antenna which works FB. WA4WAX joined the 2-meter gang. WA4HWX and WA4ABP are the 2-meter DX men. Panama City: WA4-NRP has a BC-221 going. He and WA4IMC worked Ft. Walton with their ground planes on 2 meters. K4VFT has a new 2-meter rig under construction. W4FOX set up a station to track Oscar III, Port St. Joe: K4LQQ and W4WEB mobiled to Atlanta for the Third Army MARS meeting. Traffic: (Mar.) K4VPY 935, W4TFL/4 512, W4BVE 170, W4MLE 105, W4EQQ 56, WA4JIM 38, WA4NVG 8, WA4NRP 6. (Feb.) K4VWE 54, WA4JIM 43, W4TFL/4 43.

SOUTHWESTERN DIVISION

ARIZONA—SCM, Floyd C. Colvar, W7FKK—SEC: K7N1Y, PAM: W7CAF, RM: K7TNV, OES W7AYY is experimenting with antenna polarization on 144 Mc. W7WGW is working with the U.S. Geological Survey Branch of Astrogeology Electronic Laboratory assigned to the Apollo Project and is also Coconino County C.D. Radio Officer. WB6FHH/7 is returning to California. Asst. Director K7VOR attended a meeting in Los Angeles with Southwestern Division Director Howard Shepherd and ARRL General Manager John Huntoon. The annual picnic and baseball game between Phoenix and Tucson was held in Casa Grande with Phoenix the winner. The Arizona Amateur Radio Club provided communications for the Arizona Horsemen Assn. Stations providing mobile communications were W7CAF, W7EBI, K7SXQ, W7UXZ, W7CBB, K7PLO and W7-EBI who also provided an airplane to be used in case of an emergency. W7WGW has a new SBE-33 transceiver. W7DDC has resigned as president of the Scottsdale Amateur Radio Club because of a heavy work schedule. Southwestern Division Director W6QJW spoke to Phoenix Area amateurs at a very informative meeting hosted by the Arizona Amateur Radio Club. The Tucson V.H.F. Net meets Sun. at 0200 GAIT on 50.350 Mc. Active stations are K7EBW as NCS, K7YNC, K7-VUB, W46KBD/7, K7VAB, K7ZCC, K9HDQ/7, WA7-ASJ, K7AHE, W47AVY/7, W0DR0/7, K7RME, K7-QLD. Traffic: WB6FHH/7 341, K7NHL 176, K7VTY 67, W7FKK 41.

LOS ANGELES—SCM, John A. McKowen, W6FNE—Asst. SCM: John Vaidean, WB6JGA, SEC: K6YCN, RMs: W6BHG, W6QAE, WB6BBO, PAM: W6ORS. The BPL Grabbers Club had six visitors in March with K6WAH, K6EPT, W6GYH, WB6BBO, WA6WTK and K6MDD, in numerical rotation, doing their usual fine job of running up points. I want to thank everyone in the Los Angeles section for making my term in office a very enjoyable one. I have been fortunate with all of the assistance afforded me from all sides and appreciate your patience and understanding. Please keep up the good work and assist the new SCM as well as you have me. K6WAH is now NCS of the North American S.S.B.

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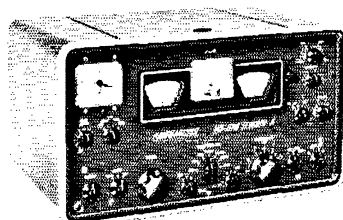
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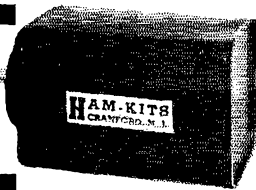
	Model	Input mc.	Output mc.	Price
2M	300-D	144-148	50-54	\$12.95 ppd.
	300-E	144-145	6-1.6	\$12.95 ppd.
	300-F	144-146	28-30	\$12.95 ppd.
	300-Q	144-148	14-18	\$12.95 ppd.
6M	300-B	50-51	6-1.6	\$12.95 ppd.
	300-C	50-54	14-18	\$12.95 ppd.
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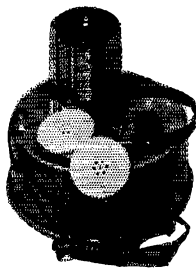
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Net on 20. W6GYH has been forwarding K6LJ's report from Hawaii. Stan reports that many Novices are heard in KH6-Land. K6MDD reports the Salvation Army Disaster Net has moved to 50.5 Mc. W6QAE reports that Mar. 25 was a record day of 25 check-ins for SCN. WA6TWS still is homebrewing. (Radio gear?) WB6-BBH, of Torrance, is going into the gear-repairing business. K6HY is chairman of the L.A. Council of Radio Clubs Technical Committee. WB6AEL still is having Ranger troubles. W6SRE, the Happy Wanderer, stayed home long enough to get some work in on Oscar III and now hears beeps in his sleep. WB6GX1 reports that WA6WTK resigned as Asst. Mgr. of 8 Ball Six. K6UMV is busy getting the new SEVARC e.d. station set up. The following OOs turned in scores for the FMT: W6IBD 2.5, WB6BWZ 9.1, W6PCP 11.2, W6OZ 12.5, WB6YKP 15.4, W6PUZ 39.8, WB6JGA 91.4. The average for the stations reporting is 25.98 parts per million. Support your license rights. Check into your Local AREC Net or Southern Calif. Net. AREC skeds can be obtained from K6YCX, 2041 South Benson, Ontario, Calif. 91761. SCN meets daily at 0300Z on 3600 kc. Check in and meet a grand bunch of operators. Traffic: (Mar.) K6WAH 1006, K6EPT 910, W6GYH 704, WB6-BBO 676, WA6WTK 551, K6MDD 526, W6QAE 813, K6-IWV 196, WB6AKZ 122, WB6JGA 107, WB6KGL 61, W6YRA 55, WA6TWS 51, WA6WKF 44, WB6GGJ 36, WA6KVA 35, WB6BBH 34, W6BHG 25, W6FD 25, K6LJ 25, W6BFPQ 23, W6MLZ 14, K6HV 11, W6PCP 8, W6MFP 6, WB6AEL 5, WB6GX1 4, W6HUJ 4, W6SRE 4, W6LVQ 2, (Feb.) WA6WTK 327, W6BFPQ 87, WB6-AKZ 14, K6UMV 11, WB6BBH 10, WB6GX1 7, (Jan.) WB6AKZ 19.

ORANGE—SCM, Roy R. Maxson, W6DEY—San Bernardino Microwave Society, Citrus Belt ARC, Riverside City ARA, Fullerton RC, OCARC and Anaheim ARA were visited in March. The good wishes for the new section are deeply appreciated. K6YCX, our SEC, reports on the proposed 2-meter repeater on "Blue Ridge" which should have good section coverage. WA6CXB gives 246 Net information and Oscar data. W6FB has a new grandson and operated W7OX in Reno recently. He also advised of the sudden passing on Feb. 23, of W6HCI, pioneer ham of Palm Springs. He will be greatly missed. W6DGM and W6VAA were at the IEEE NYC show. A nice OO report was received from W7-SMB/6. WA6ROF has a G-76 mobile. WB6ITM is moving to Carmel. The 246 Net meets on 145.08 Mc. at 1845 PST daily; the Orange Net on 145.62 Mc. at 1830 PST daily; the AREC on 3965 kc. at 0900 PST Sun. Traffic: W8ZJB 812, K6MCA 613, WA6DFT 288, K6IME 73, W8DNA 28, K6YCX 17, WA6CXB 16, W6DGM 6, W6CK 6, W6WRJ 2.

SAN DIEGO—SCM, Don Stansifer, W6LRU—A number of the local v.h.f. gang are helping track Oscar III. W6VNQ, ORS in Solano Beach, received his CP-35 certificate. W6HLN joined the Silent Keys in March. He was a member of the Palomar Radio Club, and helped many amateurs in the North County area get started. Guest speaker at the March meeting of the San Diego VHF Club was Division Vice-Director W6ECP. The April meeting featured a talk by W6CMQ, the outstanding amateur TV experimenter in Southern California. WA6-TAD has compiled a directory of fixed frequency f.m. and a.m. amateur nets in California operating above 50 Mc. About 60 local hams turned out to honor W6AIW, who recently retired from the local FCC office. The April meeting of the San Diego DX Club was held at the home of W6ZWK. W9WNV was guest at the clubs' March meeting and showed slides of his latest DXpedition. WN6OKX worked and confirmed 26 states plus KP4, VE and JA in two months as a Novice. ORS WB6KNN earned a WAC award. After Field Day your SCM will be operating WA6VUI from Mono County, and news for this column can reach me at Box 47, Route 3, Bishop, Calif. 93514. Traffic: K6BPI 439, W6IAB 2717, W6YDK 1822, WB6JUH 592, W6EOT 351, W6-VNQ 217, W6LRU 129, WB6KNN 63, WA6UUO 26, K6LKD 18, WA6TAD 15.

SANTA BARBARA—SCM, Cecil D. Hinson, WA6-OKN—RM: W7WST/6, W6DYQ reports that he soon will

►►► THE DXERS CHOICE 10-15-20 METER W2AU 2 EL QUAD ◀◀◀

A Complete Pretuned Quad (Not a Kit). Needs only 1-RG-8/U feed line for all 3 bands—no switching necessary. Bamboo Model W2AU Quad using husky Korean bamboo at your favorite dealer **\$54.95**

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ADVENTURER.....34		KNIGHT T50.....27
ANZ VFO.....32		KNIGHT VTVM.....20
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HQ170C.....217		KT320.....49
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(A small deposit will hold the unit of your choice on Lay-Away)

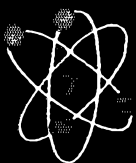
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start on-the-air code practice runs for the Santa Maria area. Frequencies and times will be reported in this column when the details are worked out. K6LBY has been out of town a lot but caught the last CD Party and racked up a nice score for Santa Barbara on c.w. The Santa Maria amateurs will have a station on the air during their First Annual Hobby Show May 22 and 23, reports WB6DPV. WB6KEH has been operating from Cal. State Poly with his Swan 350. Bill writes that the Poly club station, W6BHZ, is active with equipment for 2 through 160 and 35 full members. K6VBC has his power supply finished and is ready to put his loudspeaker on the air. K6AAK got a new tower and has his antenna system in the air at last after a previous unsuccessful attempt. It must be about time for the Santa Barbara gang to host a breakfast for the gang since the last half-dozen have been in Ventura County. Traffic: W7WST 181, K6AAK 12, WB6DPV 6.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. L. Harbin, W5BNG—Asst. SCM: E. C. Pool, W5NFO. PAM: W5BOO. RM: W5LR. The Midland Annual St. Patrick Day Hamfest, March 20-21, was very fine with more than 535 attending. W5NFO won the "Outstanding Amateur" Award for the year. The hidden transmitter hunt was won by W5EXB. W5DCW won the home-brew contest with a 2-meter receiver. The code contest was won by W5CLS with perfect copy at 25 w.p.m. W5OHF won the Swan-350. Jim complained because there was no power supply with it, but that is to be expected from a Texas Rebel. The El Paso ARC was represented by 22 couples extending an invitation to attend its hamfest. I was honored by this group when my name was placed on a birthday cake for members with birthdays on March 20-21. Other hamfests scheduled for this summer are Odessa, June 6 and Belton, June 20. The Arlington ARC, in its club paper, asks some questions that should make us all think: "What are you doing to help improve your club and what are you doing to help improve amateur radio?" W5EVS has qualified as ORS. K5BDX recently moved to Ft. Worth from Odessa and is now on the air with a Globe Scout and a Hi-Gain vertical. Don't forget that July 15 is the deadline for filing comments on the FCC Notice of Proposed Rule Making, Docket 15928. The original and 14 copies are required when making comments to the FCC. Traffic: W5CVB 180, K5DEJ 160, W5YSK 146, W5VFM 109, W5EGZ 64, K2GKK/5 38, W5LJ 21, K2ETU/5 20, W4OSG/5 10.

OKLAHOMA—SCM, Bill F. Lund, K5KTV—Asst. SCM: Cecil Andrews, W5MFX. SEC: K5DLP. We are happy to hear that W5UZX is out of the hospital. W6MJA is a new station in Warr Acres. W5EHC is enjoying operating 144 MHz after a long lull. K5VWQ is sporting a new station wagon. I would like to compliment W5UYQ and W5VNC on their fine work in getting the Senate Bill amended where amateur radio operators could still use customary telephone relaying in their emergency work. K5UPV/KG6 upgraded his license from Technician to General Class and is serving as c.w. operator on Guam for the Navy. New hams in Bartlesville are W46MGQ, W5NLNT and W4OHT. W5JKS has been helping his XYL with her "one man" Art Show. It looks like everyone is getting ready for Field Day. It appears my kidding K5BBA about using green ink in making his reports to me has raised a new friend, as W4ID wrote Bill about the green ink and sent me a carbon copy on green onion skin. The Oklahoma Storm Net already is getting a good workout as the storm season is on us. It looks like yours truly will be out of pocket most of the month of June and will not be on the air. I will be in the air most of the time and I haven't figured how I can get the ham gear in the plane. Traffic: (Alar.) W5PPE 512, K5TEY 397, W5NAIL 117, W5ABTQ 102, K5KTV 60, W5PAIL 45, K5DLP 40, W5UTQ 27, K5OCX 24, W5EHC 19, W5EQP 17, K5MTC 12, W5MFX 10. (Feb.) W5PPE 364, W5NAIL 108.

SOUTHERN TEXAS—SCM, G. D. Jerry Sears, W5AIR—SEC: K5RDP. PAM: W5ZPD. RM: K5ANS. Texas University Club station W5EHM is back on the traffic net. Texas A. & M. University Club station

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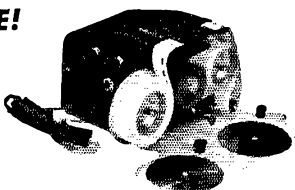
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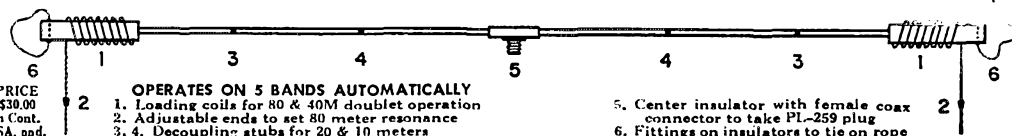
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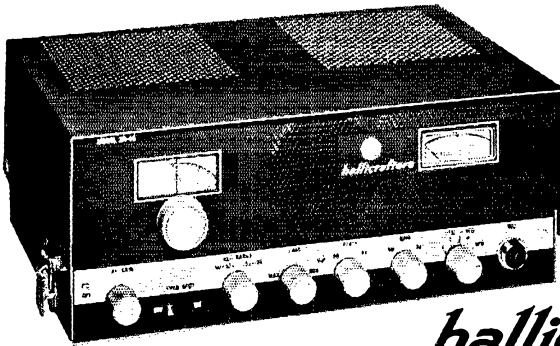
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W5AC is sponsoring code and theory classes again this semester with a class of 20. K5PNC is back home in Corpus Christi after major surgery in Houston. Also W5AF was reported in surgery. Wish you guys a speedy recovery. Many thanks to W9AEX for an FB job of relaying for the So. Texas Emergency Net C.W. section when skip is bad. W5ABQ is back on the job and reports the San Antonio Police ARC now has an FB relay service on 6 meters, incoming at 52.875 Mc. and output at 52.525 Mc., both 1.m., using 600 watts with an antenna up 250 ft. K5UQT is back on all bands. K6MZH has been assigned to San Antonio Civil Defense Communications. W3CVQ and W5BD are heard often on 160-meter c.w. having a ball and no QRX. W5UX still is climbing the DXCC list. W5TN and W5ZG keep 40-meter c.w. hot. Novices, get in touch with K5HZR, EC Bexar County. Lee wants to get a slow-speed net for Novices going. W5RIH, a real old-timer, is keeping very active on the amateur bands and also is coordinator for South Texas Navy MARS. K5MOF has a new Valiant. K5IHR, Bastrop County EC, landed in his own hospital after an auto accident. Slow it down, Doc, we don't want to lose a good EC and Field Day winner. Speaking of Field Day we are seriously thinking of operating from the home station with emergency power here at W5AIR. Congratulations to new appointees: W5ABQ and K5ANS as ORSS, K5EJL as OO. Traffic: W5AC 220, K5HZR 143, K5ANS 88, W5AIR 42, W5ABQ 37.

CANADIAN DIVISION

ALBERTA—SCM, Harry Harrold, VE6TG—SEC: VE6FK, PAM: VE6PV, ECs: VE6s SA, SS, AFJ, HB, ALL, RM: VE6AEN, ORS: VE6HR, OPSS: VE6s PV, HM, SS, BA, ADS, OOS: VE6s HM, NX, TW, TY, OBSs: VE6s HM, AKV, OE6s: VE6s DB, AKV. It is with sincere regret that we have to report another Silent Key, VE6GD, of Smalley's Radio Ltd. of Calgary. Jim was very well known by most hams in this section and will be missed very much. He was always ready to help his fellow hams in any way that he could and was very highly respected by all who knew him. The Calgary AREC has a very fine setup and is using the Calgary Tech. School as emergency headquarters. This was offered to them with all emergency equipment as they see fit with 31 kilowatts of power. Nice going, fellows. The Edmonton Club has promised to have a report next month. Red Deer is busy with the International Hamfest to be held at Waterton Lakes July 17 and 18. Get your tickets early, fellows. The Vulcan Radio Club held a class for exams the end of March. APN reports that the bands are improving. Traffic: VE6HM 184, VE6FK 85, VE6SS 19, VE6BR 16, VE6ADK 12, VE6ADS 8, VE6SU 8, VE6CG 7, VE6XC 2, VE6CA 2, VE6KS 2.

BRITISH COLUMBIA—SCM, H. E. Savage, VE7FB—The Slow Speed Net meets on 3700 kc. at 0400 GMT with VE7BMR as net mgr. Please support the net. The BCEN, 3750 kc., needs many check-ins with Victoria, Vancouver and so many places to clear traffic. VE7AOI, net mgr. for the ARPSC Net, has requested retirement after being net manager for a number of years. It seems March is unlucky for VE7DX. His NYL and mother-in-law were badly hurt and his car wiped out. VE7GM was injured and his car also was a total loss in another accident. The NYL of VE7AOA also was in a car accident. VE7BDH, Vera, is now VE8IH. VE7ALD is now VE6EH, Edmonton. VE7BN is at Contwoyto, N.W.T. for PWA. VE7BBB, Eva, is a member of the Noon Net, 3970 kc. West Kootenay ARC has printed a very fine phone directory for the South Eastern, B.C. Contact VE7VM. VE7AC has his 35-w.p.m. stecker, also 132 countries. VE7BHW has made DXCC with 100 watts and is at the bottom of the sun-spot cycle. The British Columbia Amateur Radio Association Picnic will be held Sun., Aug. 22 at Bear Creek Park, Surrey; the OK International Hamfest at OK Falls, July 31 and Aug. 1. VE7BIW is president. VE7BNO reports 23 stations and one VE3 heard on 2 meters during Oscar activity. Traffic: (Mar.) VE7BHH 70, VE7BS 60, VE7BDJ 55, VE7QQ 51, VE7BHH 34, VE7AC 21, VE7CT 8, VE7BHW 6. (Feb.) VE7BS 113.

MANITOBA—Acting SCM, Al. S. Watson, VE4JY—VE4UM reports most of the month was spent tracking

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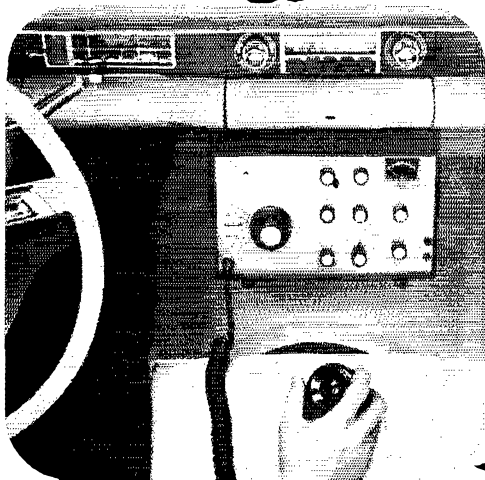
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Oscar with moderate success. Using ground plane the best DX was heard from the satellite on the East Coast. A report was made by VE4FW, VE4QX, an ORS, recently put a rig on 2 meters and made a few very good contacts. VE4QD is back on the air after a few weeks in the hospital. He had the comfort of a receiver, thanks to loyal hams. VE4RF still is in the hospital but making a good recovery. VE4JQ and VE4IF are putting out FB signals on their new s.s.b. mobile rigs. VE4XA shortly will move to VE2-Land. VE4TI also is leaving shortly. VE4HW is back home after a fine trip to the West Coast. Several of the boys, including VE4EF, VE4XQ, VE4HC, VE4WT, VE4IV and VE4MK, recently have been heard on s.s.b. VE5GO, VE5PM, VE5CI and VE3EDK regularly check in to the Man. Phone Net. Condolences to VE4TJ, whose father died recently at the ripe old age of 93. VE4AV has an FB mobile rig on s.s.b. The ARLM was favored with an excellent talk by VE4AS on TVI, Its Causes and Cure, at the March meeting. VE4HB, Acting SEC, reports 60 members active on 3.8 and 50 Mc. VE4TJ, RM, reports QNT 182, QTC 78 in 31 sessions. Traffic: VE4QX 200, VE4TJ 04, VE4JY 24, VE4UX 22, VE4NE 15, VE4FF 13, VE4XN 10, VE4XW 7, VE4EG 4, VE4JA 4, VE4QJ 4, VE4SC 3, VE4IW 2, VE4WT 2, VE4EP 1.

MARITIME—SCM, D. E. Weeks, VE1WB—Asst. SCMs: A. E. W. Street, VE1EK and R. P. Thorne, VO1ET. We regret to record the passing of VE1ANL, VE1LW and VE1ZH, (NSARA pres.), victims of tragic air crashes. VE1AIA also joined the ranks of Silent Keys. Recent appointments include R. P. (Dick) Thorne as VO Asst. SCM, VE1AII reports participants in a recent emergency test included VE1s LZ, AI, ANI, UY, HJ, ANX, AFQ, DR, AAC, OB and AIH. Those furnishing communications for the recent Dalhousie University Carnival Parade included VE1s AHJ, AI, AFQ, GC and UY. SONRA (Society of Newfoundland Radio Amateurs) announces that its membership has gone over the 100 mark. Dates to remember: July 4, International Ham Picnic, St. Stephen, N.B.; Labor Day week end, Maritime Hamfest, Digby, N.S. VO1DH is building a home-brew s.s.b. transmitter. Several Maritimers report interesting reception from Oscar III. Word has just been received that all the animals, bugs and assorted insects associated with Field Day have completed their campaign plans. How about you? Traffic: VE1HE 21, VE1DB 14, VE1ABS 5.

ONTARIO—SCM, Richard W. Roberts, VE3NG—Before going on summer vacation check your ARRL appointment(s) and mail certificates to your SCM for endorsement if they are about to fall due or are past due, otherwise they may be cancelled. The AREC is being brought up to date by SEC VE3EUM. If your area does not have an EC, write to the SCM for information. VE6UQ and VE3NG were visitors to the London Hamfest and Annual Dinner. VE3DUU still is in the North-western Hospital in Toronto. A cheery card would help Albert in his long stay. VE3HW is a new OHS on 2 meters in Toronto. VE3FOI is EC for St. Kitts. VE3MG and VE3DZA, both XYLs, were feted in Toronto papers recently. The Sudbury Club is hard at work on the ARRL Ontario Division Convention to be held in October. VE3AJA is fishing by electronics these days. The Peterboro group holds a regular net on Sun, mornings on 10 meters and has an average of ten call in. The South Waterloo ARC elected VE3EUC, pres.; VE3EGG, vice-pres.; VE3FUU, serv.-trans. The club has a fine bulletin. VE3ADMT now is VE3CZ. The Westside ARC has a new club award known as the "Order of the Lid," awarded to delinquent members. VE3EUY is on s.s.b. in the Cornwall area. The Rentree ARC held a very successful dinner in Deep River. Its Smorgasbord was out of this world. The Kitchener ARC was active in its local Sportsman show and I am informed had a topnotch display. VE3DU worked VK5KO on 160 meters. Traffic: (Mar.) VE3CYR 103, VE3NG 66, VE3BZB 62, VE3EHL 53, VE3GI 53, VE3DPO 52, VE3FGV 52, VE3DMU 51, VE3EBC 50, VE3BLZ 43, VE3BZT 41, VE3BUR 33, VE3EZY 30, VE3TT 22, VE3W19 19, VE3AKQ 15, VE3DU 14, VE3DWN 12, VE3CFI 8, VE3LK 8, VE3EGG 7, VE3DVE 6, VE3BUE 5, VE3FOA 3, VE3OT 3, VE3VD 2. (Feb.) VE3CYR 93.

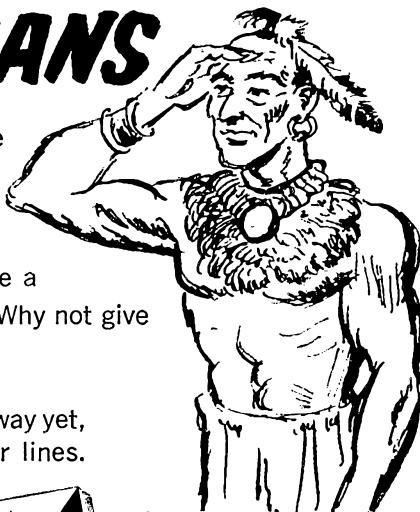
QUEBEC—SCM, C. W. Skarstedt, VE2DR—Asst. SCM: Michel St. Hilaire, VE2BEZ. A new French C.W. Net, Le Réseau de Télégraphie du Québec, now meets daily on 3580 kc, at 2330 GMT. VE2BRD, with net experience from OQN, is teaching newcomers all fundamentals. The Quebec AREC is now actively engaged in setting up a communication network for Civil Protection similar to RACES in the U.S.A. This network will give communications between Zone Headquarters and Field Offices in each of the eight zones dividing up Quebec. Mr. Marcel Dame, of E.M.O., has been very cooperative in working with the amateurs. The AREC group took

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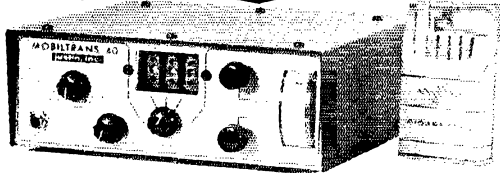
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part in handling communications for another car rally, again successfully. This type of operation appears to lend itself well for improving operating ability of mobile operators. VE2BRD is a new ORS. VE2AAU is now an OO. We are very sad to add yet another call to the Silent Keys column: VE2PD. He was a very well-known and popular OT. When this appears in print the annual ARRL Directors' meeting at Quebec City will be over. Judging from preparations being made the delegates likely will leave with a pleasant memory of genuine hospitality arranged by our French confreres. VE2JE has added a linear and now punches out a big signal on 75 meters. Traffic: VE2BRD 97, VE2DR 69, VE2TA 52, VE2CP 33, VE2BG 22, VE2ALH 21, VE2AAU 14, VE2MJQ 8, VE2BOC 8, VE2SD 7, VE2JZ 4, VE2VM 4.

SASKATCHEWAN—SCM, Mel Mills, VE5QC—Don't forget the Western Canadian "Hamfest '65" July 2, 3 and 4, Bessborough Hotel, Saskatoon, Sask. The program will include the Fri. night "307-813 Eyeball Avenue" complete with horse racing; Sat. morn July 3 there will be "Breakfast with Wall an' Don" on CFQC radio, TA-22 jr. attendance prize; four of linear excelsator at 10 with the ladies' tea and fashion show in the afternoon. At the same time the annual SARRL and ARRL meetings will be held, along with c.w. and other contests; at 6 "An evening in Hawaii at Harveys Cumberland House," and at the hotel a feature full-length movie. On Sun. morn there will be more of the tremendous equipment display with VE5AA also on the air. At noon "Hoss" Mills will present the "Bonanza" Sirloin Steakfest, followed by a field day which will include games and contests for the kids, mobile judging and transmitter hunts, plus the election of the associate pres. The world famous Pionera will be held June 28-July 3 and will be part of the Provincial Golden Jubilee celebrations so make it a family holiday week at "Hamfest '65". Conrats VE5LM, VE5YL, VE5AJ, VE5TZ and VE5FC on working Easter Island, also to VE5DK for being the first VE5 to operate 4UHTU with regular skeds home. Traffic: VE5ILP 107, VE5LAI 86, VE5NX 33, VE5MS 9, VE5YR 7, VE5KZ 6, VE5HQ 5, VE5PU 3, VE5PZ 3, VE5VD 5, VE5FA 4, VE5GX 2.

A. F. S. K. FOR RTTY

Continued from page 35

a.f.s.k. on s.s.b. transmitters.

Finally, if crystal f.s.k. is used (Fig. 7 of the May article), or if a suitable heterodying v.f.o. is constructed, perhaps the best results of all would come from a regular c.w. type of transmitter. Conversely, with a multiplying v.f.o. such as is normally used for this type of transmitter, the least desirable results of all will be achieved. In general, the average amateur will find modern s.s.b. transmitters will adapt most easily and quickly to RTTY. QST

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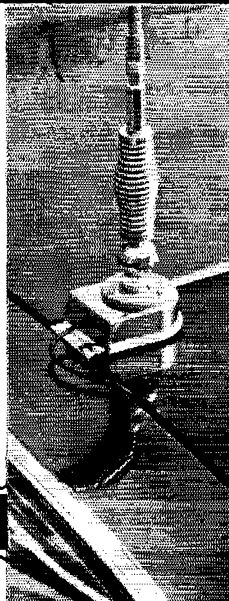
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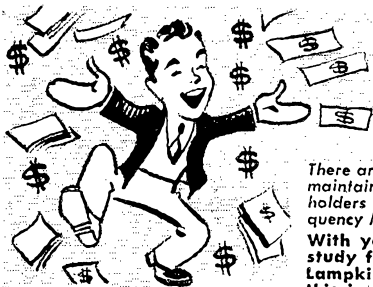
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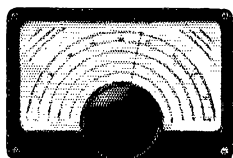
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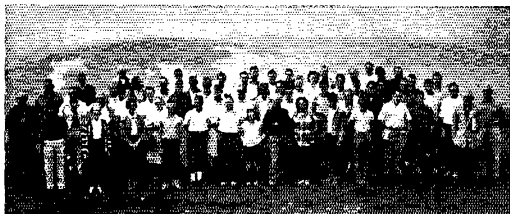


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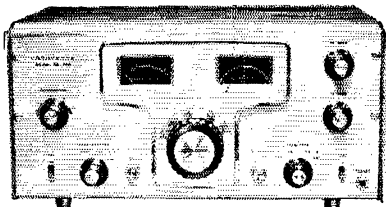
W1AJJ, Frank J. Gilbert, Lynn, Mass.
 W1AJL, Arthur M. Timlin, Lynn, Mass.
 W1BOP, Thomas C. J. Prior, Providence, R. I.
 W1PMZ, Clark E. Huffman, Littleton, Mass.
 W1SPF, Alan D. McKerrow, Rochdale, Mass.
 K1VMG, Roy S. Hultgren, Shrewsbury, Mass.
 W2DHQ, Harold C. Whitford, Canistota, N. Y.
 W2DVK, Nicholas Esposito, Flushing, N. Y.
 K2ELH, Charles W. Rankin, Albany, N. Y.
 WA2GGV, Eugene Boetsch, Irvington, N. J.
 WA2JVV, Winfield C. Nichols, Perth Amboy, N. J.
 W2JMH, George A. Mahland, Eatontown, N. J.
 W2KSL, William A. Gordon, Bronx, N. Y.
 W2VIS/K2PII, Joseph M. Rywelski, Massapequa, N. Y.

K3AMG, Walter V. Auer, Corry, Penn.
 K3MOU, Harry W. Smith, Jr., Ellicott City, Md.
 W3PUX, Paul L. Mellon, Pittsburgh, Penn.
 W3TXX, William A. Trepak, Pittsburgh, Penn.
 W3UDL, Harry Barsky, Southampton, Penn.
 K4EBH, Albert Foster, Jr., Burlington, N. C.
 W4JSE, Cordary B. Heiberger, Norfolk, Va.
 W5AAJ, T. P. Giacomini, Jr., Wagoner, Okla.
 W5DRU, Edgell D. Bales, Albuquerque, N. M.
 W5FWC, Henry C. C. Lammernann, Houston, Texas

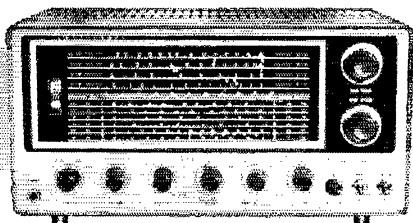
W5MCE, Winchell Keller, Oklahoma City, Okla.
 W5QFG, Neal R. Perry, Roswell, N. M.
 W5TPC, Paul Cadwell, Tulsa, Oklahoma
 W6BAS, William W. L. Burnst, San Diego, Calif.
 W6BZP, George D. Hayball, Jr., Goleta, Calif.
 K6HJJ, Jessie I. Rue, Los Angeles, Calif.
 W6JOR, Walton C. Mitchell, Palo Alto, Calif.
 W6VHE, Charles A. Chapman, Santa Clara, Calif.
 W6ZDF, Jack H. Reese, San Jose, Calif.
 WA6ZIN, Ola Mae Hudson, La Mirada, Calif.
 WN7AKE, Vernon W. Haddock, Vancouver, Wash.
 K7KTS, George D. Epley, Winlock, Wash.
 W7TJT, William A. Steenbergen, Yuma, Ariz.
 W8CJB, Louis M. Shobe, Flint, Mich.
 W8EDE, E. Kent Bacon, Rocky River, Ohio
 W8EL, Louis G. Herrmann, Cincinnati, Ohio
 W8KML, Fred J. Pichitino, Detroit, Mich.
 K8MTI, William M. Ruggles, Columbus, Ohio
 W8TN, Nelson Emmons, III, Dayton, Ohio
 W8UHL, Roy K. Foster, Warren, Mich.
 W8VZQ, Wilson E. Pacific, Battle Creek, Mich.
 K8WMN, Hazel Musselman, Dayton, Ohio
 W9FBJ, Rand M. Smith, Rockford, Ill.
 W9FXS, Ivan P. Hartsey, Olney, Ill.
 W9POG, Edwin C. Faust, Granger, Indiana
 K9QOC, Clayton B. Jones, Gilberts, Ill.
 W9TJI, Louis B. Favour, Ripon, Wisc.
 W9ZNM, Carl R. Raymond, Bunker Hill, Ill.
 W0ALA, C. Leland Cheney, Wichita, Kansas
 WA0DBA, Joe J. Siebenaler, Vinton, Iowa
 W0NAV, Fred J. Williams, Rainer, Minn.
 W0TWG, Don W. Kalbrener, Bemidji, Minn.
 W0VUP, Maurice Q. Heider, Cherokee, Iowa
 DJ1WT, Friedrich Zoeller, Hamburg, Germany
 G4OF, Arthur Roberts, Lincolnshire, England
 G2FZRV, J. K. Nelson, Isle of Man, British Isles
 KV4AC, Cecil A. Daniel, St. Thomas, Virgin Islands
 VE1UUF, John F. Shreve, Sackville, N.B., Canada
 VE2PD, N. Stanley Rivers, Greenfield Park, Que., Can.
 VE3CJQ, Kenneth B. Campbell, Ottawa, Canada
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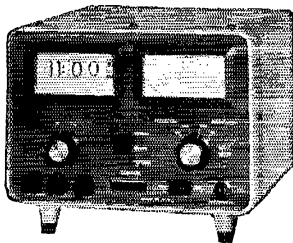
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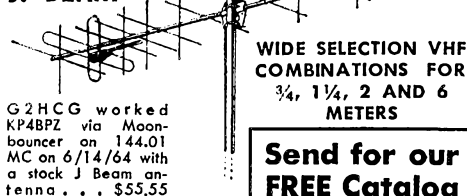
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Happenings of the Month

(Continued from page 30)

West Lake County Radio Club Willowick, Ohio
 Chip Wooten Memorial Amateur Radio Club
 of Grainger High School Kinston, N. C.

At this point Messrs. Denniston and Eaton reported in detail on their participation in the first meeting of the Executive Committee of the IARU Region II organization in Lima, Peru, early in March; on request of the Chair, it was agreed that a written report should be prepared for publication in *QST*.

On motion of Mr. Compton, unanimously VOTED that the League file comment in FCC Docket 15881, seeking a reduction in application fees for special-events stations, and a reduction to \$2 of the renewal fee to accord with those applicable to commercial license renewals.

At this point the Committee examined at length the just-released proposals in FCC Docket 15928 for changes in the amateur rules to upgrade the license structure. The Committee requested the General Counsel and the Hq. to study particularly the matter of call sign changes seeking a revised pattern which would permit minimum changes in presently-held amateur calls.

On motion of Mr. Denniston, unanimously VOTED that the League heartily congratulates Project Oscar, Inc., on the success of Oscar III, the first amateur radio repeater satellite in space.

The Committee was in recess for luncheon from 1:15 to 1:45 p.m.

At this point Mr. Hacke discussed with the Committee his plans for accomplishing the over-all study of the amateur radio service following the agreement with Stanford Research Institute.

In the course of its meeting the Committee discussed, without formal action, the upcoming national convention, RACES, international conference preparation, future satellite experimentation, annual reports, and life membership in the League.

There being no further business, the Committee adjourned at 2:35 p.m.

JOHN HUNTOON
Secretary

Field Day is

(Continued from page 18)

that no one ever notices until someone shuts it off to fill the tank, and then the silence shouts.

On the surface it is a multi-operator contest and a week-end of grand and glorious fun when we can relax and be ourselves, and nobody comments on the increasing five-o'clock-shadow, or the old comfy clothes. But, while the very words connote fun and games, Field Day is really the AREC, the Public Service Corps in action. The FCC's statement to the newspapers that this is a test of our operating under emergency power and conditions to demonstrate our ability should a disaster cause the normal communications to cease is the real reason for Field Day. So often we forget this in the color and excitement of each year's operation. And yet, if we look at it from the perspective of ARPS, Murphy's little booby traps, the crazy weather and band conditions are really training and experience for what might happen in any one of the communities that are taking part.

QST

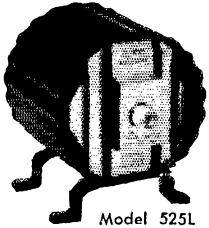


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Impedance (ohms)	50	50
Power—Steady State	125	125
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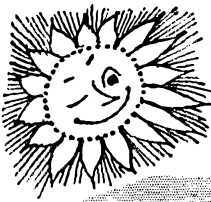
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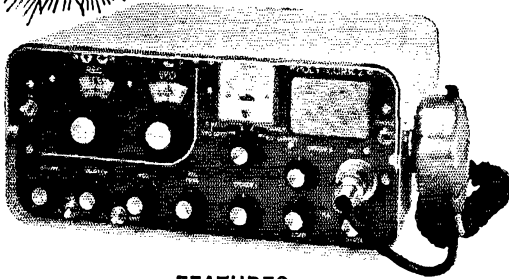
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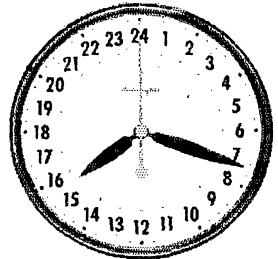
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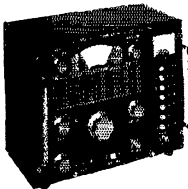
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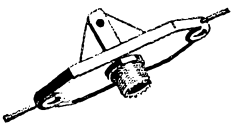


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What The ARRL Means To Me

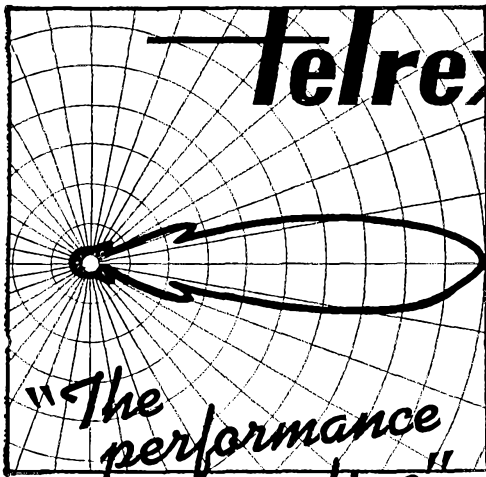
(Continued from page 78)

personal action in support of League action. Certainly no amount of easy study could make me as knowledgeable in the laws pertaining to amateur radio as is the League's well-posted attorney. "Protection" is not the word to describe this area of interest. A better label would be "astute legal counsel and knowledgeable safeguarding of my interests."

Electronics is the big word of our times, and it is getting bigger all the time. Sure, I had a few radio courses back down the road, but how in the world can I keep up with the latest ideas and techniques as they apply to ham radio? Answers to these questions and hundreds of others are provided every year in publications distributed by the League. No other single source distributes as much information about amateur radio, its techniques, its people, and its activities, as does the ARRL. To me ARRL means up to date information on every phase of ham life.

Concluding my list of meaningful areas in which ARRL provides direction for amateur radio, is the area of public service. Building our image in the eyes of the public, and building our own pride in the value of amateur radio, the ARRL, acting through the ARPSC (and AREC), the National Traffic System, and many other service activities, has directed ham radio to its deserved niche in the frequency spectrum. Only through proving the worth of the amateur service in many public service areas have we been able to retain our frequencies and our hobby. If our function and purpose were for our own self-serving pleasure alone, we'd have been long gone on the high-frequency bands. Although this is number five on my awareness list, it must be number one on any list of justifications for our existence. Thanks to ARRL, I have the pleasure of my hobby—amateur radio.

Years go by and people come and go. Tying our hobby together for the past fifty years, the American Radio Relay League has provided true leadership and direction. To me, and to every other member ham, the ARRL has meant organization, an organization which has given us the pride and fraternalism that the amateur service must have to survive the challenges and demands of a burgeoning electronically oriented society. **QST**



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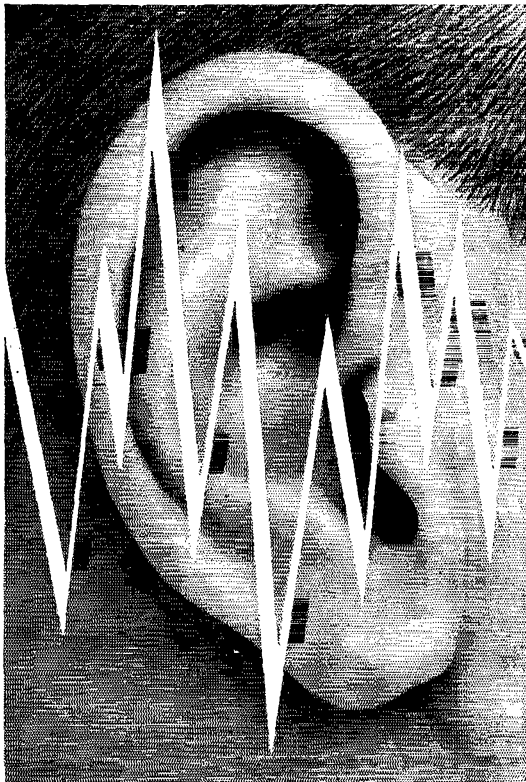
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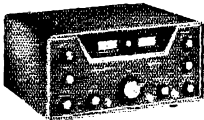
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How's DX

(Continued from page 107)

affirms, "I am now QSL manager for VP4VT of Trinidad. Greenwich Mean Time and s.a.s.e., please." ----- VE3DGX announces, "The last of my CE8AG cards were sent out April 2nd. By the time this appears in print everybody who sent me QSLs should have received theirs. If not, check with your local bureau first, then send another QSL to me (s.a.s.e. for direct response)."

HEREABOUTS - "I am now QSL manager for VP2KD," reports VE3ACD. "We sked weekly, so prompt service on QSLs is promised. S.a.s.e. is appreciated, or tape a nickel to your card if you have no Canadian postage." IRCs ought to do it for non-W/K/VE/VOS

W9MSG of the Ninth ARRL Bureau tells W1ECH that DXers who leave their home locations for overseas assignments, etc., ought to have their QSLs claimed for them by friends for safekeeping. ----- K1IMP's continuation of VP2LS and VP2DAD QSOs goes only for his own DXpeditionary-style contacts under those calls. Herb does not confirm VP2DAA QSOs. ----- Our "QSLers of the Month": CE8AG, CRs 4BB 6A1 6HG 7LU, CT3AQ, CX7AP, EIs 4AK 6AL 9F, FT3USA, FG7XK, FR7ZT, G1CP, GC2AAO, G13SE, G1M3UZF, H1K5A, HC8ZN, H18XAL, H1K6A1, H1P4JQ, HR2ABC, HZ3TYQ/SZ4, I1VAB, J47AD, K3SWW/KC6, K4I4A1, KH6s BGS FLC, KJ6DA, KLTs 4Z WAI, K4GBI, KS6BO, KW6EL, OE1FSW, OH5UQ, ON4TC, PY7X, OZ5DX, PJ5CI, PZICK, SA6BCG, SP8AKK, UG6BZ, UG6DL, VK200, VPz 2DAD 2KR 2LS 3YG 5BR 5SG, VQ8A1, VS0AWR, VU2NRA, YA4A, YN1AA, YS1RFE, ZDz 3A 8HL, ZL2AFZ, 4K11, 4X4s PV MR, 5A3TX, 5H3JR, 5N2AAF, 9L1s FG FW FS and 9J2W, plus QSL agents Wa 2CTN 2SNM 3HNK 4ANE 9WHM, Was 2WUV 6OET, WB2FSW and VE40X, all nominated for postaboard punctuality by "How's" reporters Wa 1ECH 2IP 5LXG 7QB 8YGR 9NNC, Ks 1QGC 3SLP 3VPN 4GMR 8GSV 8JPL, Was 4PKW 4PSA 4WA0 5HJK 6MVG 6VAT 8MAT, WN3BTA and VE3ADV. Any deserving DX stations or managers we failed to mention? ----- Halp! W1ECH needs a nudge toward QSLs from FF8s AC and AP of '59; W1RAN wants to catch up with VO2GS (Geo. Sampson) of St. Johns '49; W5OBS hunts a QSL from Bill of KG6HF '51; W9WHM could use a push toward DU0DM '63, JA5HT, OH2ER/4; and K8YRF will settle for hints on CO6FR, KJ6BZ and 5N2ACB all '63 activists. ----- K1QGC and W4TVQ volunteer to act as QSL headquaters for overseas DX operators requiring such services. ----- Now for our usual individual recommendations, bearing in mind that each listing is necessarily neither accurate, complete nor "official" . . .

QST

ARRL QSL Bureau

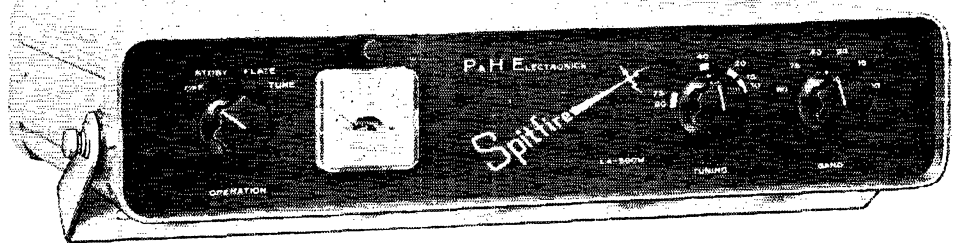
(Continued from page 77)

- W7, K7, WA7 - Salem Amateur Radio Club, P.O. Box 61, Salem, Oregon 97301.
- W8, K8, WA8 - Walter E. Musgrave, W8NGW, 1215 E. 187th St., Cleveland, Ohio 44110.
- W9, K9, WA9 - Ray P. Birren, W9MSG, Box 510, Elmhurst, Illinois 60128.
- W8, K8, WA8 - Alva A. Smith, W8DMA, 238 East Main St., Caledonia, Minn. 55921.
- VE1 - L. J. Fader, VE1FQ, P.O. Box 663, Halifax, N. S.
- VE2 - John Ravenscroft, VE2NV, 135 Thorn Crest Ave., Dorval, Quebec.
- VE3 - R. H. Buckley, VE3UW, 20 Almont Road, Downsview, Ont.
- VE1 - D. E. McVittie, VE4OX, 647 Academy Road, Winnipeg 9, Manitoba.
- VE5 - Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Sask.
- VE6 - Karel Tettelaar, VE6AAV, Sub. P.O. 55, N. Edmonton, Alberta.
- VE7 - H. R. Hough, VE7HIR, 1291 Simon Road, Victoria, B. C.
- VE8 - George T. Kondo, VE8RX, % Dept. of Transport, P.O. Box 339, Fort Smith, N. W. T.
- VO1 - Ernest Ash, VO1AA, P.O. Box 6, St. John's, Newf.
- VO2 - Douglas B. Ritecy, Dept. of Transport, Goose Bay, Labrador.
- KP4 - Joseph Gonzalez, KP4YT, Box 1061, San Juan, P. R.
- KH6 - John H. Oka, KH6DQ, P.O. Box 101, Aiea, Oahu, Hawaii 96701
- KL7 - Alaska QSL Bureau, Box 6226, Airport Annex, Anchorage, Alaska.
- KZ5 - Ralph E. Harvey, KZ5RV, Box 407, Balboa, C. Z. (Cards for SWLs may be handled via Leroy Waite, 39 Hanum St., Ballston Spa, N. Y.)

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(1) Advertising shall pertain to products and services which are related to amateur radio.

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(3) The Ham-Ad rate is 35¢ per word, except as noted in paragraph (6) below.

(4) Remittance in full must accompany copy, since Ham-Ads are not carried on our books. No cash or contract discount or agency commission will be allowed.

(5) Closing date for Ham-Ads is the 20th of the second month preceding publication date.

(6) A special rate of 10¢ per word will apply to advertising which, in our judgment, is obviously non-commercial in nature. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, takes the 10¢ rate. Address and signatures are charged for. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising so classified takes the 35¢ rate. Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply.

(7) Because error is more easily avoided, it is requested copy, signature and address be printed plainly on one side of paper only. Typewritten copy preferred but handwritten signature must accompany all authorized insertions. No checking-copy to be supplied.

(8) No advertiser may use more than 100 words in any one issue nor more than one ad in one issue.

Having made no investigation of the advertisers in the classified columns except those obviously commercial in character, the publishers of QST are unable to vouch for their integrity or for the grade or character of the products or services advertised.

S.R.R.C. Hamfest: June 6, 1965. See Hamfest Calendar in May QST or write for info after April 19, 1965. Starve Rock Radio Club, W9MKS/W9QLZ, RFD #1, Box 171, Oglesby, Ill. HAMFEST Announcement! The Hamfester Amateur Radio Club announces its 1st annual Hamfest August 8, 1965, at Santa Fe Park, 91st and Wolf Road, Chicago. Manufacturer and distributor displays, mobile contest, swappers row, food and refreshments, games for the whole family. A clown and balloons for the children. For maps to get to the hamfest and complete details, write: Hamfester Radio Club c/o John Chass, 89LOK, 5434 So. Bishop St., Chicago, Ill. 60609.

7th ANNUAL Penn-York Hamfest Morrison's Restaurant, Big Flats, N.Y. (Between Elmira & Corning, N.Y.) June 19, 10 noon. Grand Award NCX-3 SSB xcvr. Pre-registration, \$4.50. \$6.00 at door. To Earl J. Foster, W3BKF, Chairman, RD #2, Gillett, Penna. Last day for pre-reg., June 12th. Speakers, swappers, contests, etc. Smorgasbord dinner, all you can eat. Only 600 tickets available.

GREATER Bay Area Hamfest, Peacock Gap Country Club, San Rafael, Calif. October 16-17th. Write to Box 113, Hayward, Calif.

SAN Fernando Valley Radio Club 9th Annual Hamfest-Picnic, Sunday July 11th, Sunset Farms, 16303 Foothill Blvd., San Fernando, Calif. Color TV, swimming, contests, kiddie rides, fun for the family. Donation one dollar. Attn: ARRL National Convention visitors: drop by on way home. Tickets, Maps, info: K6UMV, c/o W6SD Hamfest, Box 3157, Van Nuys, Calif.

WANTED: Early wireless gear, books, magazines, catalogues before 1922. Send description and prices. W6GH, 1010 Monte Dr., Santa Barbara, Calif.

MOTOROLA used FM communications equipment bought and sold. W5BCQ, Ralph Hicks, Box 6097, Tulsa, Okla.

WANTED: military or industrial laboratory test equipment. Electronicraft, Box 13, Binghamton, N.Y.

WANT Callbooks, catalogs, magazines, pre-1920 for historical library. WA4A, Wayne Nelson, Concord, N.C.

MICHIGAN Hams! Amateur supplies, standard brands. Store hours 0830 to 10 Monday through Saturday. Roy J. Purchase, W8RP, Purchase Radio Supply, 327 E. Hoover St., Ann Arbor, Michigan, Tel. Normandy 8-8262.

WANTED: All types of aircraft on ground radios, 17L 618F or S388, 390, GRC, PRC, 511, RVX, Collins linear amplifier, Type 204; Especially any item made by Collins Radio, ham or commercial. Also large type tubes and test equipment in general. For fast cash action contact Ted Dames W2KJW, 308 Hickory, Arlington, N.J.

SELL swap or buy ancient radio set and parts, magazines, Lavery, 118 N. Wycombe, Lansdowne, Penna.

SAVE ON all makes of new and used ham equipment. Write or call Bob Grimes, 89 Aspen Road, Swampscott, Massachusetts: 617-598-2530 for the gear u want at the price u want to pay.

WANTED: 2 to 12 304TL tubes, Callanan, W9AU, 118 S. Clinton, Chicago 6, Ill.

304TL tubes wanted. Also other xmtrs and special purpose tubes. We will buy military or commercial transmitters and receivers with designs by W3CJR, W3CJL and MN. Air Ground Electronics Co., 64 Grand Pl., Kearny, N.J.

WANTED: Collins Parts, RC-610, GRC-27, Autodyne, Bethpage, L.I., N.Y.

QSL?? WPES?? Personalized made-to-order one-day service! Largest variety samples 25¢. DeLuxe, 35¢ (refundcd). Sakkers, W8DED, Box 218, Holland, Michigan (1000 name, call, address stickers, \$1.00).

QSLs, samples 20¢. QSL Press, Box 281, Oak Park, Illinois 60303.

QSLs "Brownie" W3CH, 3111 Lehigh, Allentown, Penna. Catalog with samples, 25¢.

C. FRITZ says, thanks to the hundreds of friends who sent get-well messages the four months he spent in hospital. Progress is good. See ya next month.

QSLs-SMS. Samples 10¢. Malgo Press, Box 375 M.O., Toledo 1, Ohio 43601.

DELUXE QSLs. Petty, W2HAZ, P.O. Box 5237, Trenton, N.J. 08638. Samples, 10¢.

QSLs See our new "Eye-Binder" cards. Extra high visibility. Samples 25¢. Dick, W8VKK, 1994 N. M.-18, Gladwin, Mich.

QSLs, SWLs XYI-OMs (sample assortment approximately 9¢) covering designing, planning, printing, arranging, mailing; eye-catching, comic, sedate, tatabulous, DX-attracting, prototypical, snazzy, unparaooned cards (Wow!), Rogers K2AAB, 961 Arcade St., St. Paul 6, Minn.

CREATIVE QSL Cards—25¢ for catalog, samples, 50¢ coupon. Personal attention given. Wilkins Printing, Box 787-1, Atascadero, Calif. 93422

QSLs, 100 for \$3.00, 28 new drawings, Samples 10¢. Brigham, Colson St., North Billerica, Mass.

QSL, SWL, cards that are different. Quality card stock, Samples 10¢. Home Print, 2416 Elmo Ave., Hamilton, Ohio.

QSLs Distinctive samples dime. Volpress, Box 133, Farmingdale, N.Y.

DON'T Buy QSLs until you see my free samples. Bolles, W5OWC, Box 9363, Austin, Texas.

QSL, SWLs, WPE, Samples 10¢ in adv. Nicholas & Son Printery, P.O. Box 11184, Phoenix 17, Ariz.

QSLs, Samples, dime. Printer, Corwith, Iowa.

QSLs, 18 sharp samples, 10¢. Filmcrafters, Box 304, Martins Ferry, Ohio.

PICTURE Of yourself, home, equipment, etc. on QSL cards made from your photograph. 250, \$7.50 or 1000, \$14.99 ppd. Samples free. Write to Picture Cards, 129 Copeland Ave., La Crosse, Wis. 54603.

ZIP Code Rubber Stamp, Call, name, address, with ink pad, \$1.00. K4ISA, Perry, Box 8080, Allandale, Fla.

SUPERIOR QSLs, samples 10¢. Ham Specialties, Box 73, Hobbs, New Mexico (formerly Bellaire, Texas).

QSLs, Samples 25¢. Rubber stamps: name, call and address \$1.55. Harry Sims, 3227 Missouri Ave., St. Louis, Mo. 63118.

QSLs 300 for \$4.35. Samples 10¢. W9SKR, "George" Vesely, Rte. #1, 100 Wilson Road, Ingleside, Ill. 60041.

QSLs 3-color glossy, 100, \$4.50. Rutgers Vary-Typing Service. Free sample. Thomas St., Riesel Ridge, Milford, N.J.

QSLs Kromekote 2 & 3 colors, attractive, distinctive, different. Free ball point pen with order. Samples 15¢. Agent for Call-D-Cal decals, K2VOR Press, 31 Argyle Terrace, Irvington, N.J.

QSLs \$2.50 per 100. Free samples and catalog. Garth, Box 51Q, Julietland, N.J.

15¢ Call QSLs \$2.40/100, \$2.90 (2 sides), Samples, Garlepy, 2624 Kromer Et., Wayne, Ind.

3-D QSL Cards have that prestige look, with glittering colors and metallics in raised space-age designs fused to brilliant plastic finishes. Cost so little more than mere mediocrity! Samples 25¢ (refundable). 3-D QSL Co., Monson 2, Mass.

QSL Specialists, Distinctive Samples, 15¢. DRJ Studios, 2114 N. Laverne Ave., Chicago, Illinois, 60639.

QSLs-100 3-color glossy \$3.00; silver globe on front, report form on back. Free samples. Rusprint, Box 7575, Kansas City, Mo. 64114.

AT Last! Something new in QSL cards! All original designs. Send 25¢ for samples to Yarsco, Box 307, Yorktown Heights 1, N.Y.

CUSTOMIZED QSLs with your autographed photo, Dime brings sample. Pic-Or-QSLs, Rice Lane, Baltimore, Maryland 21207.

RUBBER STAMPS \$1.00. Call and address. Clint's Radio W2UD0, 32 Cumberland Ave., Verona, N.J.

QSLs New cartoons. Top quality, fast service. Samples 20¢. Ed's Press, 3232 LeMoine, Chicago, Ill. 60651.

QSLs, Gorgeous rainbows, cartoons, etc. Top quality! Low prices! Samples 10¢ refundable. Joe Harms, WA4FJE, W2JME Edgewater, Fla. 32032.

PLASTIC Holder frames and displays 20 QSL cards, 3 for \$1.00 or 10 for \$3.00. Prepaid, Tepabco, Box 198, Gallatin, Tenn.

QSLs, Stamp and call brings samples. Eddie Scott, W3CSX, Fairplay, Md.

"STANDOUT" QSLs with 1/4" high call-letters. \$2.40/100, \$2.90 (2 sides), Samples free. Garlepy, 2624 Kromer Rd., Fort Wayne, Ind.

QSLs: Quality with service. Samples Free. R. A. Larson, Larson Press, Box 45, Fairport, N.Y.

QSLs, 18 samples, 10¢. Filmcrafters, Box 304, Martins Ferry, Ohio.

QSLs, WA6QAY Press, Box 17112, San Diego, Calif.

QSLs, Samples, dime. Printer, Corwith, Iowa.

QSLs, \$2.00 per 100 postpaid. Free sample. Hobby Print Shop, Umatilla, Fla. 32784.

QSLs-SWLs, 2 & 3 colors, 100 for \$2.00, Samples dime. Bob Garra, Lehighton, Penna.

QSLs-SWLs, Special types, photo, art and standard, Samples 10¢. K. Kidd's, RD #1, Telford, Penna.

OSLS, Y.L.R.L. specials, OMs, engraved badges, reasonable. Samples 10¢, W2DJH Press, Warrensburg, N.Y.

ATTRACTIVE OSLS: Guaranteed largest variety of individual samples (25¢ deductible). Paul Levin, K2MTT, 1033 Utica Ave., Brooklyn, N.Y. 11203.

"GOLDEN Call" OSLS (Only QSL) crafted by Samco for 1965. Sample 10¢. Samco, Box 203, Wynantskill, N.Y. 12198.

OSLS, Gorgeous Rainbows, cartoons, etc. Top quality! Low prices! Samples 10¢ refundable. Joe Harms, W44FE, WIGET, Mystery Hill, No. Salem, N.H. 03073.

QUALITY OSLS, new designs monthly. Samples 10¢, 25¢, 50 Savory. 172 Roosevelt, Weymouth, Mass.

CANADIANS: Technical Material Corp GPR-90 rcvr with GSB-1 Sideband slicer and GPS-2 matching speaker, \$425.00; Johnson 250W Matchbox, \$35.00; Heathkit AM-2 SWR bridge, \$15.00. All in exclnt condx. W. H. Galpin, VE6KD, 5303-114 St., Edmonton, Alta., Canada.

CANADIANS: Sell; Collins F455-J08 mechanical filter, unused, \$20; Ameco 2-meter converter model CB-2, \$15; Heath QF-1 Q-Multip, with power supply, \$12; Heath Tower with meter, \$45; 10-element 2-meter beam including antenna coupler, \$8; ATR 6V or 12V to 115V a.c. inverter, 30 Watts, \$15; Heath Mohican, all transistor receiver, Perfect, \$95. Will ship Hart, VE3TA, 4 Navy Street, Oakville, Ont., Can. Tel: V1 4-9817.

HOME BREW 2BP1 monitor-scope, \$13. K1IHK.

KWM-2, p/s, \$775.00. In perf. condx. Dan Reid, Anderson College, Anderson, Ind.

POWER Transformers rebuilt, 30 years experience, save. Kerla, 950 Metropolis, Marine City, Michigan 48039.

INTERESTING Offers galore in the new combined "Equipment Exchange-Ham Trader". Next 12 issues \$1.00. Sample free. Brand, Sycamore, Ill.

ELECTRONIC Tubes Top Brands Sold at substantial savings! (Minimum Order \$15.00). Authorized Ge, Amperex, Dumont & Eimac Distributor. Send for Free Buyers' Guide for all your Tube Requirements. Top Cash Paid for your excess inventory (New Only-Commercial Quantities), Metropolitan Supply Corp., 443 Park Avenue South, New York, N.Y. 10016. 212-MU 6-2834

COMPLETE Eimac mobile station, SWR Bridge, PMR6A and lots of goodies. All postpaid. W9WTV.

TELETYPE Machines, converters, R-388, R-390, R-390A receivers, mechanical filters for R-390A (455 1F), Alltronics-Howard Co., Box 19, Boston, Mass. 02101. Tel: 617-742-0048.

LOOKING? Shopping? Trading? Trying to save money? Write Bob Graham for special deals on new and reconditioned used gear. Cash or Budget. Graham Radio, Dept. A, Reading, Mass. 01067. Tel: 944-4000.

WILL Buy pre-1925 QSTs, etc., etc. State condition and price. W6ISQ, 45 Laurel Ave., Atherton, Calif. 94025

CRYSTAL Bargains. Free list. Nat Sunnette, W4AYV, Umatilla, Fla. 32784

WANTED: For personal collection: QST, May 1916, W1CUT, 18 Mohawk Dr., Unionville, Conn.

TUBES Wanted. All types, highest prices paid. Write or phone Lou-Ironics, Inc., 74 Willoughby St., Brooklyn 11, N.Y. 11201. Tel. UL5-2615.

ACT Now!! Barry pays cash for tubes (unused) and equipment. Barry Electronics, 512 Broadway, NYC 12. Call 212-WALKER-5-7000.

COLLINS Amateur equipment bought, sold and serviced. Paul A. Reveal, W2DC, 129 Midland Ave., Glen Ridge, N.J.

WANTED: Tubes, all types, write or phone W2ONV, Bill Salerno, 243 Harrison Avenue, Garfield, N.J. Tel. GARfield Area code 201-471-2020.

CASH For Your Gear. We buy, sell and trade, Send for free bargain list. H & H Electronic Supply, 506 Kishwaukee St., Rockford, Ill.

WE Buy all types of tubes for cash, especially Eimac, subject to our test. Maritime International Co., P.O. Box 516, 199 Front, Hempstead, N.Y.

FOR Sale cheap. QSTs or COs, any quantity. Send your list for quotation. Cash for Callbooks before 1942. Want early radio gear and publications. Eyr Rasmussen, Box 612, Redwood City, Calif.

WANTED: 60 ft. crank tower wind load 10 sq. ft. W2UGM, 66 Columbus, Closter, N.J.

WANTED: FR-2409 bandpass filter. State price. Pete Chalmian, W1BGD, 111 Buena Vista Road, West Hartford, Conn. 06107.

DXER Beware: A real bomb. York 5000 transmitter, 1 kw. using 4-1000A, bridge power supply, vacuum tuning condenser. Size 13" wide, 24" deep, 6 ft high. Further details. Bill Brown, W8SKY, 28 Marine Lane, Hazelwood, Mo. Tel.: HEMPstead 4-5440.

CASH For Callbooks, U.S. Government Amateur Callbooks wanted. W8EF, 801 Lakeshore, Grosse Pointe 36, Mich.

FOR Sale: Plate transformers 3600-0-3600 VAC @ 1000 ma., CCS with 120/240 VAC primary, one year unconditional guarantee, \$35. 4-1000A filament transformers 7.5 VCT @ 21 amps, \$12. Peter W. Dahl Co., 401 4th St. S.E., Minneapolis, Minn. 55424 Tel: 338-9077.

SELL: Battery radios, early electric radios; tubes, magazines. SASE. Krantz, 714 White Horse Pike, Stratford, N.J. 08084.

WANT: Antenna Couplers CU-286/FRR, R-391 receivers; R-278-B/G receivers, Shenherdheim, Box 183, Millinocket, Me.

BOOST Reception, 3.5-30 mc/sec SK-20 Preselector kit, \$18.98. Boost modulation—AAA-1 clipper-filter kit, \$10.99. Reduces noise, NJ-7 noiseletor, 1F, wired, \$4.49. Postpaid! Literature free. Holstrom Associates, Box 8640-T, Sacramento, Calif. 95822.

FOR Sale: Complete Collins station: 75S-3, all filter 32S-1, 516F-2, 312B-4, 30S-1, SM-1 mike, Guaranteed A-3 condx, No trades, sry, \$2400.00. W9EUQ, 808 Ridgely Bldg., Springfield, Ill.

HAM Discount House. Latest amateur equipment. Factory-sealed cartons. Send self-addressed stamped envelope for lowest quotation on your needs. HDH Sales Co., 170 Lockwood Ave., Stamford, Conn.

WANT KWM-2, 75S, 32S, as is, will repair. Sell: SB-34, \$360.00; GPR 90 with product detector, \$330; Gonset 76, late model, and 115V power 6-80 meters, \$269.00; Dynakit stereo 70 and preamp, \$165.00; Perfect: SR-150 and PS 150-120, \$555. F. Baker, Box 546, McComb, Ohio 45858.

WANTED: Tower Tri-Ex HZ or HZR model or equivalent, wind load 10 sq. ft. K2JMY, Bishop Drive, Rd 3, Poughkeepsie, N.Y.

HQ-110AC receiver; DK 60Y-2C advance relay, make an offer. K8UPC, 20515 Denby, Detroit, Mich.

TOROIDs, Unceased 88 mp \$72.50. Ppd. U.S.A. Humphrey, W46FKN, Box 34, Dixon, Calif.

NEW England: SX-101 receiver and speaker, Exclnt, \$195.00. K1UQC, 40 Clarissa, Chelmsford, Mass. Tel: AL-6-5902.

MOBILE Rig complete: Johnson Viking mobile transmitter and VFO, 5 bands, 60 watts, Eimac PMR-8 receiver, transistor power supply powers receiver and transmitter, Mike, antenna relay, cables, manuals. In exclnt condx. All for \$200. Mary Polan, W2MVS, telephone: IN 1-4919, 140-39 34th Ave., Flushing, L.I., N.Y.

RANGER II F/W, Like-new condx. Still under warranty. First certified check for \$225. Prefer pick-up deal. No trades! Paul G. Balko, W1KHW, Hillcrest Rd., New Canaan, Conn.

N.Y.C. Police, fire, receiver, Monitoradio 152-163 McFM, 6-12VDC w/ant., manual, \$40; 250V-500 Ma. regulated power supply, \$20; 75A-4, \$400; HT-33 KW linear, \$275; PR813 KW linear \$150; scintillator, optical densitometer, 14 track Magne-cord tape recorder in 6 ft. rack, \$100; Heathkit GC1A, \$85 w/ACDCPS Dumont 304A scope, \$115; KW surplus antenna tuner, \$45.00; 6 ft. racks open, 37; enclosed, \$120 double w/side doors, \$15; all standard 19", Tom Percer, K2DXY, 410 Riverside Dr., NYC, N.Y. 10025.

RTTY Gear for sale. Write for list. 88 or 44 mhy toroids, five for \$1.75 ppd, Elliott Buchanan, W6VPC, 1067 Mandana Blvd., Oakland, Calif. 94610.

CASH, Sony Transistor TVs, etc., swapped for G-R, H-P, L&N, etc. equipment, special tubes, manuals, military electronics. Engineering Associates, 434A Patterson Rd., Dayton, Ohio 45419.

PACKAGE Deal: Collins 75A-4, Serial 1926, KWS-1, Serial 382; speaker, tubes, Eico Oscilloscope, #460; best offer over \$1200. Garner, W7EUN, 1000 Ingersoll, Coos Bay, Oregon.

TELETYPE Machines, converters, R-388, R-390, R-390A receivers, mechanical filters for R-390A (455 1F), Alltronics-Howard Co., Box 19, Boston, Mass. 02101. Tel: 617-742-0048.

HO-110C receiver, in like-new condx, \$110. K2MBZ, Hartmann, 39 Andrew Rd., Whippany, N.J. 201-887-2405.

WANTED: For children's summer camp, counsellor with ham background and electronically competent, with own transmitter and receiver to qualify others for Novice and Technician licenses. Tel: 212-1T1-5149 (Roberts, Winnepeck) Roscoe, N.Y.

SELL, Morrow MB-560 5-band 65-watt mobile transmitter (See Nov 1956 QST, p. 40) w/12 to 625 volt dynamotor, \$100; matching Morrow 5BR/FTF 12-tube mobile receiver, 12-volt power supply, \$50; NC-300 with xtal calibrator and speaker, 2nd conv. osc, xtal controlled with USB/LSB xtals, \$190; Ranger 1, factory-wired, \$120. All instruction manuals, K. Markel, W2IVS, 1435 Lexington Ave., New York 10028.

APACHE transmitter. In exclnt condx, \$165, plus shipping. K1RSO.

FOR Sale: Heathkit Marauder transmitter, Warrior amplifier and Hammarlund HQ-180C receiver with instruction books, no scratches or modifications and in exclnt wkg condx, \$650 cash. Will ship your expense. Going Heath SB-Line. K4SSZ, Louis Shouse, 604 Stillwood Dr., Dalton, Ga.

SELLING OUT! SX-100, SSB, Ps, Racks, Novice xmtr, tubes, parts. List. E. Taggart, Box 373, Nashville, Indiana.

FOR Sale: NCX-3 with AC power supply, \$350. KITLY, Box 66-G, RFD #3, Great Barrington, Mass.

HALLICRAFTERS HA-5, VFO with 6-meter xtal. Perfect, \$55. K8POU, 520 Commonwealth, Kalamazoo, Mich.

HO-110C, matching speaker, first \$100. Lasky, K3HIB, 44 Hamilton St., Lansdale, Penna.

NATIONAL NCX-3, NCXD in mint condx, priced for fast sale; \$300. W4OHN, 845 Cliffside Ave., No. Woodmere, N.Y. 11581.

WANTED: 51J-4 Collins receiver. State condition, serial number, lowest cash delivered price. For sale: SX-100 receiver, perfect condx; \$150. K0AEBK, 6551 East Dakota, Denver, Colorado.

FOR Sale: HA-1-TO keyer, Vibroplex Vibro-Keyer, new; complete keyer package; \$75.00. Koss stereo headphones SP-3X, \$15. Harris Zuelke, 4157 N. Clarendon, Apt. 601, Chicago, Ill.

VIKING Ranger II kit, carefully wired, hardly used. Manual, exclnt condx. Fixed price \$225. Hammarlund HQ-140X with speaker and manual, exclnt condx; \$80. Moving to project K2LEC. Tel: 212-TR-2-7603, Robert Secman, 1985 Bathgate Ave., Bronx, N.Y.

HEATH HR-20, \$85; HX-20, \$135; 80 to 10 meters, SSB or c.w., fixed or mobile operation. Checked out and aligned by Heath laboratories. HP-20, AC P/S, \$20; HX-10, \$15.00, Gary Mercer, W9CID, 106 Terrace View Lane, Peoria, Ill.

GONSET Communicator IV 2 meters for sale with mike, xtals, spare tubes at best reasonable price. If picked up included also, halo and 10-element plastic encapsulated beam, W2SLC/4, Apt. 6C, 1228 Norwiew Ave., Norfolk, Va.

DRAKE IIB, Q-Multiplier, speaker \$195; Model 26 teletype-writer with stand, automatic line feed, carriage return, bell-break, \$125.00; Gonset 1-11 meter converter, \$15. W2QFR, 25 Cameron, New Rochelle, N.Y.

SELL: Hammarlund HQ-100A, new August 1964 perfect!! \$120.00. Will trade for SSB receiver. Paul Arutt, 1200 Harbor, Hewlett, N.Y.

TUBES Wanted for personal collection. Cash for: Sodian D-21, Speed 291 and 293; McCullough overhead heater type 403; Emerson Multivibe (3 tubes in 1); Aertion WR-21 tube and WB-800 ballast lamp as used in Aeriola Grand receiver. All with good filaments. Earle Young, 450 Magee Ave., Rochester, N.Y. 14613.

MOBILE DC transistorized supply for SSB transceivers. Heath HP-13, v. gud condx. used only 7 months. \$35. Will ship. K8LBO, Bain Cowell, 13710 Shaker Blvd., Cleveland, Ohio 44120.

FOR Sale: Complete amateur radio station. SSB/AM/CW: HT-37, \$260; Drake 2-A, \$150; TA-33, Jr and AR-22 rotor, \$50 or complete station; coax, relays, Q-multi, SWR bridge, etc. \$475. You ship. K4MFP, 815 Burnley Rd., Charlotte, N.C. 28210.

CLEANING Shack: Transistors and diodes at bargain prices. Free list. Jack Pritchard, 4336 Livingston, Dallas, Texas 75209.

GOING TO college: must sell Eico 720, Eico 722 VFO. Best offer. WA0FLB, 303 Oak Ave., Olivia, Minn.

SELL: Heath HX-20, \$135; Johnson Courier, \$125. John Oberst, W2TLO, East Focer St., Glassboro, N.J.

COLLINS 30L-1 linear amplifier, \$380. Mint condx. in orig. cartons. W0HRQ, 1805 Hillview Dr., Marion, Iowa.

DRAKE 2A plus 2AQ, multiplier-speaker and xtal calibrator. Bargain at \$170. Exclnt condx. W4YGX, Box 746, Melbourne Beach, Fla.

CLEANING Out magazines QST, CO, PE, many other titles. W3TVA.

COLLINS 75S-1, \$300; SBE Model SBI-LA linear, \$185, and SBE-33 transceiver, \$395. W5YUO, Walt, 4928 Cockrell, Ft. Worth, Texas.

SELL: Complete Ham set NC-300 in xclnt condx. Hart 75 with modulator, VFO, mike, Gotham vertical antenna, S.W.R. meter, \$225. Larry McWhirter, K0ZUP, 4 Poplar Dr., Montrose, Colorado.

LOOKING For a bargain: NCX-3, NCX-A, XCU-27, \$327.95, with manuals. Recently factory realigned. W5MRZ, Box 36, Wynne, Arkansas.

SALE: HW-12, new, \$140. Will wire any kit reasonable, radio hi-fi, etc. (20 years Navy experience, retired). Will repair any of your gear. Lan Richter, 131 Florence Dr., Harrisburg, Penna.

COSY Vacation, amateur paradise cabin for two weekly, \$50; Livingstone Lodge, Mascosa Lake, New Hampshire, Swimming, Fishing, Boats, Sports, Dartmouth golf, tennis, hot showers, fire places. Light house-keeping, Children half, camp sites, literature. Al O. Livingstone, W2QPN.

FOR Sale: 690V at 450 Ma plate transformers, No C.T. 117V primary. Hermetically sealed. Wt: 19 lbs. \$3.95 (Srv. misprint last ad) plus postage. A.R.C. Sales, P.O. Box 12, Worthington, Ohio.

30L-1 including connecting cables and new, unused, spare GE 81A. Wired for 720 volt operation. \$395. B & W Matchmaster, Model 529, \$25. Both for \$410. Will prepay transportation to any part of U.S. except Hawaii. Need Collins 302C-3 wattmeter. L. A. Morrow, W1VW, 99 Bentwood Road, West Hartford, Conn. Phones: Evenings 521-0416, Daytime 666-1541.

"HOSS-TRADER" Ed Moory Offers Demonstrator Equipment: Factory Warranty: 2-B, \$239.95; New TK-3, \$489.00; Swan-350, \$339.00; Galaxy III, \$295.00; SB-34, \$319.00; KWM-2, \$875.00; New TH-6-DX Beam & Demo Ham-M Rotor, \$195.00; Two left at old price. New NCX-5, \$585.00; and NCL-2000, \$585.00. Reconditioned: Gear, SH-33, \$219.00; HT-37, \$279.00; 200-V, \$459.00; 100-V, \$379.00; 2-B, \$195.00. Factory Reconditioned KWS-1 & 75A-4, \$975.00; GSB-100, \$189.00; Johnson Ranger II, \$198.00; SX-117, \$229.00; Drake R-4, \$295.00; Swan 240, \$239.00; Swan-350, \$299.00; Swan-400 & VFO, \$395.00; Immediate Delivery, Drake, TR-6, \$585.00. Terms: Cash. Ed Moory Wholesale Radio, Box 504, DeWitt, Arkansas. We have a New Sales Mgr., Jim Ideker, W5FMF, DeWitt Branch Office—Ray Coker Electronics, 724 Lawrence Road, Jackson, Miss.

100-watt mobile, G76, DC supply, 350 Turner mic, all cables, manual, Heliwhip, 10, 15, 20 antenna; complete; \$250.00. WA4QEO, Ted Mueker, 5444 Sanders Road, Jacksonville, Fla. Call nights 305-721-0657.

KCVR RME-4350A; revr ARC-5, 3.5-4 Mc converted; xmtr T-150A Knight; xmtr Globe Scout 65B, phone and c.w. Write for prices and details. W4VRO, P.O. Box 794, Macon, Ga.

HEARING Aids get that OSL without ORM'ing the household; for free information write WA4NRN, J. Moorehead, RR #1, Box 83, Longwood, Fla.

MUST Sell! Collins 32V-2, \$225 or your best offer. Spaulding 32 ft. tower, AR-22, TA-33, Jr. \$125.00 or best offer. Hal Melville, WA4CQ, 500 Gondoliere Ave., Coral Gables, Florida. Tel: MO 7-3286.

K10WATT SSB station for sale: SB-300, SB-400, SB-200, HO-13, HM-11, 50 steel tower, rvr, beam vertical, inverted "V", etc. All less than one year old. Write for details. W9FMW, 1567 Southfield Road, Evensville, Ind. 47715.

SELL: WRL Globe Chief 90 with xtals. In mint condx. \$75.00. D. Covert, 19 College Courts, Barbourville, Ky.

COLLINS 30L-1 linear in A-1 condition. \$350. W9ATU, 1206 Fremont, Belleville, Ill.

SCHEMATICS and parts list for transistorized ham equipment. List 106, Communication Instruments Co., Box 466, Yorba Linda, Calif.

COLLEGE: Must sell entire station: HQ-110, Eico 720/730; Knight V44 VFO plus many extras. WA2UNH, Dave Golden, 464 Neptune Ave., Brooklyn, N.Y. Tel: HI-99519.

24 HOUR kit for 12-hour Tymper (or any clock); GMT-local kit. Either kit, \$1.00, both, \$1.75. Bob May, Box 270, Jonesboro, Tenn.

RANGER II, factory-wired, PTT, in exclnt condx; \$235.00. K11GO.

FOR Sale: Viking II, 1962 SX-101A, Matchbox, Ham-M rotor, Coax, etc, \$575 complete or separately. K1SEB, 28 Allyn St., Mystic, Conn.

WANTED: Collins rack-mounts, one 551R-1 and two 351R-2s, K8VRF, Ontonagon, Mich. Tel: 906-88-4514.

HALLICRAFTERS HT-45, P-45AC. Save \$190 on this brand new, never used linear. First certified check for \$375.00 takes it. Delivered free within 150 miles of Lansing, Michigan. K8PKI: Phone ED-21774, Graham Lyday, 3647 W. Arbutus, Okemos, Mich.

\$135. Mohawk receiver, excnt. Matching speaker, Quittins. Make offer. W6UCL, 3724 8 Ave., Sacramento, Calif.

WANTED: R.F. signal generator; oscilloscope, Q-multiplier, Preselector, recent model, Factory wired, and in perfect optx. condx only. Kurs, 775 Plympton, New Milford, N.J.

MUST Sell: Eico 720 trans., 730 modulator, Hallicrafters HA5 VFO, RME-45 revr w/spkr. All top working condx. Locals can try, \$175 takes all. Shipping extra. John WB2EUM, 176 Kimball Terr., Yonkers, N.Y.

CHRISTIAN Ham Fellowship undenominational non-profit fellowship and missionary organization for hams now being organized. Free details on request. Christian Ham Callbook for \$1 donation. Write Christian Ham Fellowship, 5857 Lakeshore Dr., Holland, Michigan 49424.

RCA Vidicon TV camera tube 7629A brand new. Will accept best offer. NC-303 National receiver, \$250. Heath HX-10 Marauder, \$260. Both arc in xclnt condx. W2FNT, 18 Hillcrest Terrace, Linden, N.J. Tel: 201-HU-6-6917.

NC-400 General Coverage AM-SSB receiver in exclnt condx. W/manual, \$400. Will ship F.o.b. in original carton. Sakal, 62 Bacon Hill Rd., Pleasantville, N.Y.

SEXTANT wanted. Inexpensive but serviceable. Trade? State price and description. W1GPY.

FOR Sale: Collins 51J3 receiver with mechanical filter and cabinet, Hammarlund SP600 JX17 receiver, Rack-mounting, Kleinschmidt 174A teletypewriter with gears for 60 and 100 wpm and tuning fork. All in pert. condx. VOIEC, Box 863, St. Johns, Nfld., Canada.

WANTED: Collins SC-101 station control for KWS-1/75A-4 combination, Donald Husick, 12301 Zavalla, Houston, Texas. BUG: Vibroplex, reconditioned, like \$22 model. Sell for \$12 and W0ROR.

SELL: Heathkit DX-60 and VF-1, \$70; Hallicrafters S-108 with Q-multiplier and S-meter, \$90, or both for \$145.00. Local deal preferred. Stephen Moro, WA2JUSG, 88 Longview Ave., White Plains, N.Y. Tel: 914-946-8023.

CCTV, Grimson wide-angle system, Camera, monitor, sync generator, Vidicon and lens. Complete \$395. Also Vidicon camera, \$150. Marsan 177 monitor, \$125. Burt Cohen, 1801 Drexel St., Hyattsville, Md.

HEATH HW-10 Shawnee, in nice condx, \$139.00. WA1AVF, Rte 2, Box 143A, Storrs, Conn.

VALIANT I, F/W, Matchbox, SWR meter, low-pass filter, key, mic, dual 813 linear, low and high power pack 350 watt modulator and driver. Total price \$250. C-E 20A, 348 VFO, \$100; Millen fone and c.w. 90 watts with 3" scope, \$75. Loads of other material. RA, no shipping. V. Olson, 1430 Foster, Chicago, Ill. Tel: 878-2784.

KWM-2, 516F-2 power supply with spkr. Looks and operates like new. \$775.00. Bob Gibb W6UIM, 345 N. Granados Ave., Solana Beach, Calif. 92075.

LOUISIANA, BC-610 kilowatt RTTY, AM and CW, less accessories. Sell or trade for smaller transmitter like Ranger, Navigator, etc. Mac, K5MVN, 113 Woodcrest, New Iberia, La.

SELL: Cubical quad, W2AU, 2-element for 10-15-20 meters, brand new, never unpacked, complete instructions, \$40; pickup deal preferred. Ed Abbott, 27-04 109th Ave., South Ozone Park, Queens, N.Y. Tel: MI-1-0502.

GONSET Communicator, IIB-6, Either 6v or 12v as per July 1957 QST, 100 Watts, VFO-63, \$35. Also VFO condx. D. E. Scott, K1HDF, RFD 3, Amherst, Mass.

KWM-2, 516F-2, 312B-5, SM-1, Ham Scan, all like-new, less than 1 year old. Will accept closest offer to \$1000. W1MNG, 1003 Wagner Road, Baltimore 4, Md. Tel: 301-825-7296.

COLLINS KWM-1 and AC supply 516F-1, \$375; KWM-1, 516F-1, 12 VDC supply, 516E-1 and mobile mount 315D-1, \$525.00. Joseph Lodate, 4519 Gen. Early, New Orleans, La. 70126.

SELL: KWS-1, 75A4 w/spkr, like new, ship F.o.b. \$1000. W9RIX, 1307 N. Kankakee St., Lincoln, Ill.

MUST Sell: HQ-140X #135; DX60, \$60; Eico 730, \$45. All in gud condx. Local deal. WA2HGI, Paul Gallant, 1642 President St., Brooklyn, N.Y. 11213. Tel: PR-2-2178.

WANTED: Commercial or military, airborne or ground. Equipment and test sets. Collins, Bendix, others. We pay freight. Ritco, Box 156, Annandale, Va.

FOR Sale: DX-100B, \$125; Western Electric, 34-A, \$200; Equipment and Test Sets. Collins, Bendix, others. We pay freight. Ritco, Box 156, Annandale, Va.

FOR Sale: DX-100B \$125; Western Electric, 34-A, \$200; RCO, \$25; S-39, \$25; Concertone, #1401, \$75. Wanted: schematic, controls BC-413-A. W6KEC, 154 N. McKinley Pl., Monterey, Calif. 91016.

ATTENTION! Amateurs! Beach OTH for rent! Completely furnished, permanent all-band antennas affixed. Accommodates eight. Write for reservations. Herbert Brnham, WA4ICB, 861 Dill Bluff Road, Charleston, South Carolina.

TOWER, Vesto 61-foot with crankover head, mast clamp, stored bearing, motor plate, wooden platform. Never erected, stored indoors. \$475. F.o.b. W3LOS, 138 Chautauque, Erie, Penna. 16511.

CENTRAL 20A, QF-1, 458 VFO Gonset Comm. III, 6m, Globe LA-1 linear, make offer. Wanted 75S-1, KWS-1 dial assembly. Box 564, Lehigh University, Bethlehem, Penna. I.

COMPLETE Station: Great condition. NC-300 (dream receiver with speaker, calibrator and manual. DX-100 transmitter with microphone, Dow-Key relay, spare tubes, and manual. Original owner. A Bargain at \$275. K2QBV, J. Korzeica, 111-23 76th Rd., Forest Hills, N.Y. Tel: 212-CH-1462 evenings.

HAVE December 1915 and January 1916 QSTs, the first two issues, and the pro-War World War One copies. Also many issues following World War One. Complete list available upon request. SASE please. Offers solicited. Mrs. P. T. Bennett, 2603 Madera St., Dallas, Texas 75206.

H&K Model 500 tube-tester, \$35.00; HC-221 freq. meter with mod., original calibr. book, A.C. power supply, \$95.00; Elmac PMR6A mobile receiver 550 to 30 Mc, with DC supply, \$45.00. Gonset mobile Converter 3 to 14 mc, \$15; Gonset noise-clipper, \$5.00. All in ex-celnt condx. Ross Macaluso, W2CHM.

WANTED: McMurdo-Silver test equipment and early McMurdo-Silver receivers. Description and price first letter pse. T. McMullen, W1QVF, RFD Collinsville, Conn.

APACHE Transmitter, in mint condx: \$150; D-104 mike, \$20, also xclnt condx. W1PIO. Prefer local deal.

SX-117, year old, in exc. condx in and out, no spkr, \$250.00. Invader 200, factory updated, almost all new tubes, like-new condx: \$350.00. Will ship either, freight collect. Steinhauer, W1LHZ, RD #1, Dallas, Penna. 18612.

ESTATE must sell Viking II, plus VFO Collins 75A1, Gud condx. Best offer accepted. Write KP4YY, 1050 Ashford, Apt. 3B, Santurce, Puerto Rico.

SELL: HA-2, HA-6, P/S, \$350.00; 6N2 T-Rolt F/W, \$450. 8C-1031, \$50. C. Rice, 4183 W. Four Lakes Dr., Linden, Michigan 48451.

SELLING: Collins 32V3 AM/CW transmitter in perf. condx. Two spare 4D32s and other spare tubes, \$200. New, unused 4-1000A, \$50. Joseph Marshall, Jr., 22 Clare Dr., East Northport, N.Y.

SPECIAL Announcement! Celebrate "Illinois Amateur Radio Week" with us by official proclamation of Governor Otto Kerner. The Hamfester Radio Club announces its 31st annual hamfest Sunday, August 8, 1965, at Santa Fe Park, 91st and Wolf Road, near Chicago. The hamfest features: manufacturer and distributor displays, mobile contest, swappers row, games for all ages, food and refreshments, a clown for the kids, and much more. For maps and details, write: John Chass, K9LOK, 5434 South Bishop St., Chicago, Ill. 60609.

WANTED: HRO-7 receiver. Prefer rack model with National power supply and speaker. Please state number of coils, condx, and lowest price in your first letter. R. Bartel, W2AWS, RD-2, Box 31, Kingston, N.Y. 12401.

SELL Hallicrafters S-40B receiver, \$50; National NC-125 receiver with built-in Q Multiplier. Both in ex-celnt condx, used daily on air. Tommy Jones, WA5JV1, Box #8, Madill, Okla. 73446.

COLLINS 30L-1, \$350; 312B-5, \$250; cables and manuals, new condition. Dave Koontz, 5803 Filaree, Malibu, Calif. Tel: GL-7-2119.

SELL: DX-100, \$95; NC-300, \$169. KIYEN, W. Hartford, 233 7485.

COLLEGE Bound: Sell Heathkit DX-40, \$42.00; Heath VFO model VF-1, \$12.00; National rcvr. Mod. NC-125 with Q-multiplier, \$95. All in perf. condx. You pay freight. K8UUX, 729 Allerton St., Kent, Ohio.

DRILL Holder, designed especially for "home-brewers". Attracting engraved panel. Holds: taps, body and tap drills, #2 through 1/4-20, \$2.95 postpaid. Photo, stamp, W9ZWN, C. L. Carter, 737 S. DeQuincy St., Indianapolis, Ind. 46203.

HAVE Copy of Vol 1, #1 (December 1915), and partial inventory of QST magazines starting with February, 1920. Offers solicited. B. M. Harrison, 78 Longfellow Road, Wellesley Hills, Mass.

RANGER II, \$220; HQ-170A-VHF (160-2M), \$295. Perfect condx. Each used less than 20 hours. Look and operate like brand new equipment. Dan Franklin, Rte. 7, Box 401, Tallahassee, Fla.

QSTS: 1945-1959 complete. Asking \$70 plus postage. Miscellaneous QSTs 1942-1944 and ARR. Handbooks. Stamp brings list. W. Noonburg, 3 Boulder Brook Drive, Wilmington, Del.

SELL: SX-117/HA-10, 6 mous. old, mint, \$320; AR-88, \$125; CR-91 (similar to AR88 except 75-500 kc and 1500-30 mc) \$125; Times facsimile M1000 radiophoto recorder, schematics, \$100; BC-454 with PS, \$13; Collins mech. filter adaptor 455 Kc. 1.2 kc b/w, \$35; 2 kc freq. standards (commercial forks), \$15; 250V 50 ma. electronic regulated PS, \$10; "Ultimate" transistor keyer (parts cost over \$100, needs work); \$25; K7MSL transistorized keyer, perfect, \$15; H&V audio rcvr. generator, \$35; W3DZZ Tribander (3-cl. 1.5/20, 5-cl. 10m) \$40. C. B. Smith, K2RM, 1530 Glenwood Dr., Dunellen, N.J. Tel: 201-968-4003.

SELL: Hammarlund HC-10 SSB adapter, \$75; Elmac AF-67, \$75; PS-2V AC p/s, \$35.00; Gonset G-66B w/3-way p/s, \$110; Minneapolis Honeywell W612A mobile transistor p/s 12VDC to 500V and 250 v at 300 Ma. DC. Very rugged construction, \$40.00. All above items in ex-celnt condx. Merle J. Newton, K2KVU, Box 402, RD #1, Utica, N.Y.

FREE! Blue Book List. Leo offers hundreds of bargains on reconditioned gear. Viking II, \$97.00; SX-117, \$289.00; Collins 62S-1, \$59.00; King 500A, \$359.00; Galaxy 300, \$239.00; Heath MR1, \$59.46; HO-140X, \$139.00; Cheyenne, \$49.18; SX-140, \$72.15; SX-101A, \$229.00; SX-71, \$99.00. Many more! Free 1965 catalog. WRL, W0GFQ, Leo, Box 919, Council Bluffs, Iowa.

FOR Sale: 200V Central Electronics. In ex-celnt condx. Make offer. K9UDT, Rte. 1, Gleason, Wisconsin 54435.

KWM-2 and 516F-2 power supply with speaker. Superior condition with Waters Q-multiplier and incremental tuning. E-V mike. Complete station: \$925.00. W2OZQ, 516-MA6-1099, Roslyn, L.I., N.Y.

S-108 for sale, \$105 or best offer. Barely used, Call HENRY 212-GR-55994, NYC, N.Y.

HAVE Warrior. Want DX-100 or DX-100B and SB-10. Will sell. D. C. Hubbard, 3501 Meadowbridge Rd., Richmond, Va. 23222.

WANTED: Small Waterman or Millen scope. Scafax model RRG. W7JFU.

FOR Sale: HQ-110-C, \$115; Harvey-Wells TBS-50C, \$40. Will ship collect on receipt of certified check or money-order. K5UXR, Lloyd Moore, Rte. 1, Box 42A, Colt, Arkansas.

SELL: Complete parts for KW linear 10-80 M, 2-8135, 2-866As. Cost \$175.00 plus. Pick up only, sry. Stephen Clifton, WA2TYF, 800 West End Ave., N.Y., N.Y. 10025.

SELL: Swan 240 rcvr and p/s. Best offer. WA2RUD, W. Levy, Polly Park Rd., Rye, N.Y.

SELL: Rack cabinet 66" panel space, \$22; sliding drawer for cabinet, \$5; Premier DCR 18190 cabinets unused, \$15 each; 35A relay test set, \$10; pair WE hybrid repeat coils, \$5; 40m groundplane, 2" tubing, radials, \$10; 24 Johnson 107 insulators, 50¢ ea.; six noninductive WV rhombic terminating resistors 1 Kw, \$2.00 ea; 5000 ft. #12 copperweld antenna wire, \$2 per C; WE type 40 Jack strips, 2 rows of 20, with jacks, \$5 ea. F. Nosek, W2LBM, 26 Westbrook Dr., Peekskill, N.Y. Tel: 914-LA8-8753.

HQ-170C, \$225; G-76 and DC ES AC supply, \$230; DX-40, \$35. WA2PQV, 4013 Bell Ave., N.Y. 66, N.Y.

COLLEGEBOUND: Sell Heathkit DX-40, \$42.00; Heath VFO model VF-1, \$12.00; National rcvr model NC-125 with Heath Q-multiplier, \$95.00. All in perf. condx. You pay freight. K8UUX, 729 Allerton St., Kent, Ohio.

FOR Sale: RCA VP1, \$20; Mallory VP12-260 Vibrapack, 12 volt, 1000 uF, 500 volts outp., \$11.00. W8WGO, 14487 Washington Blvd., Cleveland, Ohio 44118.

COLLEGE: GS-B100, one year old, original owner, \$225; 75A - manual, product detector, sideband AVC, \$175.00; S-40B, \$45; Hammarlund 4-20, ex-celnt Novice rig, \$35; Johnson 122 VFO, \$15.00; gear located in N.Y.C. Inquire after June 8. Prefer local sale. WA2KHO, Tel: 212-GL-7-8618.

TWOER, new, unmodified, \$45.00. Sixer, modified to 4 watts outp., \$50. Mobile p/s, \$10.00 plus shipping. WA6COE, 8142 Beaver Lake Dr., San Diego, Calif.

FOR Sale: KWM-2, 136B-2, PM-2, 351 D-2, 312 D-5, 516 E-1, CC-2, Trap Traveler Antenna and case, 70% list price; will take 32S-3 on a partial trade. W. H. Jay, K4TWK, Box 516, Douglasville, Ga.

SELL: Collins 75S-1 receiver, 32S-1 transmitter, 51GF2 p/s. Electro-Form mic; used less than 10 hours. \$800. Bert Green, 51 Elmira St., Hallowell, L.I., N.Y.

DRAKE TR-3, RV3, AC p/s, like-new with factory cartons. First \$500 takes all W8BQH. Phone 513-791-4685. Cincinnati, Ohio.

SALE: Sideband Engineers transceiver SBE-33 including built-in AC p/s, DC mobile p/s and mobile mount. In new condx. \$265.00. Also Gonset transceiver G-76 with matching AC supply. New condx. \$205.00. Also Hallicrafters transceiver SR-150 with AC and DC supplies and mobile mounting rack. New condx. \$485.00. W3NEC, Dick Ach, 707 Barclay Lane, Broadall, Penna. Phone 215-353-0226.

MANUALS for surplus electronics. List 10¢. S. Consalvo, 495 Roanne Dr., Washington, D.C. 20021.

COMPLETE Station: Fico 720, 730, 722, Lafayette HE-30 rcvr. Best offer over \$200. Also Fico 722, original carton, \$45. All factors wired in ex-celnt condx. Larry Leventhal, 290 Ninth Ave., N.Y., N.Y. W82DPG.

EVERY ham wants a kilowatt. For \$360 my Collins 30L-1 is yours with connecting cables and new, unused spare G1E 811A. Will prepay transportation to any part of U. S. except Hawaii. L. A. Morrow, W1VG, 99 Bentwood Rd., West Hartford, Conn. Phones: Evenings 521-0416. Daytime 666-1541.

FOR Sale, in ex-celnt condx: Collins AC p/s 516F-2, \$75; Johnson KW No. 106067, less deck, \$500; Johnson KW Matchbox w/SWR br., \$100; Collins 32V-2, No. 2001, \$75; Collins 30S-1 linear, \$30; Collins 51S-2, No. 2001, \$120; National NC-100, \$150.00; National NC-100A, w/spkr, \$50; National HFS 28-230 Mc w/pwr. supp., \$50; C-E MM2 scope w/IF adapt., \$60; C-E compression amp, \$30; Globe Champion 300A, \$50; Zenith transceiconic portable, \$25; RCA signalist sig. gen., \$25; Dumont 274A scope, \$120. W1TJW, Box K, Falmouth, Mass. Tel: 548-3146 days; 548-1891 nights.

HAM, Over 18, to instruct at a children's camp in the Pocono Mountains in Pennsylvania. Own equipment required. Please explain type equipment and further qualifications to Pocono Highland Camps, 6528 Castor Avenue, Philadelphia 49, Penna.

SBE-33, Turner Dynamic mike, mobile p/s and mount. In like-new condx. First check for \$275 takes all. Mitch, WA2UJO, 2946 Northwood Dr., Endwell, N.Y.

JOHNSON Pacemaker, \$165.00; HE-12 12V P.S., \$50; Central Elec. 20A, SSB exciter, VFO, \$90; Comanche rcvr, P.S., \$65. Sell, trade, for Transceiver AC P.S. W2CE.

SELL: 4CX1000A, never used; \$100. Slightly used, \$50. Tom Krueger, 3307 W. 66th pl., Chicago, Ill.

SELL: Harvey-Wells Bandmaster and pwr. supply, original cartons; NC-183 receiver; Advance 115V coax relay; Turner microphone; Millen preamplifier; Instructograph; Heathkit amplifier A-6A; Collair, 4-changer diamond-needle; RCA 45 rpm recorder; QST, new 1951 through 1955; 8 mm movie equip. (trade?). Bernard McConnell, 4410 Cayuga, Bronx 10471.

COLLINS 75S-3, in ex-celnt condx. Will pay shipping anywhere in states. First check for \$475 takes. G. R. Hanson, 1433 Wildwood Dr., N.E. Cedar Rapids, Iowa.

COMPLETE Ham Station for sale: Swan 400, 420VFO, w/117 v.p.s., Drake R-4, HO-10, HO-10, scope, 3-band beam, rotor, tower, mike, bug, \$1200. You pick up, tower and rotor plus other goodies free! Fred Redburn, K6HTU, 240 Loma Vista Pl., El Cajon, Calif. 92021.

COLLINS 75S-3, \$450; 32S-1, \$375; 30L-1, \$375. AC supply, \$60. DC supply, \$100. Call or write, Joseph Michaels, W2MNR, 80 Birch Lane, Woodmere, L.I., N.Y. Tel: 516-CE-9-9227.

HX-11 50 watts c.w. transmitter. Flawless, used little; \$30.00. Everett Battin, W90VD, 522 Parkside Dr., Elgin, Illinois 60121.

COLLINS 32V-3, spare final, coax relay, low-pass filter, manual, mint condx; \$250: Central Electronics MM2 monitor scope, perf., \$65.00; P-38 prop pitch rotoat motor, brand new, \$35; RC-A 4X150A, brand new pair, \$15.00; Gonset code practice RF monitor, perf., \$15.00; Natuna Select-O-Ject audio filter, perf., \$12.00; Denny Guilbert, W9D0S, 603 East High, Urbana, Ill.

SELL: Johnson Pacemaker in gud condx. SSB-AM-CW, built-in VFO, 100 watts, 10 thru 80 meters; \$100. freight extra. K4DPV, St. Petersburg Beach, Florida 33706.

SELL: Apache, scope aligned SB-10, \$210; with SX-101A, \$200. Both in superb condx. K2YMO, Ludutsky, 38 Mead Lane, Westbury, L.I., N.Y. Tel: 516-ED-4-5816.

FOR Sale: SB-33, SBI-LA, power supplies for AC, DC to 1 kw. Webster Antenna with KW coils for 20 and 40 meters, all accessories. Try a KW mobile for a thrill! \$550.00; KWM-1 with all accessories for AC and DC operation, \$500.00; HQ-10 scope, \$50. Heath 1G-2, RF signal generator, new, \$50; 4CX250-R, new, \$25; 4Z-7, exclnt, \$200; 75A-4, #3643, 2.1, 1.1, 6.0 kc. filter, \$550.00; KWS-1, #237, factory modifications, \$750. EV-664 mike, stand, \$35.00. Collins 302C-1, watt-meter, \$45.00. Major James W. Craig, 1646-B Sycamore Dr., Blytheville AfB, Ark, 72317.

SELL: Collins 75S-1, \$315, exclnt, Pacemaker, #135, v.v. gud, WA9ABC, 415 Dewey, Wis. Rapids, Wis.

SELL: Complete 2M FM station now operating base and mobile. Both power supplies, antennas, speakers, microphones; \$175.00. Drake TR-3 DC power supply, new, never installed, \$120. K4AUI, P.O. 297, Buchanan, Va.

HALLICRAFTERS HT-32A, HT-33A, and Drake 2A, multiplier and calibrator, in exclnt condx; \$850. WAYJL, 5902 Appleton Dr., Nowalk, Va.

TELEVISION Studio camera. Page 102, 3" viewfinder, rack focus. Very gud condx, with manual, H-20; binary chassis for 410 sync generator, \$20; Walex Tronix or I, plug-in, 1500 mmd vacuum variable, Holec zoom lens, H-P 608 generator, K4GYO, 430 Island Beach Blvd., Merritt Island, Fla.

HALLICRAFTERS. Best buy yet, like-new HT-37 and comp. SX-111; together for only \$400. Separately, HT-37 \$275, SX-111, \$160.00. Write: W1WGM, Bob Ansell, 12 Peacock Farm Rd., Lexington, Mass.

GONSET Twins complete w/power supply 110V, 6V, 12V all cables, mike, etc. Perf. condx. \$175. K6JJA.

FOR Sale: Certified check only! In exclnt condx. (with all schematics, manuals, inc. conversions), B&W low-pass filter/1 kw, \$15; Hustler mobile antenna/80, \$20; bumper mount, \$10; DKC-TRP auto TR switch, \$25; VX-1 Electronic Voice control, \$25. VQX HP-23 a/c p/s 117v, \$65; HP-13 d/c p/s, 12v, \$35; HW-12 80 SSB xmt, \$150; SB-10 SSB adapter, \$80; DX-100HT/SSB xmt, \$150; TA-33 Triband beam (unpacked), \$100. Totals \$665. Package deal; \$650. Stanley B. Eyre, K1LZA, Hard Hill Rd, RFD 2, Woodbury, Conn.

75A3 Rx \$260; Valiant I, \$195. Both in fine condx and just realigned, K1ZDI, 174 Andover Rd., Billerica, Mass.

COLLINS: Must sacrifice KWM-2 with AC power supply and Collins microphone; \$850. 30L-1 linear amplifier, \$375.00. Both look and operate like new. Phone R. K. Novak, 703-536-9811, McLean, Virginia.

COLLINS KWM-1, A.C. power supply (Collins); Collins mobile mount; \$375.00; Hallcrafters HT-37, Drake 1-A, \$350.00; Gonset 101 amplifier, \$390.00. Cash for all! Need the money for new business. Joe H. Luck, Welcome, Minn.

FOR Sale: HT-32, \$325; 2 & 6 meter converters, \$25; Central Electronics SSB slicer, \$25. Edwin A. Fensch, 474 Parkway St., Mansfield, Ohio

HEATH Shawnee, in exclnt condx, \$170; Heath Sixer and mobile supply, \$45. Dale Kempainen, 8525 M-36, Whitmore Lake, Mich.

MOBILOCK! Incomparable theft protection now available exclusively to KWM-2 owners. Write Transistcs Co., 4452 N. 20th Rd., Arlington, Va.

SELL: HQ-110 with clock, perf. condx; \$180. Eddie George, K3YGL, 895 Kennebec St., Pittsburgh 17, Penna. 15217.

NCX-3, calibrator. NCX-A, like new condx, \$305. W4LMY/3 1515 Woodsdale Rd., Wilmington 19809.

INVADER 200, perf. condx, \$350 or you make offer. BC22IN, \$60. WA9AAX.

DRAKE 2-B, used 2 hours, \$215; calibrator, \$10; HT-41 with new 7094's, \$269; HT-33, \$194; HW-32 with Collins DC p/s, \$194. Elvin Miller, 3845 Kipling Ave. South, Minneapolis, Minn.

COLLINS Gear: Have 32S1, 516F2, 75S1 with or without Waters Q-mount. Sell or trade for KWM-2 complete. Have 75A2/3 spkr for \$7.50. Trade SB-33 and DC supply plus \$350 cash for KWM-2 or even for Galaxy 111 and AC or DC supply. W0BNE, Box 105, Kearney, Nebraska.

XMTRS: 500 watt A.M. Rig (QST design) with p/s and modulator, \$125; Gonset Commander with VFO, \$50; Ranger, \$115; 3-10, \$70, both for \$170. W6SND, 4922 Cecilville Ave., La Crescenta, Calif. Tel: 248-2092.

SELL: Clean Poly-Com PC-6, 115 vac and 12 vdc, complete with mobile mount, mike, instruction book, \$165.00 certified check or money-order. Also teletype converter; model 14 and TD, FM 100-watt mobile unit. Send for list. Cleaning out shack, S. R. Rosenquest, K5RTI, 1301 Clearfield Dr., Austin, Texas 78758.

SELL: CE 20-A xmt with Deluxe 458 VFO (160 thru 10 mtrs), and QT-1, \$125; also NC-303 with calibrator, \$270. Both in exclnt condx. If package deal, add mike and relay, W6BMMG, 2027 Joaquin St., Modesto, Calif, 95350.

MULTI-Eimac station. AF-68A, PMR-8 and AC-DC p/s, exclnt for six meters, \$200; NC-300 in perf. wkg. condx., \$150; six meter halo antenna, \$10. John Fenwick, WA8DAU, P.O. Box 40154, South Charleston, West Va., 25309. Phone 768-4087.

HX-10 Marauder, mint condx; \$275. HQ-129X, spkr, Ameco PCL preamp and p/s, gud condx, \$125.00; Eimac AF-67, PMR-8, mounting racks, pwr, supply, v.v. gud condx, \$195. Hy-Gain trapped vertical, 10-80M, \$115.00. K2BUS, Tel: 516-CU-5-8589.

EXCEPTIONAL Hammarlund buy: original cartons, under 25 hours' use, HQ-170AC rcvr, \$275 (cost \$380); available Ameco F W Nuvisator 2M converter matches rcvr scale, \$25 (cost \$50); HX-50 xmt SSB, AM, CW, \$325 (currently \$500). W2BKQ, Floyd Fellows, Crimson Ave., Malverne, N.Y.

KWM-2, \$750; (recently updated); noise-blanker, \$60, both \$800; SW-240, \$240; 12 VPS, \$70; both for \$300; Heath HP-23 AC-PS, \$30; W/M-1, DX-Adapter, AC-PS, \$400; 2-meter custom-made walkie-talkie, \$35. No trades. Cash. F.o.b. Louis Kocurek, Jr., W5VIV, 418 Country Lane, San Antonio, Texas 78209.

EICO 723; absolute mint condx, inside and out! Factory wired, with manual, new auto, 4 xtal and key, \$50. Bob Greenberg, WB2OIO, 76 Saddlewood Dr., Hillsdale, N.J.

SELL: Heathkit Comanche-Cheyenne, Chromium knobs, AC supply A-1 condx; \$165.00. Consider NC-300 or 303. WA6HFV, Box 98, Bloomington, Calif. Phone 714-877-0464.

MODEL 15, \$85; TT-4A, \$75; 2 TD units, \$45.00 each, F.o.b. Denver. Need: factory-built KW linear, K0ATZ, 2450 So. Quitman St., Denver, Colo. 80219.

EICO 720, 730, gud condx; Hammarlund HQ-100C, in exclnt condx, Best offer. Greg Julow, 8 Woodcrest Dr., South Burlington, Vt.

COLLINS 516E-1 dc supply and 351D2 mobile mount for KWM-2. In exclnt condx, \$300. David W. Langley, W4YDY, 4517 Revere Dr., Raleigh, N.C.

TBS-50-D 7-band Harvey-Wells xmt, \$45; RC-348-L, \$35, including AC supplies. Bill McNally, WBDXR, 3452 Grafton Ave., Cincinnati 37, Ohio.

COLLINS 5114, like new condx; also Delco 12-volt 60 am. alternator with a transistor output. Will swap for American gold coins, rolls, proof sets, Indian-head pennies, W2MCA, Izzy Gruber, 130 Beech St., Valley Stream, N.Y.

MOONBOUNCE, 1296 Mc, for sale. Transceiver, xtal control, 5 kw. pulse-output, will work MCW, 130 or 60 cps in 19" panels. Surplus. Easy conversion. Will trade or will ship. Also want skeds for ground wave 1296. W0FHH, 2123 W. Koenig, Grand Island, Neb.

FOR Sale: HX-50 AM-SSB-CW xmt, 160 M to 10. Like new condx. Need: S/Line, A. H. Greulich, K8HBR, 215 N. Murray Ridge Rd., Elyria, Ohio.

SELL: G-50, mint condx, \$225; or your best offer within reason. Two 6-meter beams; Mosley 40K kit. Best offer. Want: Ham-M or better rotator, W4RLS, Box 26, Russellville, Alabama.

KWM-1 with noise blanker, 516F2 power supply, mobile mount, speaker, mike, extra crystal box, low-pass filter. Also Lafayette HE-45 6-meter transceiver with HE-61A VFO C-E MM-1, scope, new Tecraft 2-meter converters, 6 and 2 meter Duo Beam, T-R switches, power transformers and many other items. Write for list. H. C. Dressel, W2UJF, 2 Genesee St., Batavia, N.Y. 14020.

FOR Sale: Receiver—National NC-240 with speaker, exclnt condx. L.o.b. \$75. W2VP, Barisch, Rte #1, Milton, N.Y. 12547.

SALE: Ranger II P.T.T., immaculate, \$185; Drake RV-3, never used, \$55.00; AR-22 rotor, exc., \$20. All guaranteed. Will ship. W6EJF, Wayne E. Generich, 2301 Canehill, Long Beach 15, Calif.

HALLICRAFTERS SX-110 receiver with Lafayette HE-48 speaker, both in exclnt condx, \$85. Call WBZGW, 212 EV 8th St., New York, N.Y. 10011. George Hawyrsko, 115 South 2nd St., Brooklyn, N.Y. 11211.

RETIRING: For sale, Collins KWS-1, 75A-4 rcvr, serial No. 5146 with verter dial, combination \$1050 or your best offer. All one owner, with instruction books. Prefer not to ship because of weight but have two wheel trailer and can deliver within reasonable distance. Also have back copies QST, August 1953 to August 1960, and CQ May 1959 to April 1961. Ken Myers, W9YJF, 6207 Graham Road, Indianapolis, Ind. Tel: CLifford 3-0585.

KW Warrior Linear, \$150; DX-100 S99, Crating extra ship RR exc. collect, W2QND, 176 Winding Way, Little Silver, N.J.

CIRCUITS from Handbook, QST, CO, etc. constructed. All work guaranteed. Reasonable. Free information, WA6IKV, Whitmore, 3240 Machado Ave., Santa Clara, Calif.

WANTED: Johnson Viking Circuit, State condx and price. John Walter, R.R. #5, Box 25, Valparaiso, Ind. 46383.

HAVE Gone solid state. Will sell Central Electronics 600-L with new 813, \$200; Technical Material Corp. GPR-90 with xtal calibrator, \$220; GSB-1 SSB adapter, \$75; Collins 23 Mc. P.T.O. type 7015 for R38/511 receiver, new, \$45; 4X250B Eimac pair, used, \$30; new 50c Eimac 1000 new, \$85; large Jennings vacuum variable 10-750 Pf, at 10 Kv with mounting bushing, new, \$35; I pay best way shipping and must request payment by money-order or certified check for funds transfer which will be returned if your item has been sold. Don Taylor, K9SFM/DJOKM, c/o Elekluft GMBH, Franzstr. 45/45 Bonn, West Germany.

SX-111, Used 25 hours. Best offer, James Cullen, 109 Thicket Rd., Baltimore, Md.

F/W Thunderbolt, \$265; Courier, \$149; SX-101 III, \$169; Invader 200, \$295; HT-32, \$295; HT-37, \$305; 75S1, \$295; 75S1 W/500 cy, \$325; SBE-33 w/c, \$255; 32S3, \$550; new HT-37s, \$395; KWM-1 w/c, \$349; 75A-4, \$145; HW12, \$115; Ranger, \$99.00. Write for free list. Howard Radio, Box 1269, Abilene, Texas 79604.

WANTED: Standard 19" rack, 30 to 50 inches high. K8VRF, Thomas Perron, Ontonagon, Mich.

NEW HT-41 linears, \$249; A-1 reconditioned Collins 75A-2, \$179; 30L-1, \$349; 75S-3, \$449; 32S-3, \$599; Drake 2-A, \$159; 2-B, \$129; TR-3, \$499; Hallcrafters HT-40, \$49; SX-140, \$79; HT-41, \$199; Hammarlund HQ-170, \$189; HQ-180, \$249; Johnson Ranger, \$129; Valiant, \$159; National NCX-3, \$269; NCL-2000, \$395; Swan, \$V-240, \$49. Many other bargains. Write for lists, Henry Radio, Butler, Mo.

NC-300 perfect condx, \$165; Nuvisator 6-meter converter, \$20; Globe 6N2, VFO \$20. Bill Olson, K1JDY, Garden Lane, Durham, N.H.

WANTED: HRO-60 bandspread coil, type AC. Scott Aronson, Nehercrest Lane, Orchard Park, N.Y.

RANGER II, F.W. PTT, like new condx. \$215.00. KIIGO.

CHEYENNE, Gonset Super 12, mike and mount, \$99. Knight 1-150 and 1-150 and 1-170 or trade for A-1. Precise, W2PWT, Q1219-F1-3-9382, 78-42 264th St., Floral Park, N.Y.

WANTED: K4ZU Bi-nodal coupler or complete G4ZU beam with bi-nodal (coax) coupler. W3FFB, 1434 Denniston Ave., Pittsburgh, Penna. 15217.

GRICE Electronics has Globe 755-A VFO, \$30; Heath Mohawk, \$165; DX-20, \$20; DX-40, \$40; HR-20, \$95; DX-60, \$60; Johnson Ranger, \$125.00; VF-122, \$25; Challenger, \$125.00; De-Luxe Matchbox KW, \$125.00. Write P.O. Box 1911, Pensacola, Fla. 32502.

APACHE TX-1, like new, only \$155. K2EGI.

HEATH Apache TX-1, \$130. Perf. condx. from estate of W2NRZ, Mrs. V. A. Sangregorio, 7512 12th Ave., Brooklyn, N.Y. 11228.

SELL: Complete parts for KW linear 10-80 M, 2-813s, 2-866As. Cost \$175 plus. Pick up deal only. Stephen Clifton, WA2TYF, 800 West End Ave., N.Y., N.Y. 10025.

SELL T-150A, \$75; R-100 (S-meter, calibrator), \$70; both for \$140, A-1 condx. manuals, wired by CCH (careful, conscientious ham), F.o.b. WA6NAT, 2802 Forni, Placerville, Calif. 95667.

HT-40, SX-140, VF-1 w/power supply, D104G, \$175. K1THS, 52 Vauxhall St., New London, Conn.

FOR Sale: Clegg Zeus xmt, mod., p/s, Clegg Interceptor rcvr and all-band tuner, complete, \$675, K9ITR, John Wrobel, 3304 W. Palmer St., Chicago, Illinois.

WILL Sell NCL-2000 linear. Won at Dayton Hamvention. Lists at \$685. Make offer. Buchanan, WA81OA, 11082 W. Broad St., West Jefferson, Ohio.

WANT E. H. Scott radios, factory service manuals, National F87 coils, HQ-120 rcvr, antique xmtg tubes, W2DYU, 277 Herrick Ave., Teaneck, N.J. 836-7632.

CRYSTALS Airmailed: Kits, MARS, Marine, SSB, Nets, etc. Custom finished etch stabilized FT-243, .01% any kilocycle \$500 to 8600 \$1.90. (Five or more same, or mixed frequencies \$1.70). Ten or more same frequency \$1.50 1700 to 20,000 kilocycles \$2.50. Overtones above 10,000, Add 50¢ each for .005%, HC-6/u miniatures above 2000 add 75¢ each. ARRL Kits: FT-243; "DCS-500" & "IMP" \$9.95/set. Low frequency crystals and other kits available. State exact needs. Airmailing 10¢ crystal, surface 5¢. Crystals since 1933. C-W Crystals Box 2065-O, El Monte, California, 91732.

VIKING Kilowatt, No desk, \$600. You haul it. James Nev, 228 North Poplar St., Elizabethtown, Penna. 17022.

WANTED: Summer job, Qualifications: Senior Physics Major at RPI, Amateur Extra, Commercial Telephone and Telegraph licenses, experience in troubleshooting and building equipment. Willing to work almost anywhere. Contact Brian Alson, WA2KSD, Box 186, Cold Spring Harbor, N.Y.

FOR Sale: KWM-2 p/s, \$800; 312B-5 console, \$200; mobile p/s 12v. brand new in carton, \$150, SMI mic, \$20; complete package for \$1100. Call/write: Albert J. Bertolisi, 382 Fulton St., Farmingdale, L.I., N.Y. Tel: 516-CH9-0923.

6 Meter Gonset Communicator IV (late model); Shure 401A mobile mike, Saturn 6 Halo with matching transformer, bumper mount and xtals all in excnt condx. \$250 complete. For positive ground cars (DE inverter for Communicator, \$2. Will demonstrate. Louis C. Johnson, K2VNB, 99-32 66th Rd., Forest Hills, L.I., N.Y. 11374. Tel: 212-IL9-2388.

GOING SSB, Eico 720-730 modulator; 722 VFO (FW), also c.w. monitor, relay, spare tubes. All in excnt condx. \$135.00, V. Lang, K1TLW, 26 Hall St., Newington, Conn. 666-5869.

WANT Ham-M, Gud condx. WB2HZY, C. Burger, 125 Clove Rd., New Rochelle, N.Y.

MUST Sell for college expenses: SR-150 and P-150 AC/supply, 1 yr. old in excnt condx. Knight SWR bridge; B+W 5-band coax switch; Suprecx headphones; AR-22, all parts for SSB-KW. Complete station only \$580. Will sell separately. All inquiries will be answered. Bob Schwartz, WB2ZOSB, 38 Grace Ave., Great Neck, L.I., N.Y. Tel: 516-482-9055.

HUNTER Bandit 2000B excellent condx \$375. Collins PM-2 supply, \$95; Sylvania TV camera, \$275; Swan 175 and AC supply, \$160; 136C-1 blander for 75A-4, \$49; 75A-4 VFO, new, \$49; KWS-1 VFO, new, \$39; KWM-1 VFO, new, \$29. Richard E. Mann, 7205 Center Dr., Des Moines, Iowa.

COLLINS 32V-1, newly tubed and in perf. condx. \$125.00. Astatic 10C SSB mike, \$12. 4D32 tubes, \$10. K7DHL, Box 189, Grand Canyon, Ariz.

HALLICRAFTERS SX-101A, \$300. Ranger w/ptt, \$150; TA-36 beam, \$110; other items, will consider any offer (swap for stereo-hi-fi equipment). K1VLN, J. Crawford, Box 868, Springfield College, Springfield, Mass.

FOR Sale: SX-42, used by non-ham for FM tuner. All hands exc. condx. Will accept any reasonable offer. Contact R. Ross, 530 W. 163rd St., NYC, N.Y. Tel: LQ-8-7037.

SELL: Gonset Communicator III, 6M, \$130; PE-103, connector and spare brushes, \$12.50; f.f. VTVM, General Radio 726A with book, \$40; TS-34-AP oscilloscope with instructions, \$30; Broadcast Band ARC-5, \$17.50. John Nagle, 40 Whittier Pkwy, Severna Park, Md.

HW-12-22-32 owners convert your rig to a Tribander for a total of \$25.00 with these specifications: 200 watts SSB, 170 watts c.w. covering 14-14.35, 7-7.35, 3.7-4.0 Mc. Featuring selectable SSB/Selectable AVC. Completely self-contained for fixed and mobile with neat appearance. Other specifications are unchanged. Average construction time is 4 hours. For complete step-by-step instructions with 17 pictorials and complete parts list with catalog stock numbers and prices, send \$5.00 ppd to Tribander, Robert Christie, WA2SIZ, 88-15 168th St. Jamaica, N.Y. 11432.

FOR Sale—Super-Pro Receiver, SP-400SX with Central Electronics Model B Sideband Slicer with Q-multiplier. Complete, \$159.50. W0HNG.



THE LEAGUE IS YOU!

Working together, the members of ARRL have for fifty years provided the base of support from which our great public-service hobby has grown and maintained the precious privileges that many amateurs now take for granted.

Through membership in the League and affiliated clubs, many people pool their knowledge, their skills, their energy, and a small part of their material resources to help one another. The result is top-notch training programs and publications, top-efficiency traffic nets, community communications programs—and an amateur radio service which is useful to our country and deserving of its privileges.

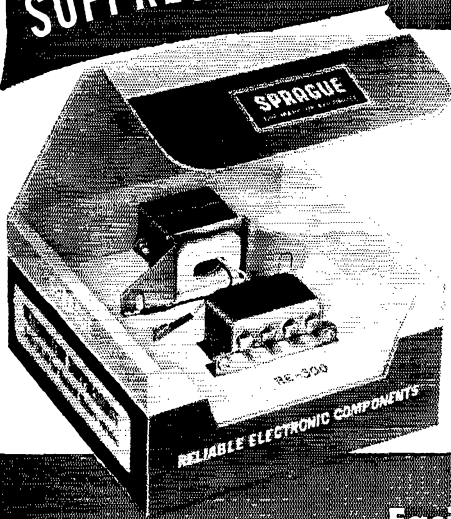
Newcomers gain from the experience of the old timers, and old timers gain from the enthusiasm of the beginners. The more we work together in the League, the greater will be our collective achievements—and our security.

Each and every radio amateur is vital to the League, and the League is vital to each and every radio amateur. Join now with over 100,000 League members so that we can all share more fully in these mutual benefits. League membership, including QST subscription, is only \$5 in the U.S., (additional licensed family members at the same address \$1), \$5.25 in Canada, and \$6.00 elsewhere.

If you are already a member, help strengthen your League by spreading this word to others!

THE AMERICAN RADIO
RELAY LEAGUE, INC.
Newington, Conn. 06111

SUPPRESS RFI IN YOUR MOBILE RADIO GEAR!



NEW!
SPRAGUE SUPPRESSIKITS
FOR VEHICLES WITH
ALTERNATOR SYSTEMS

Easily installed on cars or trucks with citizens' band, amateur, industrial, or public service mobile radio equipment

★ Three different Suppressikits to choose from—Type SK-10 for Chrysler Corp. cars and trucks, Type SK-20 for Ford Motor Co. vehicles, and Type SK-30 for General Motors Corp. equipment.

★ Designed to fit most newer vehicles through the 1965 model year. (for older vehicles, see the SK-1 Suppressikit, below.)

★ Well-engineered L-C Networks and/or heavy-duty Thru-pass Capacitors handle the hash and eliminate the siren-like whine caused by the alternator output.

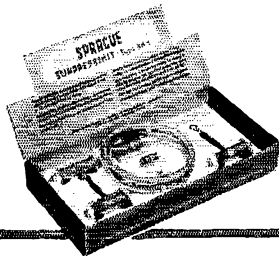
★ Extremely easy to install—no cutting, no soldering, no wiring harnesses. All components are neatly marked and packaged, and come complete with comprehensive step-by-step installation instructions.

★ Provide really *effective* interference suppression through 400 mc, at moderate cost.

★ Will stand up under continuous operation in hot engine compartments.

★ Permit faster, more readable, less tiring communication at greater ranges.

TYPE SK-1 SUPPRESSIKIT FOR VEHICLES WITH D-C GENERATORS

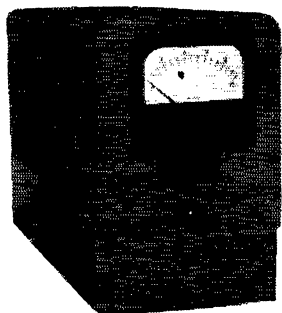


Designed for simple but effective installation. The generator capacitor is built for continuous heavy duty 257°F (125°C) operation. A full 60 ampere current rating plus the high rated operating temperature provide an extra factor of safety against expensive generator burnouts, unlike many suppression assemblies containing general-purpose capacitors. Effectively suppresses RFI through 400 mc. Includes easy-to-follow installation instructions.



GET YOUR SUPPRESSIKIT FROM A SPRAGUE DISTRIBUTOR TODAY!

65-510



VERSATILE FULL POWER DUMMY LOAD HAS BUILT-IN ANTENNA SWITCH AND METER—FOR ONLY \$49.90

Tune up your transmitter for greatest sock—peak your output on the meter! Conservatively rated at 750 watts, this dummy load will easily handle more than legal maximum amateur transmitter ICAS output. 50 ohms, with VSWR better than 1.1 to 1 up to 30 Mc. Four-position internal switch connects transmitter to 1000 or 150 Watt dummy load range, then to antenna A or B. In ventilated shielding case 6" wide, 9" high, 13" deep. Complete, ready to plug into transmitter.

Fully Guaranteed. Made in U.S.A. A Special Value Product by Harrison. Model DLM—\$49.90.

(Charge it, pay as little as \$5.00 a month)

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Be Kind To Your Fellow Ham!

Don't QRM a QSO by tuning up on the air.

JOIN THE SPPDRET

(Society for the Promotion of Putting the Dummy on the Right End of the Transmitter)

For those who want the very best!

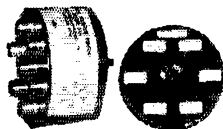


WATERS Deluxe DUMMY LOAD/WATTMETER

Less than 1.3 to 1 VSWR up to 230 Mc. Accurately measures actual RF power into its 52 ohm oil-cooled non-inductive load, with meter ranges of 0-1000, 0-100 and 0-10 watts. Can dissipate full KW for 5 to 7 minutes, then lights warning signal. Compact—only 4¾" wide, 9" high, 10¼" long. A top quality instrument.

WATERS MODEL 344 — \$89.75
(New price as of April 1, 1965)
(Charge it, pay as little as 10% a month)

WATERS COAX SWITCH



Six positions. Lets you instantly switch your transmitter to different antennas or dummy load. Carries full KW. Negligible insertion loss and VSWR. Standard coax receptacles. Complete with attractive plate and knob.

Model 335 — \$12.95

OK, Bill:

I want to help stamp out QRM! I pledge I will tune up and test into a dummy load as much as possible. Send me my SPPDRET badge, free.

Also send me:

- Your Model DLM, for \$49.90
- A Waters Model 334, for \$89.75
- Waters Coax Switch 335, for \$12.95

Enclosed is \$ _____

Or, CHARGE my Harrison Account No. _____

Name _____

Address _____

2 Full Gallons in a pint size container

Nothing under the table . . . National's self-contained NCL-2000 amplifier packs a full 2000 watts PEP in its desktop cabinet. A real rock-crusher, the NCL-2000 delivers up to 1400 watts of peak SSB output into your antenna on the 80 through 10 meter bands, and is fully rated for 1000 watts D.C. input in CW, AM, and RTTY operation.

National's two-gallon package has features you won't find elsewhere at twice the price: two husky RCA 8122 output tubes, designed specifically for high-power SSB service, provide 800 watts of available plate dissipation; adjustable passive grid circuit allows operation with exciters providing from 20 to 200 watts output, and may be used as exciter dummy load for easy

exciter tune-up with amplifier plate voltage removed; ALC output for use with the NCX-5 and other exciters incorporating ALC provisions; separate plate and multi-meters; high-efficiency operation in CW and RTTY modes; all changeover relays incorporated for use with either transceiver or transmitter-receiver combinations; automatic switch-over to exciter-only when plate voltage is removed; and complete safety and overload protection, including lid interlock, automatic B+ shorting bar, time delay, and current overload relays. To top it all off, the NCL-2000 carries National's One-Year Warranty.

Your National dealer will wrap up this potent little package for you at the pint-sized price of \$685.



NATIONAL RADIO COMPANY, INC. 

37 Washington Street, Melrose, Massachusetts, 02176 World Wide Export Sales: Auriema International Group,
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RCA RECEIVING TUBES



...for that "New-Receiver" Performance

Capable of making the most of every microvolt of signal and every kc of bandwidth, modern amateur receivers are a tribute to engineering ingenuity. RCA is proud that leading designers specify RCA Receiving Tubes. Here's why they do:

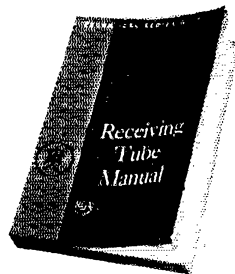
RCA Receiving Tubes have **LOW BACKGROUND NOISE**—a feature that enables the designer to achieve greater signal sensitivity through better signal-to-noise ratio. RCA tubes have **LOW HUM**—an advantage that helps get more from signals down "in the mud." **HIGH ELECTRICAL UNIFORMITY**—makes tube replacements easy. **SUPERIOR STABILITY**—assures freedom from drift and minimizes variations in gain with tube life. And mark this: Only RCA Receiving Tubes have the **DARK HEATER**—a feature that reduces heater-associated defects as much as 20 to 1.

Re-tube with "RCA's"—and hear the difference. RCA Receiving Tubes are available from your Authorized RCA Distributor.

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NOW AVAILABLE—Latest RC-23 Receiving Tube Manual

Want complete receiving tube data at your finger tips? Pick up your copy of the new RC-23. It contains a record 608 data-packed pages of easy-to-read technical information on more than 1000 receiving tube types. Extensive sections on tube theory, application and installation are included. It's a must for every shack. See your RCA Tube Distributor for a copy. Or, send \$1.25 to Commercial Engineering, Sect. 337, RCA Electronic Components and Devices, Harrison, N.J.

The ARRL National Calling and Emergency Frequencies

FULL TIME*

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

PART TIME**

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

GUARD SEGMENT

3548.5-3551.5
3872-3878
7098.5-7101.5
29,637-29,643
50,547-50,553
145,347-145,353

*For traffic and emergency calling 24 hours per day, 365 days per year. No transmission of any kind (except calls for emergency help) the first five minutes of each hour.

**For traffic calling and general amateur use except during FCC-requested or FCC-declared emergencies, at which time operation is the same as full-time frequencies listed above.

Rules for Use

1) For emergencies, use QRRR on c.w. and RTTY, call "CQ Emergency" on voice. If your call is answered, transmit the following information as a formal message: (a) your location, as accurately and detailed as possible; (b) the nature of your emergency situation; (c) the nature or type of help required. After sending the message to the answering station, stand by on frequency for further traffic, questions, or to assist anyone trying to help you. If your call for help is not answered, or if you are able to transmit only, send the message requesting help again and again, for as long as possible, to permit monitors to locate you and copy you. Through repetition your message will be copied, even though your signals are weak.

2) On full-time NCEFs, the first five minutes of each hour are reserved for emergency calling only. Never transmit on a full-time NCEF during that time for any other purpose.

3) Always clear any NCEF when an emergency call is heard, regardless of the time of day or night. Emergency calls have first priority over all other transmissions.

4) Use the NCEFs to move any traffic you are unable to clear on established networks. CQ your traffic list on an NCEF (but not during the first five minutes of the hour on full-time NCEFs), then move off the frequency with answering stations to handle it. Make calls short. Listen frequently and carefully.

5) Use the NCEFs for calling and answering only. Except for actual distress messages asking for emergency assistance, all traffic should be handled (at least 5 kc.) off the NCEF. As soon as contact is established, move to another frequency to complete the communication.

6) Monitor full-time NCEFs (and part-time NCEFs during emergency) with a spare receiver whenever you are in your shack. Be prepared to answer any emergency calls heard thereon. A receiver operating squelch on one of the v.h.f. NCEFs is especially desirable.

7) Notify any casual station heard operating on a full-time NCEF (or a part-time NCEF during emergency), asking for his cooperation in this voluntary program. ARRL can supply notification cards on request.

The use of the frequencies and frequency segments listed on the other side of this card represents a voluntary program undertaken by radio amateurs to provide immediate emergency communication in any distress situation, and to make available channels normally kept clear for this and other calling purposes. This program was first initiated in 1948 and has assumed many forms since then.

The program is completely voluntary, one which we amateurs must enforce ourselves without FCC "teeth." Experience has indicated enforcement sometimes difficult, but not impossible. Successful operation of the NCEF program in accordance with the rules stated will demonstrate to all, and to FCC in particular, that we amateurs are a public service and can set ourselves up to perform as such without FCC regulations for this purpose.

The frequencies selected are in various portions of amateur phone and c.w. bands. Admittedly, they will not be ideal from everybody's standpoint. Nevertheless, every amateur should equip himself with the capability for utilizing one or more of the listed "full time" frequencies, especially if he operates mobile, so that he is ready to perform an emergency service at any time called upon.

A few observations regarding their use would appear to be in order.

The designation of certain NCEFs as "full time" and the others as "part time" is based primarily on past use of the various frequencies during emergencies. The lowest NCEF, 3550 kc., has always received the most use, so it seems obvious that this should be full time. Others which have received widespread use in the past have been 3875 and 7100 kc., so these also have been designated full time. NCEFs on 10, 6 and 2 meters have been designated full time not so much because of their use in past emergencies as for their ease in monitoring using receivers equipped with squelch.

The other six NCEFs, including those on the

so-called DX bands, have been designated "part time," to be used as NCEFs only *during periods of FCC-requested or FCC-declared emergencies*. The Alaska earthquake proved such frequencies useful; for traffic calling they always can be an asset. These NCEFs, having limited use during normal times, in the event of an FCC-requested or FCC-declared emergency immediately assume the status of full-time NCEFs until the emergency is terminated.

The five-minute listening period at the beginning of each hour on full-time NCEFs emulates commercial practice, which has proved successful for decades. The only difference is that with us it is *voluntary*. This means that it will work only if we *make* it work.

Note that the NCEFs are to be used regularly *for establishing contact for the purpose of handling traffic* except, of course, during the five-minute listening period. Most traffic is handled routinely on regular nets. The amateur with an occasional message to handle, or the traffic operator "stuck" with traffic, may find it possible to clear it by a directional or specific-place call on one of the NCEFs. From time to time stations of the National Traffic System will monitor these frequencies in order to guide "stray" messages into regular traffic channels.

Notification cards (a special ARRL form) are provided for those wishing to monitor the NCEFs to advise amateurs operating casually there about the NCEFs and ask for cooperation. They may be obtained, in limited quantities, from the ARRL Communications Department, 225 Main St., Newington, Conn. 06111. These cards will put the notification in its proper perspective and avoid ill feeling.

This is a widespread voluntary program that requires cooperation from all. A few can spoil it. Its success, however, will be a large feather in the cap of amateur radio's ability to regulate itself and at all times be ready to perform a public service. We can do it if we *will* do it.

— ARRL Communications Department