

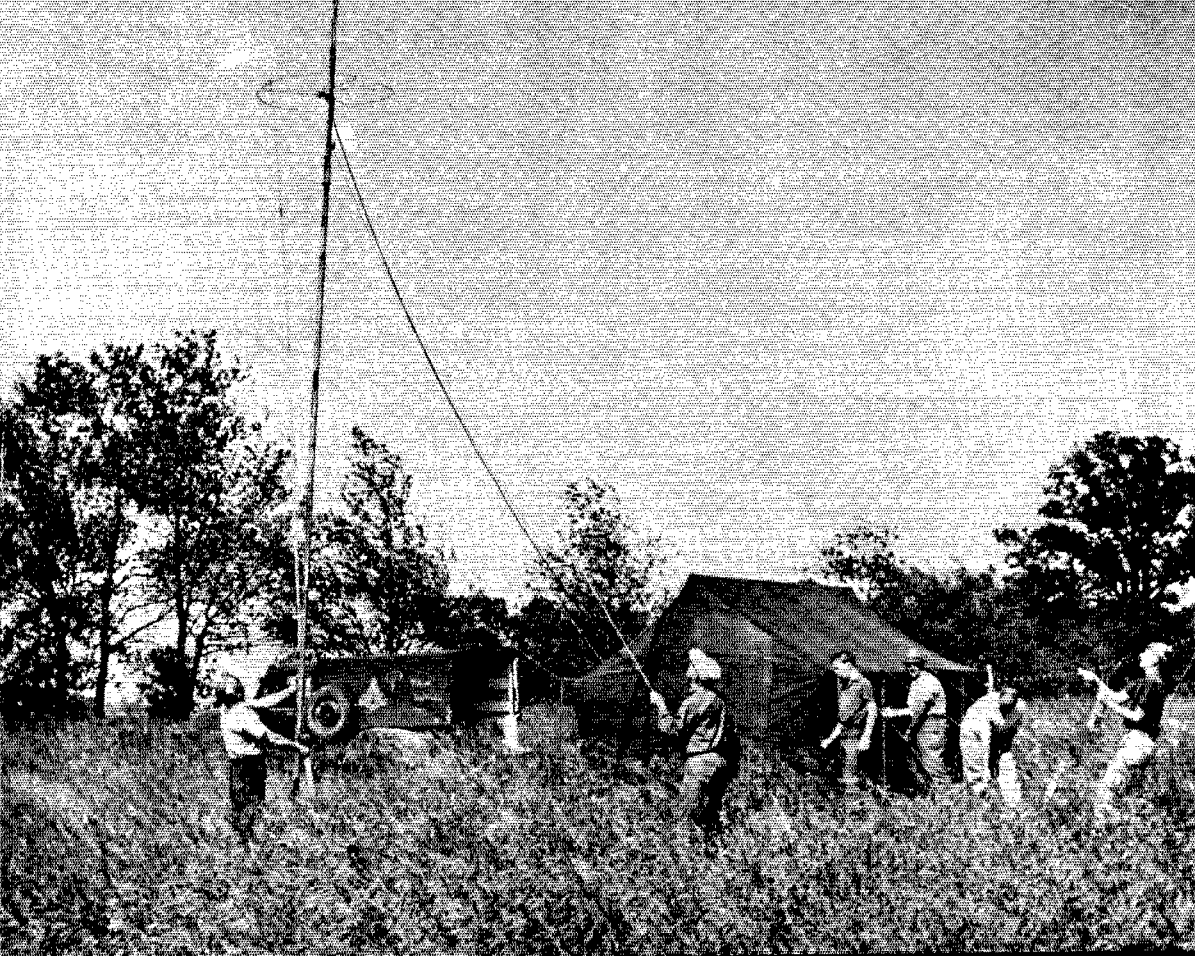
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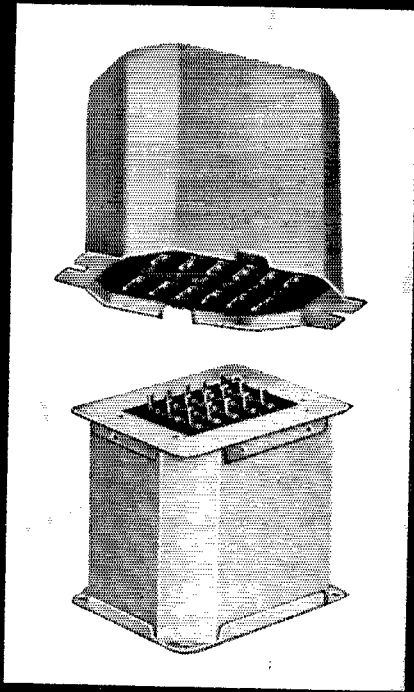
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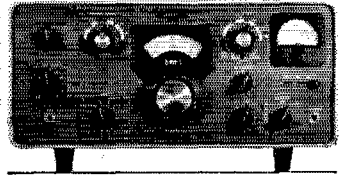
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QST

JUNE 1966
VOLUME L NUMBER 6

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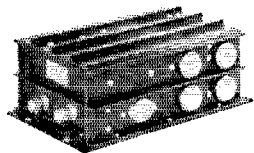
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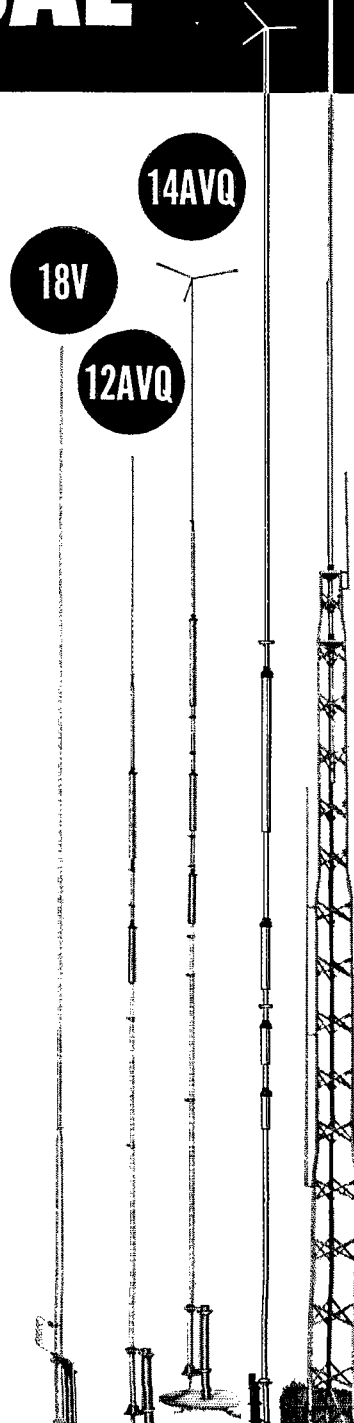
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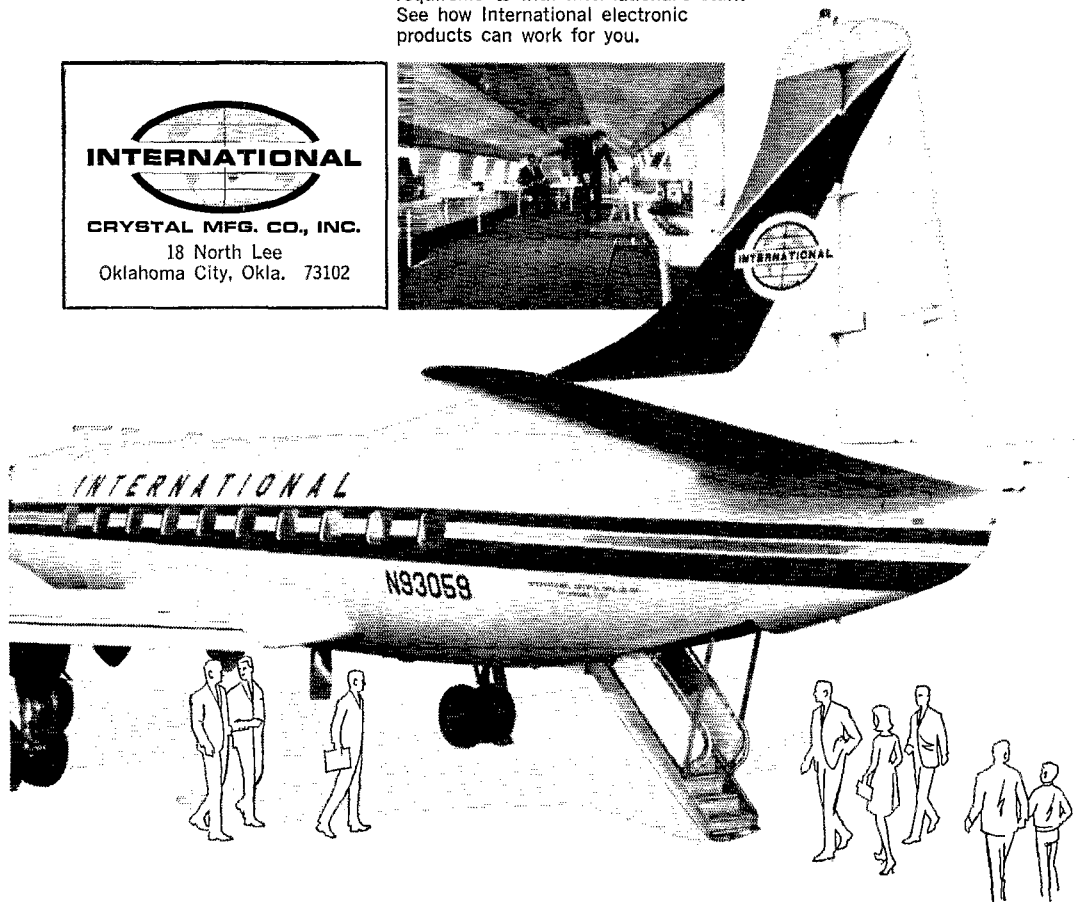
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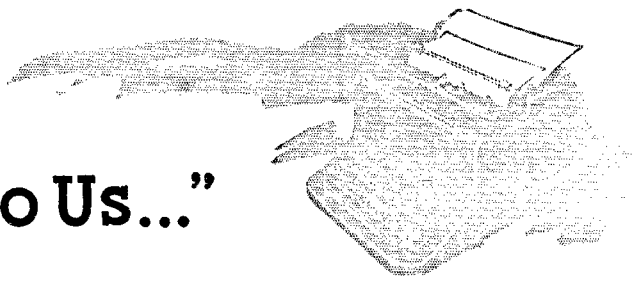
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W6ZH—A TRIBUTE

The past four years have been milestones in the life of the League, due in great measure to the outstanding leadership which has been provided by Herbert Hoover, jr., W6ZH.

During his tenure as President of the American Radio Relay League, our society has taken an increasingly greater part in the affairs of the International Amateur Radio Union; we have recommended that the FCC adopt an expanded form of incentive licensing to raise amateur proficiency; we have advocated an ARRL program aimed at improving operating and technical standards; we have started to lay the groundwork for a forthcoming international radio allocations conference; we have attained a commemorative stamp, an amendment of the Communications Act to provide reciprocal operating agreements, more privileges on 160 meters, a new v.h.f. handbook, a "junior" handbook, an operating manual in preparation, a revised agreement with the American National Red Cross, the formation of the Amateur Radio Public Service Corps, and the creation of a Maxim Gold Medal Award; we have commemorated the 50th anniversary of the League, and *QST*; and we have moved into a new headquarters building at Newington, completely refurbished W1AW, and are nearing our goal in the Building Fund.

While, as our President himself admonishes us, we have by no means achieved all the goals he envisioned, nor has the path been easy, forward progress during these past four years has been outstanding. The League staff, and your Secretary/Editor personally, have found it a real challenge serving under Herb Hoover. We feel the deepest regret that personal considerations do not permit him to continue in the office, yet no one knows better than we at Headquarters the extent to which presidential duties he enthusiastically assumed have made an impact on personal and business life. We are grateful for the four years of his leadership our League was privileged to have, and reassured to know that his wise counsel and guidance will continue to be available, through his successor and other officers, because of his wholehearted dedication to the advancement of amateur radio.

DXPEDITIONS—A CAUTION

In recent years expeditions to remote areas have provided lively interest for the DX-minded among us. Properly organized and conducted, they have been and can continue to be high spots in the challenging game of DX.

We must express a warning, however, concerning a more recent trend of laxity among some DXpeditioners as to the validity of their exotic-area licensing documents. There have been several incidents in which amateurs (mostly U.S., but some others as well) were too eager to accept the word of a local or minor official as to operating authorization, without bothering to determine whether such people had the power to grant privileges. Such incidents are hardly a contribution to international relations since they incense the legitimate amateurs and national societies in parent countries who play the game by the full rules. In administering DXCC affairs, the League cannot undertake individual and detailed investigation of the validity of each and every operation authorization; normally we must assume that such operations are legitimate, unless there is a warranted challenge of legality. In a few of the latter instances, credits have had to be withdrawn.

Perhaps in most cases the DXpeditioners were acting in good faith, knowing of the haphazard procedures which (it must be admitted) exist in some remote areas, and so specific instances are best left unstated here. We can better understand the feeling of our foreign brethren by a fictitious but parallel example in the reverse direction: How would we—or our government!—view the operation of a Lower Slobbovian amateur in the Virgin Islands on the basis of a Harbormaster's okay—without reference to FCC?

Organizing a DXpedition—or any plans for operation on foreign soil—should include meticulous attention to the authenticity of licensing documents. Failure on the part of voyaging amateurs to assure themselves on this point can destroy much of the healthy international relationships most DX activity helps create, and might ultimately cause a reappraisal of the granting of new-country status to DXpeditions.

QST

COMING A.R.R.L. CONVENTIONS

- June 3-5 — West Gulf Division, Arlington, Texas
June 4-5 — Georgia State, Atlanta
June 18-19 — Rocky Mountain Division, Colorado Springs, Colorado
July 2-3 — West Virginia State, Jackson's Mill
September 16-17 — Ontario Province, Niagara Falls
October 15-16 — Hudson Division, Tarrytown, New York
October 21-22 — Great Lakes Division, Muskegon, Michigan

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

ROCKY MOUNTAIN DIVISION CONVENTION

Colorado Springs, Colorado June 18-19

The ARRL Rocky Mountain Division Convention will be held in the City Auditorium, Colorado Springs, Colorado, Saturday and Sunday, June 18-19, under the sponsorship of the Pikes Peak Radio Amateur Ass'n., Inc.

There will be many unusual activities, including a Chuckwagon style dinner, served by the famous Colorado Springs Jaycees. Tours of the Air Force Academy and the local Civil Defense operation will also be offered.

Transmitter hunting, mobile antenna measurement, a swap and shop, exhibits, and an optical maser display and talk by representatives of the Mountain States Telephone Company will be featured. Colorado Springs, the home of NORAD, nerve-center of our national defense, has much to offer the visitor interested in communications.

The general convention program will include a talk entitled "Fifty Years of Progress in Amateur Radio" by ARRL Assistant General Manager Dick Baldwin, W1IKE; "Matching Antennas" by QST Novice Editor Lew McCoy, W1ICP; a presentation by Burt Bittner, of Kaman Nuclear, on his "current discontinuity" antenna; code speed and left-footed c.w. contests; technical talks on v.h.f. and u.h.f. varactors, v.h.f. scatter, and slow-scan amateur TV; MARS meetings; ARPSC and DX forums; a Royal Order of the Wouff Hong initiation ceremony and many other attractions.

The fantastic scenery and tourist facilities of Colorado Springs, plus the spaciousness of the City Auditorium, offer the promise of a fine ARRL convention. Registration until June 1 is \$3.00; \$4.00 after that. A steak chuckwagon dinner and show in the Garden of the Gods Saturday night will cost \$3.00 and Sunday luncheon, \$2.50; both meals, pre-registration price, \$5.00.

Registrations should be addressed to the ARRL Convention Committee, 4 Chula Vista, Manitou Springs, Colorado.

WEST VIRGINIA STATE CONVENTION

Jackson's Mill

July 2-3

The 1966 West Virginia State ARRL Convention will be held on Saturday and Sunday, July 2-3, 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, S.W.O.O.P. for the XYLs, Army and Navy MARS meetings and the midnight initiation ceremony of the Royal Order of the Wouff Hong. On Sunday there will be meetings of WVN (phone and c.w.), the presentation of various awards, and other activities. ARRL Hq. will be represented by National Emergency Coordinator George Hart, W1NJM.

Full registration is \$8 per person, which 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, specify number of men and women in party for proper lodging placement.

Full registration requests should be sent to Dorothy Morris, 1136 Morningstar Lane, Fairmont 26554. \$2 tickets are available from Bill Godwin, K8TPF, RD#2, Elkins 26241. For additional convention information, contact Dave Newlon, W8MLX, Convention Secretary, 1106 Montrose Drive, South Charleston 25303.

IMPORTANT NOTICE

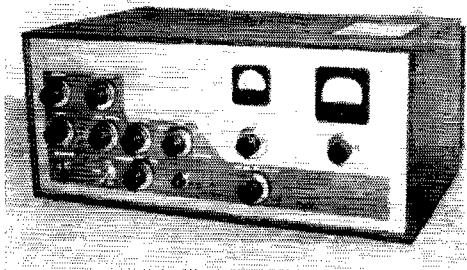
Changes of Address

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

OUR COVER



Field Day! Hams will be hauling together to get those antennas up, just like this club was doing a year ago. Members of the Kalamazoo ARC, W8VY/8, shown here include WN8-PMK, W8ELW, K8MPN, K8CPX, W8EMD, and K8SZP.

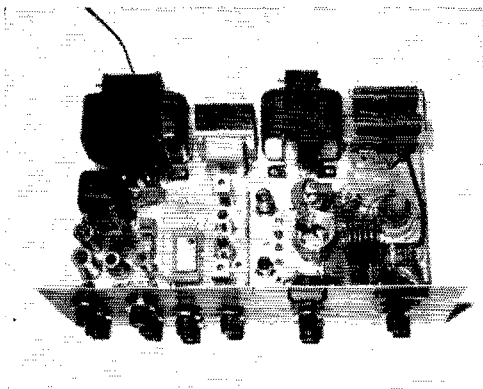


This attractive s.s.b. package of rack-panel dimensions includes a 450-watt (p.e.p. input) linear complete with power supply. A considerable measure of the compactness is made possible by taking advantage of oscillator signals available in some of the current popular-model receivers.

450-Watt Multiband Unit

Using Receiver-Oscillator Drive

BY VAROUJAN KARENTZ,* WIYLB



The subassemblies containing the audio section, balanced modulator, crystal filter and first mixer are in the lower left-hand corner of the chassis. The second mixer and driver are at the center, and final-amplifier components to the right. Power-supply components occupy the rear portion of the chassis. The audio section, as shown, includes some circuitry not pertinent to this article.

An S.S.B. Transmitter for Transceive Operation

Although there are one or two exceptions in manufactured equipment, most s.s.b. transmitters designed for transceiver operation with a companion receiver include circuitry for operation independent of a receiver. This transmitter circuitry, which duplicates oscillator stages in the receiver, lies idle in transceive operation. Considerable savings in the construction of an s.s.b. exciter for transceive operation can be realized by eliminating this duplication.

WHILE this article describes a multiband s.s.b. transmitter capable of transceive, independent, or remote operation, the main purpose is to demonstrate the transmitter simplification that is possible by taking advantage of the circuitry already existing in some of the recent-model receivers to provide the various r.f. signals normally needed in an s.s.b. transmitter. The inclusion of a high-power linear amplifier as an integral part of the transmitter yields maximum watts per cubic inch of cabinet space, and also contributes to keeping construction costs down by eliminating the extras normally associated with building a linear amplifier as a separate physical unit.

Borrowing of equivalent circuitry from the receiver makes it possible to eliminate all oscillators from the transmitter chassis. These include the upper- and lower-sideband crystal oscillators, the v.f.o., and the 5- to 8-crystal heterodyne oscillator normally needed to convert to the desired operating band. The result is a reduction of almost 50 per cent in the cost, size, and labor involved in the construction and adjustment of an equivalent s.s.b. exciter of the conventional type.

* Walnut St., Millis, Mass. 02054

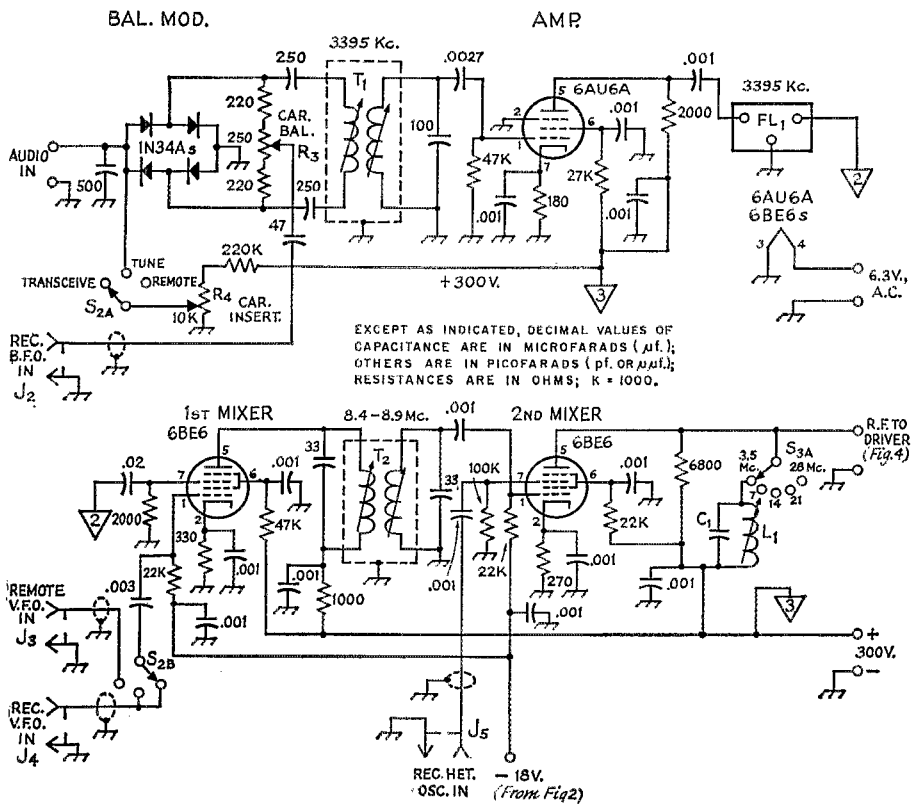


Fig. 3—Balanced-modulator and frequency-conversion circuits. Capacitors of decimal value are disk ceramic; others are silver mica or NPO ceramic; fixed resistors are 1/2-watt unless indicated otherwise.

- C₁—Selected to tune with L₁ to desired band.
- FL₁—3395-kc. crystal filter, 6-db. bandwidth 2.1 kc. (Heath 404-200, or James Knight JKF6A1 ORN-S).
- J₂, J₃, J₄, J₅—Phono jack.
- L₁—Coils wound on 3/8-inch iron-slug form, adjusted to resonate with C₁ at center of desired phone band (at 28.8 Mc. in the 10-meter band).
- R₃—Wire-wound control.

- R₄—Linear control.
- S₂—Two-section 2-pole 3-position ceramic rotary switch.
- S₃—(See Fig. 4 for S_{3B} and S_{3C})—S_{3A}, S_{3B}—Two-section 5-position ceramic rotary switch (assembled from Centralab 2500 series components); S_{3C}—High-power single-section 5-position rotary switch (Ohmite 111-5, or similar).
- T₁, T₂—Modified 4.5- or 5-Mc. i.f. transformer (see text).

easily made. With some other receivers, it may be necessary to make these connections internally. An inspection of the receiver circuit diagram should reveal the appropriate points for oscillator-signal take-off. Care should be taken, of course, to make sure that all oscillators are functioning in the receiver's standby or muted condition.

Initially, consideration was given to the use of the crystal filter in the SB-300 for transmitting as well as receiving, thereby saving the cost of an identical filter in the transmitter. However, this would have required extra control wiring, and a switching relay with input and output cables between the receiver and transmitter. In the end, simplicity won over cost, and a duplicate replacement filter was purchased for use in the transmitter.

Sideband-Generator Circuits

The audio circuitry shown in Fig. 2 is quite conventional. Output at low impedance is pro-

vided for the balanced modulator by the use of the cathode follower V_{2B}. VOX and antitrip circuits are included. One pole of the VOX relay shorts the audio output in the receive position. If a 500- or 600-ohm tap is available on the receiver speaker output transformer, this may be fed to the input of the antitrip tube. As an alternative, a speaker output transformer with a 600-ohm or higher-impedance secondary can be connected in reverse, with the low-impedance winding connected to the speaker voice coil, and the secondary to the antitrip input.

Fig. 3 shows the circuits of the balanced modulator and mixer system. The diode ring-type balanced-modulator and following amplifier circuits are similar to those used in the SB-400 transmitter. Several other balanced-modulator circuits for single-end audio and r.f. insertion were tried. However, the circuit shown affords the greatest ease of adjustment, and no capacitive null-balancing compensation was necessary to obtain 32 db. of carrier suppression as measured

with a v.t.v.m. and r.f. detector. T_1 is a surplus 5-Mc. transformer, capacitively-loaded in the secondary to retune to the center frequency of 3395 kc. so as to pass either the upper- or the lower-sideband carrier frequency (3393.6 or 3396.4 kc.) coming from the SB-300 b.f.o. Since the b.f.o. output amplitude proved to be the same on both frequencies, no amplitude-balance provisions were necessary in switching sidebands.

Carrier insertion for transmitter tune-up and c.w. operation is accomplished by applying a variable d.c. voltage to the diode modulator through a 10,000-ohm divider control R_4 , thus upsetting the modulator balance. Even with the carrier 20 db. or so down on the slope of the crystal filter, more than enough carrier signal passes through the filter to provide adequate drive to the output linear for full output. The 6AU6A amplifier not only serves to amplify the low-level signal from the balanced modulator, but also to isolate the modulator from the filter and present the necessary 2000-ohm input impedance required for the filter.

The old reliable 6BE6 pentagrid converter tube is used in both mixer stages. These stages are controlled by the VOX relay which applies approximately 18 volts of bias to the No. 1 grids on standby, thus effectively eliminating any signal feedthrough. T_2 must pass the band of 8.4 to 8.9 Mc. which results from mixing the 5- to 5.5-Mc. signal from the receiver v.f.o. with the 3395-kc. s.s.b. signal from the filter. A double-tuned bandpass coupler was necessary

to provide a comparatively flat pass band and discriminate against unwanted components in the mixer output. This coupler consisted initially of two slug-tuned coils mutually coupled. However, this arrangement was eventually replaced by another surplus 5-Mc. i.f. transformer, principally because of the shielded construction. The internal 100-pf. capacitors were replaced by 33-pf. units, and two slug-tuned coils of the transformer were tightly coupled, and readjusted to tune to about 8.7 Mc. By proper adjustment, the critical coupling point was found, and a response flat within a satisfactory 6-db. amplitude limit was achieved over the required 500-ke. tuning range. Standard 4.5-kc. interstage i.f. transformers may be similarly modified.

It should be noticed that signal insertion to the grids of the second mixer are in reverse of the usual order, the oscillator signal feeding the No. 3 grid, while the first-mixer output signal is fed to the No. 1 grid. This change resulted in the elimination of bothersome spurious components in the output of the second mixer. These spurious products may have been the result of improper injection voltages, which were not controlled, or because of the inherently poor selectivity of the resistance-loaded output circuit.

To make it possible to operate the receiver and transmitter on different frequencies for DX and other purposes, J_3 is provided for feeding in an external independent v.f.o. Any stable v.f.o. covering 5 to 5.5 Mc. and delivering at least 5 volts of signal across 22,000 ohms will suffice. I

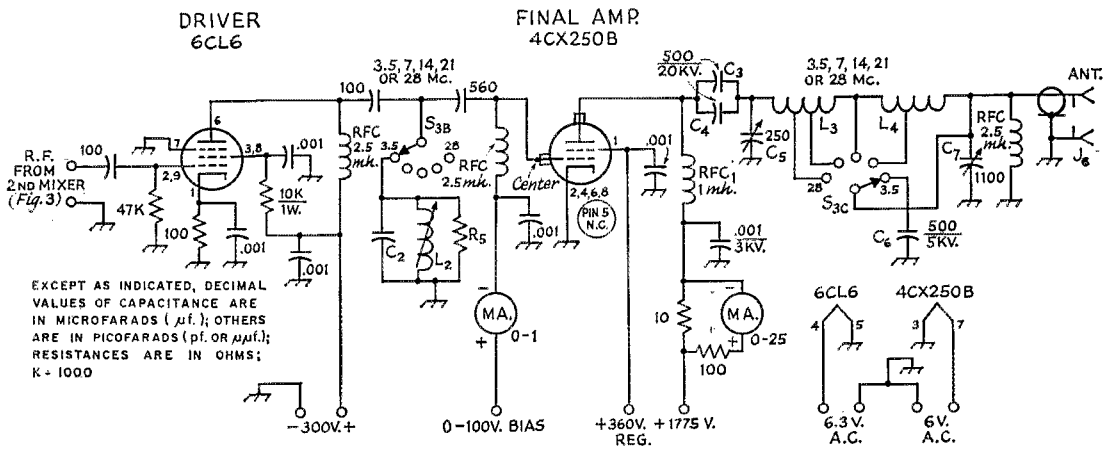
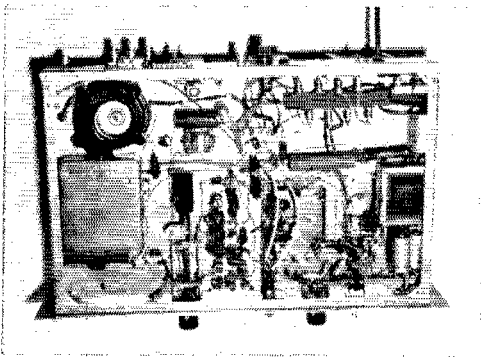


Fig. 4—Driver and final-amplifier circuits. Fixed capacitors of decimal value are disk ceramic; others, if not listed below, are silver mica. Fixed resistors are 1/2-watt unless indicated otherwise.

- C_3 —Selected to tune with L_2 to desired band.
- C_3, C_4 —TV ceramic doorknob type (Sprague 20DK-T5).
- C_5 —3000-volt transmitting variable (Johnson 154-9, or similar).
- C_6 —Mica or ceramic (Centralab 858S-500).
- C_7 —Triple-gang broadcast replacement-type variable, sections connected in parallel (Miller 2113, or equivalent).
- L_2 —Coil wound on 3/8-inch iron-slug form, adjusted to resonate with C_2 at center of desired phone band (at 28.8 Mc. in the 10-meter band).

- L_3 —6 turns No. 10 wire, 2 1/4-inch diam., 5 turns per inch, tapped at approximately 2 1/2 turns and 4 turns from C_5 end.
- L_4 —Approximately 18 turns No. 14, 2-inch diam., 8 turns per inch, tapped at approximately 9 turns from C_5 end (Illumintronics Air Dux 1608T).
- R_5 —Adjust value, as necessary, to stabilize final amplifier and driver.
- RFC1—1-mh. 300-ma. r.f. choke.
- S_{3B}, S_{3A} —See Fig. 3.



Bottom-chassis view. Second-mixer and driver coils are to the left of the two-section band switch (S_{3A} - S_{3B}). The shaft of this switch terminates in a right-angle drive coupled to the final-amplifier band switch (S_{3C}) above deck. The cut-out in the upper left-hand area exposes the two sub-assemblies mentioned in the text. Low-voltage filter components are along the left-hand edge of the chassis, with the high-voltage rectifiers in the lower left-hand corner. On the right-hand side is the blower which exhausts into the box covering the 4CX250B socket. The screen-voltage relay is to the left of the blower.

The low-voltage supply furnishes 300 volts (through a suitable voltage-dropping resistor) for the exciter stages, and regulated 360 volts for the final-amplifier screen. Screen and plate voltages are applied simultaneously to the 4CX250B by means of K_2 which is actuated by the high-voltage switch S_4 . A half-wave rectifier operating from the low-voltage transformer supplies AB_1 bias for the final amplifier, and blocking bias for the two mixers on standby.

The use of semiconductor rectifiers in the low-voltage supply leaves the 5-volt filament winding of T_2 free. It was found by measurement that this winding actually delivers 6 volts under the approximately 2.5-ampere load of the 4CX250B heater. However, I should add that the line voltage at W1YLB averages 125 to 130 volts, so this heater voltage, as well as all other output

voltages, may not be quite as high in some locations as those indicated in Fig. 4.

Ventilation

Of some concern in using tubes requiring forced-air ventilation is the annoying noise often generated by the blower. A surprisingly quiet, compact and adequate blower was assembled using a 3200-r.p.m. phonograph motor, and a 4-inch squirrel-cage blower assembly. The motor is mounted on top of the chassis, and the blower underneath with its outlet feeding into a $4 \times 4 \times 2$ -inch pressurized box which encloses the 4CX250B socket. The calculated air flow, while not sufficient according to Eimac specifications for continuous maximum-power service, does keep the seal temperatures well within the specified maximum of 250 degrees C. In over two years of operating, no discoloration of the tube's external anode from excessive heat, or degradation in power output has been noticed.

Construction

It is not anticipated that the reader will duplicate exactly either the circuitry or the construction, and therefore many of the mechanical details will not be described. As is usual with home-brew equipment, junk-box and surplus components were used when and where they were suitable. In addition, the cannibalizing of an old 100-watt a.m. rig that had long been in retirement, helped materially in obtaining components and hardware.

The entire transmitter, including the high-voltage supply, was constructed on a $12 \times 17 \times 2$ -inch chassis. The audio stages, including the VOX amplifiers, were built on a separate $2 \times 4 \times 6$ -inch chassis as were the balanced modulator, crystal filter, amplifier and first mixer. These two subassemblies are bolted on top of the main chassis which has a large cut-out in this area to provide access to the under sides of the small chassis.

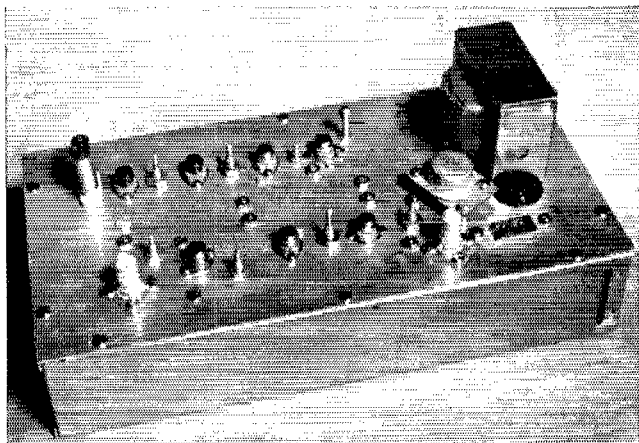
QST

Strays MOOR

Recently, Army Command MARS Directors and others met at the U.S. Army Pacific Headquarters at Fort Shafter, Hawaii to discuss subjects relative to the MARS Army program. The main topic was the recently established MARS network in Vietnam, and ways and means to improve the MARS radio facility between Vietnam and the U.S. Shown in the photograph (front row l. to r.) Col. Leonard Drazen; Col. J. C. Liggett; E. S. Liscombe, K4KNV; (middle row l. to r.) H. Beagle, KH6DXB; Eldridge W. Fossburg, KL7CHL; Capt. Joseph Komar. Richard DeWeil; Robert Fowler; (back row l. to r.) Maj. K. S. Sawyer; Lt. Howard Titus; Raymond Underwood; Sgt. Williams; Martin Kurdt; and RMC Leo McCulloch, WA6MLW.



A Low-Noise Transistor Converter for 432 Mc.



BY JAMES W. BRANNIN,* K6JC

Fig. 1—Top view of the K6JC 432-Mc. transistor converter. Injection stages are at the rear; r.f. amplifier, mixer and i.f. amplifier at the front. Large transistor and transformer, right, are part of the power supply.

Optimum U.h.f. Reception, with Simplicity and Moderate Cost

THE decision to build this converter was prompted by the excellent results achieved with a transistor preamplifier previously described¹. If transistors worked so well as r.f. amplifiers, it was only logical to go the whole way and build an all-transistor converter to replace the tube-and-transistor combination. The converter to be described gives better performance, with far less bulk and power consumption than tube models, and it can be adapted readily to battery or portable work, if the occasion arises. In ability to detect weak signals it is probably exceeded only by a properly-designed and carefully-adjusted parametric amplifier.

Circuitry

The circuits are simple, mechanically and electrically, and basically conventional, with the possible exception of the method of injection used. Difficulty was experienced in getting enough mixer injection voltage when the output of the oscillator-multiplier was coupled to a small coil in the mixer emitter circuit. When the circuit was changed to the one shown, with injection to the mixer base, the overall gain and noise figure improved. The r.f. amplifier stage is essentially the same as that of the preamplifier referred to above.

The addition of an i.f. amplifier stage is an element of novelty in transistor converters, at least. Some receivers used with converters may have rather poor performance at 28 Mc., in which case the extra gain is helpful. Increased converter output fed to the receiver at 28 Mc. also helps to mask amateur signals in the 10-meter range that might leak through on some receivers. The amplifier permits the converter to be used at some distance from the receiver, without worry about loss of i.f. signal.

A third-overtone crystal at 50.4375 Mc. is followed by three multiplier stages, to give injection voltage at 403.5 Mc. The receiver tunes 28 to 29 Mc. for covering 431.5 to 432.5 Mc. These frequencies may not fit every application but they can be juggled slightly to suit individual requirements.

The power supply was built in for convenience. The zener regulator holds voltage substantially constant, and there is no noticeable ripple in the output. Voltage variation is only 0.2 volt, from no load to 75 ma. load under actual test.

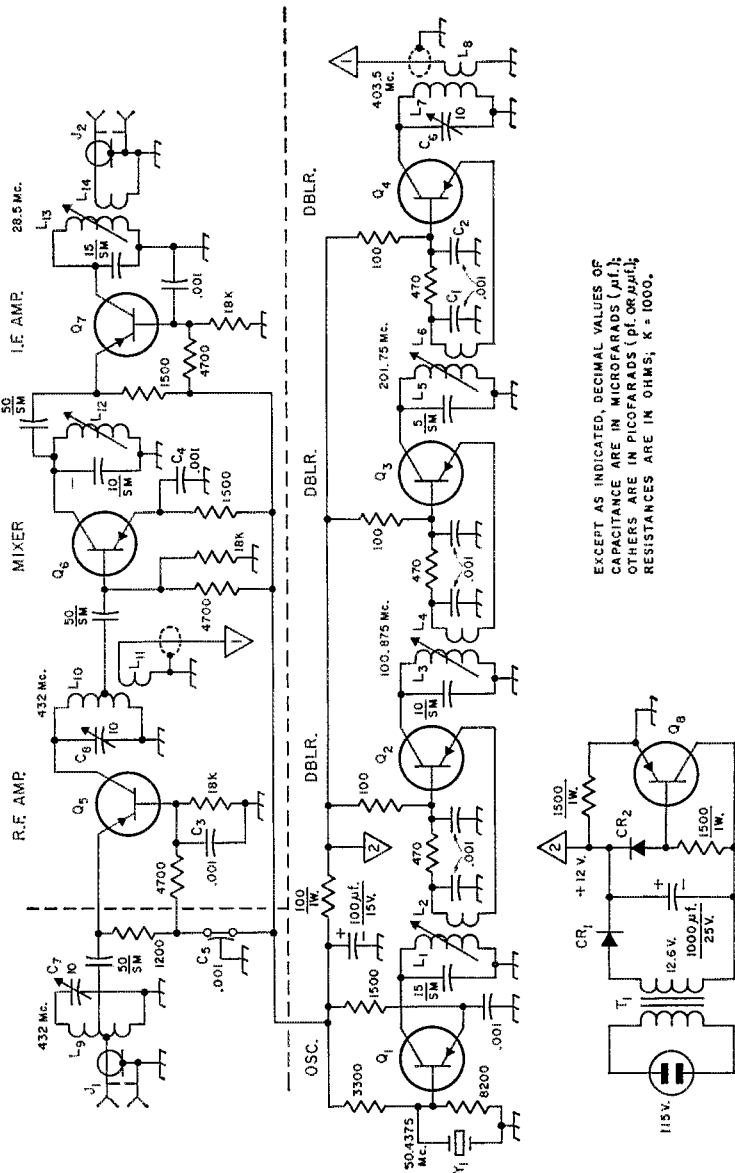
Construction

The converter is built on a 5 by 10-inch aluminum plate, which mounts on a See-Zak expandable chassis. A copper shield plate runs the entire length of the converter portion of the plate, at its centerline. Another plate at right angles to the long one extends directly across the r.f.

* 225 Park St., Redwood City, Calif.

¹ Brannin, "Transistor Preamplifier for 432 Mc." October, 1965, *QST*, p. 62.

Fig. 3—Schematic diagram and parts information for the 432-Mc. transistor converter. Capacitors not otherwise described are ceramic. SM indicates silver-nica. Those with polarity indicated are electrolytic.



EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS (µf.); OTHERS ARE IN PICOFARADS (pf. OR 10⁻¹²); RESISTANCES ARE IN OHMS; K = 1000.

- C₁, C₂, C₃, C₄—0.001-µf. button-nica or ceramic standoff.
- C₅—0.001-µf. feedthrough.
- C₆, C₇, C₈—1/2 to 10-pf. piston variable
- CR₁—Any silicon power supply diode.
- CR₂—12-volt zener diode (Mallory ZA 12A).
- J₁, J₂—BNC connector.
- L₁—7 turns No. 26 enam, 5/8 inch long, on 1/4-inch ceramic form, iron slug (Miller 41A000CBI).
- L₂—3 turns No. 26 enam. wound over ground end of L₁.
- L₃—4 turns 1/4 inch long, like L₁.
- L₄—2 turns at ground end of L₃.
- L₅—3 turns No. 26 enam, 3/8 inch long, on 1/4-inch ceramic form, iron slug (Miller 40A000CBI).
- L₆—1 turn at ground end of L₅.
- L₇—3 turns No. 18, 1/4-inch diam., 5/8 inch long, air-wound.
- L₈—1 turn insulated wire between first two turns of L₇ at ground end.
- L₉—4 turns like L₇, tapped at 1/2 and 3 turns.
- L₁₀—3 turns No. 18, 1/4-inch diam., 1/4 inch long, center-tapped.
- L₁₁—1 turn insulated wire between first two turns of L₁₀ at ground end.
- L₁₂—10 turns like L₁, but closewound.
- L₁₃—14 turns like L₁₂.
- L₁₄—3 turns insulated wire wound over ground end of L₁₃.
- Q₁, Q₃—2N1499A.
- Q₂, Q₄—2N1742.
- Q₅—2N2398.
- Q₆—2N1744.
- Q₇—2N1867.
- Q₈—2N2869. Q₈ is RCA; all others Spague.
- T₁—12-volt filament transformer, any small type.
- Y₁—Third-overtone crystal, 50.4375 Mc.

amplifier socket. It is notched to fit the transistor socket. A 12-volt line from the power supply comes along a bus adjacent to the copper shield, supported on standoffs. It runs through the small r.f. shield via C_5 .

Needless to say, r.f. leads must be the absolute minimum length, if the 432-Mc. and last two multiplier circuits are to resonate properly. The position of the output link on the last doubler should be made adjustable, so that coupling can be varied for optimum energy transfer. A short piece of small coax or other shielded wire runs through the main shield to connect L_8 and L_{11} .

Transistor Q_8 , in the power supply, is mounted on a small piece of bakelite or other insulating material. This permits the power supply to be operated with either positive or negative ground, making it convenient to use either p-n-p or n-p-n transistors without modifying the circuits. The filament transformer used for T_1 is larger than needed, but it was taken from the junkbox for this application.

The tube shield in the lower left portion of Fig. 2 encloses the 28-Mc. output coil, L_{13} . A shield was cut across the bottom, about $\frac{1}{4}$ inch above the base on each side, leaving two $\frac{1}{4}$ -inch lips that were bent out to form mounting brackets. A small notch was made on each side, so that the collector lead and output link lead can be brought out of the shield.

Transistor sockets were used, in preference to wiring the transistors directly into the circuit. This permits experimental work with other transistors that may become available. Standard parts are specified wherever possible, but the avid home-builder will probably be well endowed with used or surplus components that will serve equally well. There is a wide variety of transistors that may be used in such a converter. Because of this it is not possible to make specific recommendations about substitute types.²

Adjustment

It is recommended that a grid-dip meter and a vacuum tube voltmeter with an r.f. probe be used in aligning the converter. It is not necessary

² If the Sprague transistors specified are not available locally, it is suggested that the builder write Sprague Products Company, North Adams, Mass., attention Mr. Sidney L. Chertok.

that the g.d.o. cover the 432-Mc. range, though it will be helpful if it does. The five slug-tuned coils can be adjusted to approximately the correct frequencies with the aid of the dip meter. Then, with the converter on, the circuits can be peaked, starting with the oscillator. Put the r.f. probe on the emitter end of L_2 , and adjust L_1 for maximum reading. Check with the dip meter or a calibrated wavemeter to be sure that the output is on the desired frequency.

Proceed with each following stage in a like manner, to get maximum output at 403.5 Mc. The job can be done without the v.t.v.m., provided a dip meter with reliable calibration and good sensitivity is available for checking the multiplier frequencies up through the third stage. If the frequency is right here, it can hardly be wrong in the last stage, and L_7 - C_6 need only be adjusted for maximum signal strength in actual reception. Optimum coupling between the injection chain and the mixer is also indicated by maximum signal strength. Retune the mixer input and doubler output circuits for maximum response whenever the coupling is adjusted, of course. There are advantages to having fine signal generators, noise generators and other test equipment available, but the job can be done without them, with some patience and knowledge of how the various circuits actually work.

Results

The performance of the converter came up to all expectations. Noise figure is close to 5 db., and frequency stability is very good. Sideband and c.w. stations are copied over long periods, with little or no evidence of drift. The converter is doing a fine job of pulling in 432-Mc. signals over distances of 100 miles or more, across mountainous terrain and in the absence of favorable propagation conditions.

If one is interested in uniform response across more than two or three hundred kilocycles of the band, it may be desirable to broaden out the i.f. amplifier by loading the 28-Mc. coils, L_{12} and L_{13} . It has been determined by experiment that 1200-ohm resistors across these coils increase the overall bandwidth of the system markedly, at a sacrifice of only about 4 db. in gain. Usually there is more than enough gain available, so this change may be desirable in most installations.

A word of appreciation to W6VSV and W6PBC for their helpful hints on circuit design is in order. Q57

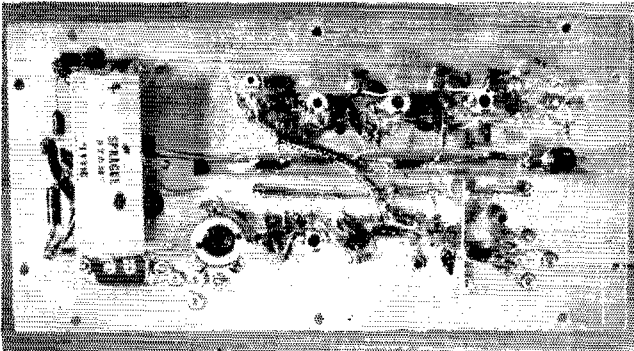


Fig. 2—The 432-Mc. transistor converter is assembled on a top plate. R.f. circuits (lower portion) are isolated from the injection stages by a copper shield running the length of the converter proper. Power supply components at the left.

Offset Tuning and F.S.K.

for the Drake TR-3

Simple Modification for Incremental Receiver Tuning and RTTY Operation

BY ELSTON H. SWANSON,* W2PEE

THROUGH a year and a half of mobile service, the Drake TR-3 transceiver has been found to be a completely reliable and beautifully performing piece of equipment. Its sensitivity, stability, power output, and freedom from maintenance problems leave no grounds for complaint. However, although offset tuning of the received frequency is effectively taken care of by the accessory v.f.o. (RV-3), it is not practical to utilize separate v.f.o.s for transmit and receive in a mobile environment. The only solution is to build some form of receiving offset tuning into the TR-3 itself. (This feature is variously called incremental tuning, delta tuning, or by some other similarly descriptive term, depending upon the manufacturer.)

An examination indicated that it should be possible to install such a system in the TR-3 with relatively little difficulty. At the outset, the following objectives were established for this project:

1) All components were to be mounted within the TR-3. No outboard components or attachments would be permitted.

2) The incremental tuning control should be on the front panel.

3) The normal use of the transceiver in driving a linear should not be impaired; hence the auxiliary contacts of the change-over relay in the TR-3 should not be used for the offset tuning circuit.

4) Approximately plus or minus 3 kc. of variation was all that was desired.

5) As little change as possible in the v.f.o. calibration was desirable.

Offset Circuit

The circuit of Fig. 1 meets the electrical objectives very handily. A varactor, CR_1 , is used to tune the transceiver v.f.o. a few kilocycles either side of the frequency to which the main tuning dial is adjusted. A capacitance variation is obtained by varying the voltage applied to the varactor by means of potentiometer R_1 , whose source is the 150-volt regulated supply in the transceiver. The V20 Vari-cap used at CR_1 produces a capacitance variation from 10 to 50 pf. under a voltage change of 20 volts (the maximum rated working voltage) to 0.1 volt. It was found that the desired total

tuning range (about 6 kc.) could be obtained by connecting the varactor at the cathode tap of the v.f.o. By setting the offset control to its midpoint initially, the desired range of 3 kc. either side of the frequency to which the transceiver dial is set is obtained. When the offset control is thus adjusted, the main dial calibration will be off by about 3 kc., of course. However, this is well within the compensating range of the dial fiducial. Purists may prefer to shift the main dial, which can be done easily because of the friction drive.

If the offset tuning control is set off center while receiving, the transmitted frequency will be offset by the same amount, of course, unless the control is recentered. To avoid having to do this, a second potentiometer, R_2 , is switched in on transmit. This control is preset to the center frequency, and thus the transmitted frequency remains the same, regardless of the setting of the offset tuning control.

The switching operation is performed by a small s.p.d.t. relay, K_1 , operating from the unregulated 150-volt supply in the transceiver. The relay is actuated by the grounding pole of the antenna change-over relay in the TR-3 — the same pole that grounds the receiver cathode line in the transceiver. If offset tuning is not desired, it can be cut out by switch S_1 .

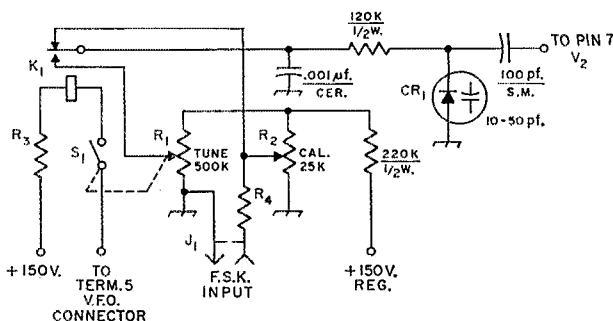
Offset Installation

The mechanical problems were the more difficult ones. It soon became obvious that, in spite of the uncluttered appearance of the TR-3 wiring and components, there was actually very little room for mounting additional parts. Fortunately, in the lower right-hand corner, there is a $\frac{3}{8}$ -inch hole through both subpanels, and it was found that by temporarily removing the

A single simple modification requiring only a few readily available components accomplishes both of the objectives mentioned in the title. Offset tuning permits off-frequency reception up to 3 kc. either side of the transmit frequency which is held constant. The f.s.k. system for RTTY provides easily-adjusted variable shift for either polar-relay or pulse-type drive.

* R.F.D. 1, Wolver Hollow Road, Oyster Bay, New York.

Fig. 1—Circuitry of the offset-tuning and f.s.k. modification for the TR-3. Resistances are in ohms (K = 1000). SM = silver mica. CER = ceramic.



CR₁—Voltage variable-capacitor diode, 10–50 pf. at 20–0.1 volts (Pacific Semiconductor V20 Varicap).

J₁—Phono jack.

K₁—S.p.d.t. d.c. relay, coil current 15 ma., or less (reed relay similar to Magnecraft W103X-11 used).

R₁—Log-taper control with “push-pull” switch (Mallory PP-55A).

R₂—Log-taper control.

R₃—Select value to suit relay-coil resistance and voltage or current (10,000 ohms, 2 watts for relay listed above).

R₄—approx. 150,000 ohms; see text.

S₁—See R₁ above.

phone jack immediately behind this position, it was possible to install R₁ with a “push-pull”-type switch attached to serve as S₁. A little mechanical ingenuity is necessary to put the mounting nut on this control but, by holding it between the two subpanels as the control is put into place, it can be secured. The dress panel can then be drilled in the appropriate place, which turned out to be at the center of the bull’s-eye mark on the lower right-hand part of the dress panel. Fig. 2 shows the front panel with the new control.

The varactor and isolating-filter components were mounted on a small terminal strip which was then fitted between the microphone and headphone jacks on the side of the chassis. This brings these components close to the socket of the 6AU6A v.f.o. tube, permitting a short lead to Pin 7. The photograph of this area (Fig. 3) should be explanatory.

This left only two components to be mounted, namely, K₁ and R₂. The relay problem was solved by utilizing a tubular-type reed relay which was snapped into a fuse clip of the appropriate size which, in turn, was mounted to one of the shield plates under the chassis (see Fig. 4). Any small s.p.d.t. relay with a coil requiring 15 ma. or less can be used. The calibrating potentiometer, R₂, was fastened to the top of the v.f.o. shield can above the chassis with a little dab of epoxy (see Fig. 5). Since this potentiometer has an effect on frequency, both for transmit and, when incremental tuning is not used, for receive, it was deemed desirable to keep it away from any of the higher-temperature areas, hence the mounting above the v.f.o. can.

The only problem remaining was to wire in the various components. It was found possible to lay the necessary wires in along with the existing harness and tie into place with a bit of lacing cord. The voltage pick-off points were conveniently selected as follows:

Unregulated +150 volts—available on the terminal board to the rear of the socket of V₁₇ (the 6AQ5 audio-output tube).

Regulated +150 volts—available at the VR

tube, or on the terminal board adjacent to the RV-3 (v.f.o.) input connector.

Connection to the change-over relay through the receiver cathode line is conveniently made at Terminal 5 on the v.f.o. input connector.

Offset Alignment

Alignment is very simple:

1) The offset switch should be turned on and the tuning control, R₁, set to the center of its range. The panel should be marked for this position so that it may reset to the same position after use.

2) The transceiver function switch should be set to the crystal-calibrate position, and the main tuning dial tuned to zero beat.

3) Without turning the offset-tuning control, push the knob in to open the switch and disconnect the offset tuning control. The calibrate control, R₂, should now be adjusted to restore zero beat, and locked in place with either a potentiometer lock or an application of Glyptal.

4) The receiver calibration can now be restored by slipping the main dial if necessary.

The calibration is now complete. In use, the offset tuning is normally switched off, and all tuning is done with the main tuning control. If, after establishing a contact, it is necessary to retune for good reception, the offset tuning control should be switched in and all further tuning

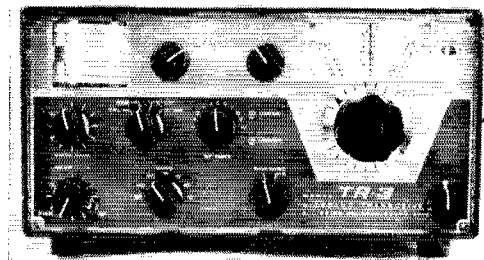


Fig. 2—The addition of the control knob for R₁ (lower right-hand corner) in no way detracts from the appearance of the panel of the TR-3.

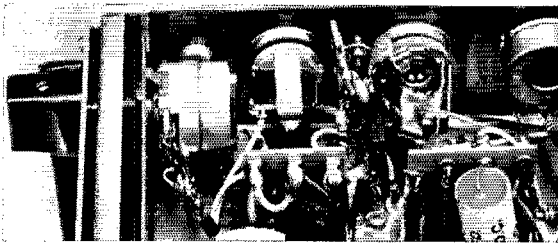


Fig. 3—This view shows the mounting of R_1 and control knob at upper left. The terminal strip which serves as a mounting for small components is to the right of R_1 , between the two jacks.

done with that control. In this way the transmit frequency is not affected and "frequency hopping" is avoided. When switching the offset tuning out after use, the offset control should be returned to its central position. Otherwise a desired incoming signal may jump to one side or the other when the offset tuning is switched in, depending upon where the offset control was left when used previously.

RTTY Operation

After the foregoing was completed, and after the benefits of the offset tuning had been enjoyed for some time, I had occasion to consider once again, as in the past, the problem of utilizing the TR-3 as a transceiver in RTTY work. The author is of the opinion that producing frequency-shift keying by means of sideband generation with a.f.s.k. tones is a dangerous approach, and therefore prefers a direct frequency shifting of the v.f.o. Frequency shift in a v.f.o. is easily obtained by any of the diode shifter circuits used by RTTY operators. When it comes to receiving, however, the tracking of the receiver and the transmitter in frequency does become a problem for at least two reasons:

1) In the c.w. mode, the 9-Mc. crystal carrier oscillator in the TR-3 is shifted (by the switching of some cable capacitance) about 1 kc. This, of course, gives a 1-kc. beat note for c.w. purposes when two transceivers are in communication. It also serves to shift the carrier into the passband of the i.f. filter in the transceiver so that it does not suffer the attenuation that would otherwise take place.

2) Using the same v.f.o. frequency for transmit and receive would normally result in the receiver being zero beat with either mark or space, as the case might be, except for the factor noted in (1) above, whereas in actuality an offset (depending on the design of the terminal unit) is required to get proper audio beats to feed to the terminal unit.

Because of the varactor already in the circuit, f.s.k. can be very readily obtained. At W2PEE, the f.s.k. keying pulse is derived from the d.c. loop, and is a negative-going pulse regulated by a 50-volt Zener diode. The pulse is adjustable, by a front-panel control on the TU, from zero to -50 volts. The sense of the keying pulse (i.e., the -50 and 0 voltage states with respect

to mark and space) is reversible via a panel switch on the terminal unit. Hence "right-side-up" keying may be obtained for any frequency relationship between v.f.o. and i.f. It was found that, by changing the value of R_4 in Fig. 1, a shift of from about zero to approximately 1000 cycles could be obtained. It should be obvious that by connecting the f.s.k. input terminals to polar-relay contacts and making R_4 variable, frequency-shift keying of the right magnitude may be obtained. Thus the system herein described lends itself to the production of frequency-shift keying by either the polar-relay-contact type, or the voltage-pulse type of f.s.k. driving signal. Incidentally, although the voltage pulse used at W2PEE is a negative pulse, a positive-going pulse will suffice equally well; it merely inverts the sense of the keying. In the case of a polar-relay circuit, the sense of the keying may be inverted by switching from the mark to the space contacts on the relay.

Several interesting features emerged in the use of this circuit:

1) The shift can be very readily calibrated by switching off the offset tuning and tuning in the crystal-calibrator signal nearest the point at which the station is operating. Shifting the f.s.k. input signal from mark to space will then allow a direct adjustment of the desired shift. In all cases it will be found that either the mark or the space frequency is essentially unaffected by the shift-adjustment control, and only the opposite will change.

2) Because in normal RTTY transceiver operation the receiver offset tuning is always switched on, the f.s.k. circuit is automatically disconnected when in the receive condition. This, then, prevents feedback around the TU loop and, provided

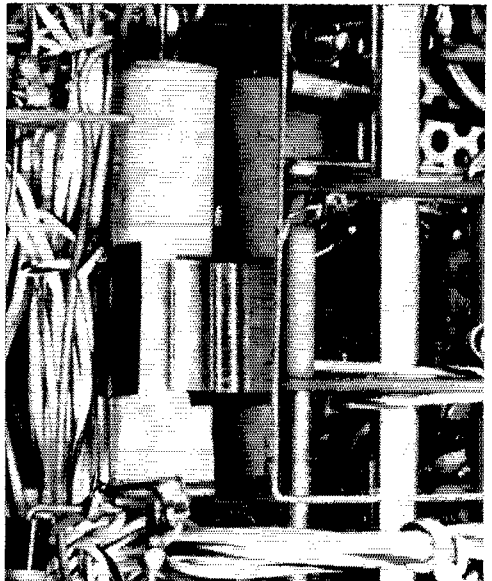


Fig. 4—The relay (a tubular reed type, in this instance) is mounted in a clip toward the front end of the shielding partition which supports the band switch.

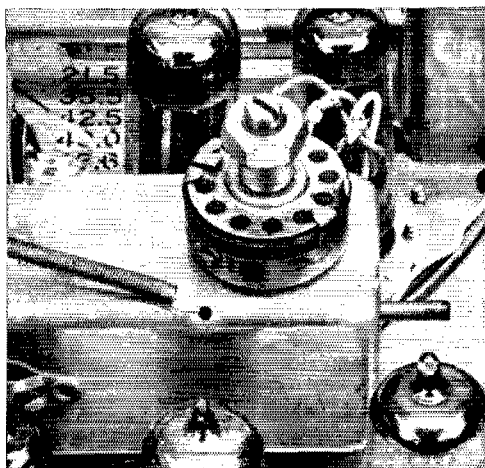


Fig. 5—The calibrating control, R_2 , is cemented to the top of the v.f.o. can in the TR-3.

the terminal unit in use has a mark-hold feature, no additional controls are needed to go from transmit to receive, other than throwing the switch on the panel of the TR-3.

RTTY Adjustment

The TR-3 sideband-selector switch must be left in the "X" position for c.w. operation and, depending on the band in use, this may be upper sideband or lower sideband. Also depending on the band in use, the relationship between the v.f.o. frequency and the heterodyne crystal-oscillator frequency, which shifts the output to the proper band, varies, affecting the sense of the f.s.k. This, then, requires a proper setting of the terminal unit and f.s.k. drive for both the transmission and reception of "right-side-up" signals. It will also be realized that the position of the offset tuning control for proper tracking of receiving and transmitting signals may vary because of the above factors. It is easier to obtain this calibration empirically than analytically, and such was done in our case. The technique used at W2PEE required a separate receiver and transmitter and is as follows:

- 1) The TR-3 is switched to the c.w. position. The transmit gain control can be turned all the way counterclockwise because only a calibrating signal is needed.
- 2) This signal can then be tuned in on the auxiliary receiver and set for a given beat frequency.
- 3) The auxiliary transmitter is then set to provide the same beat note from the auxiliary receiver.
- 4) The auxiliary transmitter is then received on the TR-3 without touching the main tuning, and the offset control is adjusted to provide the reference beat note as used in (1) and (2). This process is repeated for each of the five bands and a control chart, such as that shown in Table I, is prepared. It will be seen that there are only two positions for offset tuning required for all bands, and it is suggested that these be marked on the

offset tuning control by some means. In fact, one position suffices for four of the five bands.

The f.s.k. input connector used was a phonotype jack requiring only a quarter-inch hole for mounting. It was placed on the rear apron, adjacent to the grounding stud. A shielded lead was run from that point through the 9-Mc. oscillator compartment to a small terminal strip, where R_4 was mounted. If a variable resistance is desired, this could be mounted on the apron, or remotely, at the convenience of the operator.

Table I

Band	Offset Tune Control Position (degrees)	F.S.K. Driver Sense	TU Receive Sense
80	+100	2	Reverse
40	-45	1	Normal
20	-45	2	Reverse
15	-45	1	Normal
10	-45	1	Normal

C.W. Identification

A little reflection will show that it is easy to obtain n.f.s.k. c.w. identification with this system. An additional jack could be mounted on the rear apron, and a resistor run from the arm of the calibration control to this jack. This resistance could then be adjusted to give the narrow shift required for ID. Alternatively, when a voltage-keyed f.s.k. source is used, provision can be made at the source for shifting that voltage a small amount to obtain narrow-shift ID.

Actually, it takes longer to read about this little scheme for obtaining f.s.k. than it does to incorporate it.

Two further notes must be made with respect to f.s.k. operation. The TR-3, as with any of these sideband transceivers, relies, of course, on a relatively-low duty factor to obtain the high-power c.w. outputs of which they are capable. Normally, one would be safe in operating such a unit at its a.m. rating for RTTY. However, the TR-3 utilizes a controlled-carrier type of operation for a.m. I have operated mine by adjusting the plate current on c.w. to 200 ma. The power input can be readily adjusted by the transmit gain control. Secondly, because of the limited bandpass of the TR-3, the standard space tone of 2975 cycles is outside the passband, and is therefore severely attenuated. The TU mark and space frequencies will consequently have to be adjusted to accommodate the TR-3. In our case, we used a frequency of 1275 cycles for mark and 2125 for space. These seem to work very well.

Now, if one of you other fellows will come up with a good noise silencer for the TR-3, we can all make a good piece of equipment very nearly ideal.

QST

Tips On Making Use of Your Junk Box

In most cases it is possible to substitute for specified components when building or servicing equipment. This article contains some useful information that can save the newcomer time and money.

How To Substitute Components

BY LEWIS G. McCOY,* WHICP

ONE of the most frequent questions asked by Novices is about substituting components in a piece of gear, whether or not the gear is something they are building or a commercial unit. Any ham who has been around for a while is usually aware that it is possible to substitute components, even though they are not the same value or type, and have a unit function as it did before. This article is written for the ham getting started in amateur radio and who takes an interest in building gear or servicing his own equipment. Most hams collect a junk box of parts, and having some knowledge of what values in a unit or circuit are critical and those that are not, can be very valuable information. Also, it can be a real time saver if you have a component that can be substituted without having to go out and search around or buy by mail.

For an example, let's use the circuit of a simple rig, Fig. 1, that appeared in a recent issue of *QST*¹. This is a two-stage transmitter and we have included the parts list and other information that normally appear in a construction article.

Capacitors

There are two basic types of capacitors used in radio equipment, fixed or variable. With a fixed capacitor the amount of capacitance is a fixed amount, not subject to change, while a variable capacitor has a maximum and minimum value, depending on its setting.

One of the things a capacitor will do is pass r.f. and audio but will stop or "block" d.c. A capacitor used to stop the flow of d.c. is usually referred to as a blocking capacitor. In Fig. 1 C_{10} and C_{12} are blocking capacitors. The r.f. developed in the oscillator is used to drive the amplifier. C_{10} will pass the r.f. to the amplifier stage but will block the d.c. from flowing to the amplifier grid. Usually any value from 0.01 to

0.001 microfarads can be used for blocking in a piece of gear operating in the 80- through 10-meter range.

Any type of fixed capacitor with the exception of electrolytics can be used. Mica or disk ceramic capacitors are preferred, but paper or any other type that will physically fit into the space can be used at the lower frequencies. However, in the event you use paper capacitors in values larger than 0.01 $\mu\text{f.}$ you run into two possible problems. First, the unit may have significant inductance and will not be an effective capacitor at those frequencies. Second, the capacitor will be physically large.

Generally, at v.h.f., the largest value should not exceed 0.001 $\mu\text{f.}$ for the reasons given above.

The other common use of fixed capacitors is for bypassing circuits. In radio circuitry it is sometimes necessary to shunt r.f. and audio currents across parts of a circuit and a "bypass" capacitor is used for this purpose. All of the information given for blocking capacitors holds true for bypassing. C_8 , C_9 , C_{11} are examples.

Another stumbling block for the beginner is voltage ratings. You may note in a circuit that a 0.01- $\mu\text{f.}$, 250-volt capacitor is called for. You can always use a capacitor with a higher voltage rating but it isn't safe to use a lower rating. In a power supply, for example, a 20- $\mu\text{f.}$, 450-volt capacitor may be specified. If you happened to have a 20- $\mu\text{f.}$ unit at 600 volts this would be perfectly all right to use. Another point to keep in mind is that if two equal capacitors are in series the total working-voltage rating is the sum of the individual ratings; in other words, two 250-volt capacitors would have a 500-volt rating. However, the total capacitance is halved. Two 20- $\mu\text{f.}$, 250-volt capacitors connected in series would have a rating of 10 $\mu\text{f.}$ at 500 volts.

In many parts of a circuit you may find "silver-mica" capacitors specified. C_1 and C_2 in Fig. 1 are an example. Silver-mica capacitors are less subject to capacitance changes as they heat up or cool off. In a frequency-determining circuit

* Beginner and Novice Editor

¹ McCoy, "The Mighty Midget," Feb. 1966, *QST*.

out the electronics industry. If no tolerance is specified in a parts list, you can use any value that falls within the 10-percent range.

Many times you can find resistors in your junk box that can be adapted for a substitution. For example, two resistors may be connected in parallel to obtain the desired amount of resistance. Keep in mind that when two or more resistors are connected in parallel, the total resistance is always *less* than the lowest value used in the combination. A frequent setup is two resistors in parallel, and the formula for total resistance is:

$$R = \frac{R_1 R_2}{R_1 + R_2}$$

When two resistors of the same value are connected in parallel the total resistance is always half the value of one. For example, two 1000-ohm resistors in parallel would be 500 ohms. Also, assuming the two resistors have a power capability of 1 watt each, the combination would be two watts.

Resistors connected in series will have the total resistance of the sum of the resistors. Two 1000-ohm resistors in series would have a total resistance of 2000 ohms. Many times your junk box will furnish a combination of resistors to permit you to substitute without having to purchase a new unit.

Circuit diagrams will usually specify the power ratings required for resistors used in the unit. Note the last sentence in the label in Fig. 1, "Resistors are $\frac{1}{2}$ -watt unless specified otherwise." This doesn't mean you cannot use a resistor with a *higher* wattage rating. As long as the power-handling rating is higher, the unit can be used.

Sometimes, too much heat used in soldering a $\frac{1}{2}$ -watt resistor may change the value. If possible, it is a good idea to check any junk-box resistor with an ohmmeter before installing it.

You'll find there are two types of fixed resistors, composition or carbon, and wire-wound. Ordinary wire-wound resistors should never be used in a circuit carrying r.f. because they have a certain amount of inductance which could upset an r.f. circuit.

R.F. Chokes

If you look at Fig. 1 you'll see that several r.f. chokes are used. The inductance of an r.f. choke is made intentionally much higher than the inductance used in a tuned circuit. This is done to offer a very high impedance path to the flow of r.f. The r.f. won't flow through the choke but the d.c. will. This keeps the r.f. from flowing back into the power supply. You might assume that you could use a bypass to keep the r.f. from flowing back to the supply but if you used only a bypass capacitor and no choke, you would bypass the r.f. in the circuit and it wouldn't tune.

The usual r.f. choke values used in transmitters in the 80- through 10-meter bands run from about 750 μ h. minimum to 2.5 mh. maximum. Any value in this range should work. However, in

v.h.f. work, it is a better idea to follow the designer's specifications quite closely because r.f. choke values are more critical at these frequencies.

In some instances an r.f. choke may have a "self-resonance" in an amateur band. This can cause problems, because such a choke could heat up and have a hot spot or actually burn out if sufficient power were used. If you have a grid-dip meter it is a fairly simple job to check out a junk-box choke before installing it. Connect the two leads of the r.f. choke together with a short piece of wire. Couple the grid-dip meter coil to the choke and check through the bands that you intend the choke to work on. If you get a "dip" in one of the bands you can be fairly certain the choke will have a hot spot at that frequency.

Power Transformers

Probably the most amount of mail we get about substitutions concerns power transformers. First off, you can always substitute if the transformer in question has the same voltages but with more current-carrying capabilities. In many instances, you can even substitute if the current rating is less. Power transformers are customarily rated in terms of continuous duty. However, amateur service, at least as far as transmitters are concerned, is intermittent duty. In a recent article² we used a TV power transformer to power a 700-watt amplifier. The transformer was rated for about 350 watts continuous duty. In our amplifier it was possible to run the transformer at 700 watts simply because the amplifier can be classed as intermittent service.

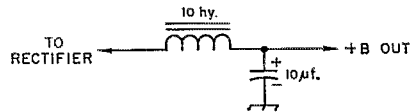


Fig. [2]—Typical power supply filter showing method for calculating ripple percentage.

Using a transformer that has lower current ratings than what is called for takes a little guess-and-by-golly selection. It is probably safe to assume that a transformer having 25 percent less rating than called for would be OK. At least it is worth a try to see if the unit would substitute. If after using the transformer for a while the transformer case gets so hot you cannot keep your hand on it, it is probably running too far over ratings. With your rig fully loaded, key down, a 15 minute test should be adequate to prove the transformer will do the job. You can easily see that with keying, or on s.s.b., the transformer is more or less resting between words in speech or when the key is open in c.w.

If the voltage from the substitute is different, it is still possible the unit can be used. Suppose your circuit called for a 375-0-375 volt transformer and the substitute was 350-0-350 volts. This is such a slight difference that the substitute

² McCoy, "A Low-Cost 200-Watt Linear Amplifier," Feb. 1966, QST.

tion can be made and you wouldn't be able to discern any appreciable difference in the rig's operation. If the voltage were much less, it would mean that you would get less output and you might have to change some dropping resistors so the voltage didn't drop as much. If the substitute has higher voltages, it can still be used by installing voltage-dropping resistors or a voltage divider. The power-supply chapter of the *Radio Amateurs Handbook* should be consulted for additional information on voltage dropping.

Power Supply Chokes

We mentioned substituting electrolytic capacitors earlier, and in many power supplies the amount of capacitance needed will depend on the power-supply choke inductance. The purpose of a filter system in a power supply is to get the a.c. ripple down to an acceptable level. The approximate ripple percentage can be determined from the formula:

$$\frac{120}{LC}$$

where L is in henrys and C is in microfarads. In Fig. 2, we have a typical choke and associated filter. For example, if a 10-henry choke were used with a capacitor of 10 μ f. the ripple would be

$$\frac{120}{10 \times 10} = \frac{120}{100} = 1.2 \text{ percent.}$$

You can easily substitute chokes or capacitors, tailoring your changes to fit the ripple percentage determined from the original LC specifications.

In addition to inductance ratings, you must take into consideration the current ratings or the current the choke must carry. You can always use a choke with higher current ratings than specified. In all probability, you could use a choke with as much as 25 percent lower current rating without serious troubles, although the inductance becomes less if more current is drawn through the choke than the unit is rated for. Again, a study of the power supply chapter of the *Handbook* is in order for more detailed information.

Silicon rectifiers are becoming more and more popular. You can always use a silicon rectifier that has higher voltage and current ratings than are specified originally. In many instances the particular type of rectifier specified may be quite expensive, but once you become familiar with the surplus market you'll probably find

rectifiers with higher ratings at *much less cost* than the specified type.

Other Components

It should be apparent that you can always use a switch that has *more* contacts or sections than are required. One problem with switches is knowing if the junk-box unit will carry r.f. or if it has adequate voltage rating. Usually you can find this information in the manufacturers' or distributors' catalogs.

If you like to build and service your own gear, it is a good idea to write to the various manufacturers and get their catalogs. Also, when writing to the larger mail order distributors, be sure to ask for their industrial catalogs. Many distributors have two catalogs, one for the Hi Fi or CB type and the other, which is much more detailed, for the constructor.

In many instances, your best guide in substituting components is just common sense. For example, while a coax fitting may be specified, your junk box may yield up a phono fitting. Such a substitution is perfectly OK if high power isn't being used. However, we wouldn't recommend using a phono jack for a kilowatt rig.

Identifying the value of unknown components is a whole story in itself. However, a few points might help. If you have a grid-dip meter and a *Lightning Calculator* it becomes a fairly simple matter to find the value of an unknown capacitor or coil. The calculator will give you the necessary information about any but multilayer coils. For capacitors, all you need do is make up a couple of coils of different inductances to be used as standards. For example, a 10- μ h. coil is good for a wide range of capacitor values. Suppose we have an unknown mica capacitor. The first step would be to connect it across the 10- μ h. coil. Couple the grid-dip meter to the circuit and go through the grid-dip ranges. Let's suppose we get a dip at 5 Mc. With our *Lightning Calculator* we line up 10 μ h. and 5 Mc. and find that the capacitance required to hit that frequency with 10 μ h. is 100 pf., so we know that the capacitor is a 100-pf. mica. Of course, if the capacitor is color-coded the code would give us the answer, but sometimes it is difficult to determine which of several color codes is used. If so, the above-described method will do the job. Again we refer to the *Handbook* for details on the various color codes used for marking component values. Q57

Strays

One of the boys at Harrison Radio passes on this eutey. He received a call from a ham who wanted to know what he could expect to get for a transceiver in good working order but with the serial numbers filed off. The quick reply was "About two years"!

.....

Here is another tragic story which should be a lesson to us all. A radio tower that M. L. Axtell

erected at his home in Blue Grass, Iowa, toppled across high-voltage wires killing him and his wife. Axtell was found on a couch beside his radio equipment in a small basement room. His wife apparently went to his rescue and was electrocuted when she touched him. Ropes used to moor the antenna apparently snapped, dropping the aluminum tower across the high-voltage wires. (From the *Sunday Times-Democrat*, Davenport-Bettendorf, Iowa).

THE 100-kc. frequency standard shown in Fig. 1 generates harmonics that are usable from 1.8 to 54 Mc., and has the additional feature that the output level can be controlled by R_1 , a linear potentiometer. This is obviously useful, for example, for adjusting the strength of a given harmonic to the same level as the WWV signal to facilitate zero-beat adjustment of the standard. However, another feature is that the linearity and range of control are such that the output signal can be reduced practically to the noise level, which also makes the device a handy little signal generator for receiver alignment. The circuit was concocted by Don McKinley, VE3AU, who also built the version shown in the photograph.

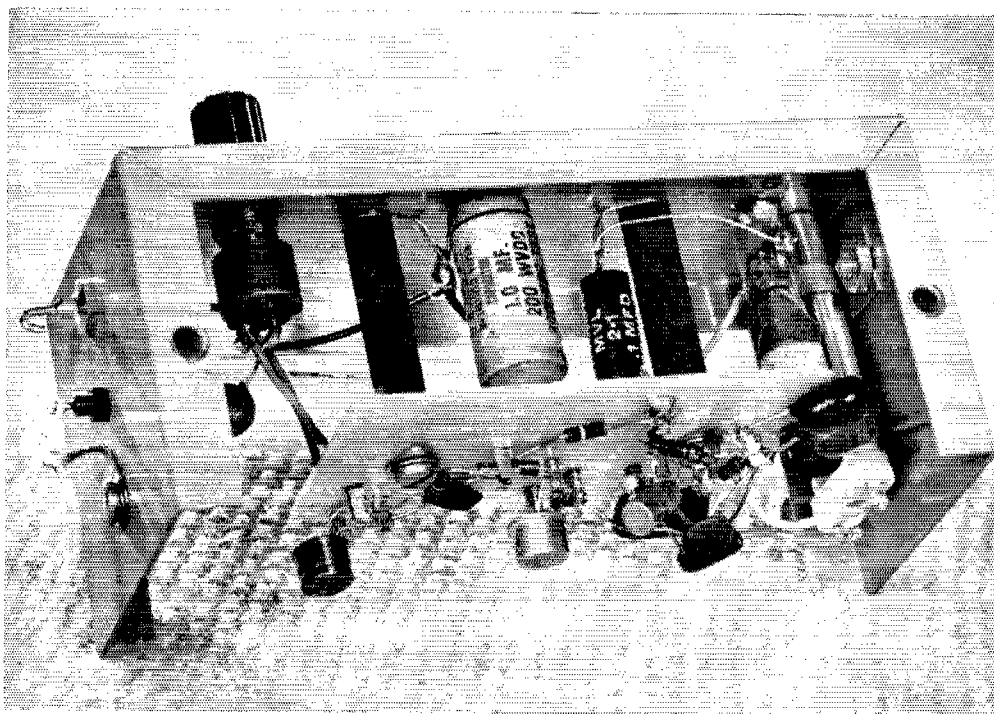
The 100-kc. oscillator circuit is the transistor equivalent of what, in tube circuits, we might call a triode Pierce oscillator with a tuned output circuit. The capacitive divider which tunes L_1

gives an impedance step-down for driving the base of the Class B buffer stage, Q_2 . The collector output of this stage, at A , consists of approximately half sine waves of 100 kc., and is used to drive a Class B "squarer" stage, Q_3 . The output waveshape from Q_3 , at B , is a series of rectangular waves having a very fast rise time and a duty cycle of about 20 per cent. The result is ample harmonic output throughout the frequency range mentioned above, when the signal is taken through a shielded conductor having a capacitance of about 30 pf. The output should be coupled to the receiver's antenna input through a small capacitance — about 10 pf. in the average case.

The transistors specified in Fig. 1 are the ones that were used, but almost any low-priced transistors can be substituted for the 2N334 and 2N1306 types. The 2N1143 is rather expensive,

Transistor 100-Kc. Standard and Harmonic Generator

Plus — A WWV Converter Circuit



The 100-kc. frequency standard fits into a $5 \times 2\frac{1}{4} \times 2\frac{1}{4}$ inch box without crowding of components. A piece of punched phenolic board, about 2×3 inches, is used for mounting the small parts. The adjustable-output feature allows the standard to be used as a signal generator for receiver alignment.

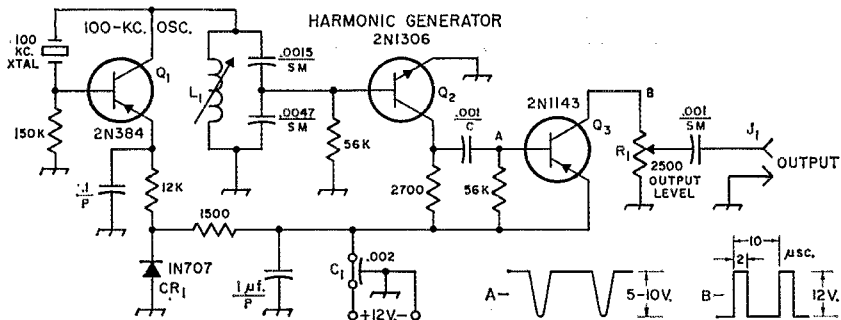


Fig. 1—Transistor 100-kc. frequency standard with adjustable output level. Capacitances are in μf ; C—ceramic, P—paper, SM—silver mica. Resistances are in ohms (K=1000); fixed resistors are $\frac{1}{2}$ -watt. C₁—Feedthrough type; value not critical. CR₁—Zener, 7 to 8 volts.

J₁—Phono jack or feedthrough.
L₁—App. 2 mh., slug-tuned.
R₁—Linear taper (Allen Bradley type G).

but any good high-frequency transistor should work. A high-frequency type is needed in order to get the fast rise time for generating the higher harmonics.

The 1500–4700-pf. capacitance divider gave the right drive to a number of 2N1306s that were tried, but if a different transistor is used it may be necessary to vary the capacitance ratio while maintaining about the same overall capacitance. Reducing the 4700-pf. value will increase the drive, and vice versa.

WWV Converter

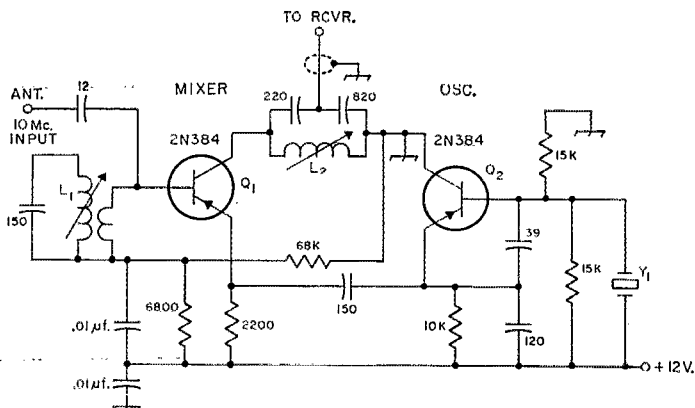
Those with amateur-band-only receivers should find Fig. 2 useful. This circuit is a crystal-controlled converter for picking up both the 10-Mc. harmonic of a 100-kc. standard and the 10-Mc. signal from WWV and moving them to some spot in the 3.5–4.0-Mc. band. The standard can then be adjusted to zero-beat with WWV. The converter crystal, Y₁, may be a surplus unit anywhere in the range 6.0–6.5 Mc., in order to place

the conversion or “first-i.f.” frequency in the 3.5–4.0-Mc. band.

Two transistors are used, one as a mixer and the other as a crystal-controlled oscillator. The two emitters are coupled through a 150-pf. capacitor to inject the oscillator signal into the mixer. Output at the conversion frequency is taken from a capacitive divider in the mixer-output tuned circuit, the output line being connected across the larger of the two capacitances for an impedance step-down. Any transistors that work well at 10 Mc. or higher can be substituted for the 2N384s.

No photograph of this circuit is shown; it can be arranged in any reasonable layout since the tuned circuits do not require shielding. It could be combined with the 100-kc. standard without much, if any, increase in the size of the box shown in the photograph, or could be built as a “drop-in” assembly to fit inside a receiver. VE3AU has used it both ways, along with switching that permits using either the standard or the converter, or both, as needed. Q5F

Fig. 2—Converter circuit for moving the 10-Mc. WWV signal to the 3.5–4.0-Mc. band for amateur-band-only receivers. Except as indicated, capacitances are in picofarads; capacitors are mica except 0.01- μf . units, which are ceramic. Resistances are in ohms (K=1000); fixed resistors are $\frac{1}{2}$ -watt.



L₁—App. 1.7 μh ., slug tuned. Base coil 5 turns No. 24 enam. wound at ground end of L₁.

L₂—App. 10 μh ., slug-tuned.
Y₁—Crystal in 6.0–6.5-Mc. range.

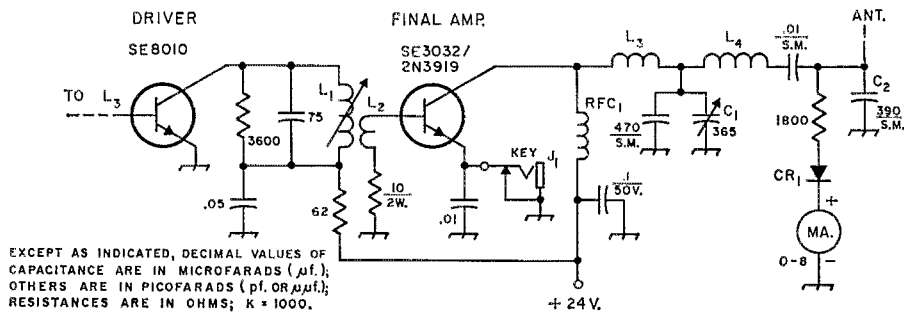


Fig. 1—Revised driver and final-amplifier circuits. Except where SM indicates silver mica, fixed capacitors are disk ceramic. Resistors are 1/2-watt unless indicated otherwise.

C₁—Broadcast-replacement type.

C₂—May be replaced by variable; see text.

CR₁—FDM 1000 (Fairchild) or similar.

J₁—Closed-circuit key jack.

L₁—24 turns No. 26 on 1/4-inch iron-slug form.

L₂—6 turns No. 24 wound over low-potential end of L₁.
L₃—7 turns No. 18, 3/4-inch diam., 10 t.p.i. (Illumintron 610 Air Dux).

L₄—12 turns No. 20, 3/4-inch diam., 16 turns per inch (Illumintron 616 Air Dux).

RFC₁—7 μh. (Ohmite Z-50).

Notes on the Field-Day Gallon

BY GEORGE DAUGHTERS,* WB6AIG

EARLY response to the article on the Field-Day Gallon¹ indicates considerable interest in transistor transmitters for portable work. Further work since writing the article has resulted in improved circuitry, and the addition of a couple of accessories which will undoubtedly be of interest to those who have read the original article.

Improved Driver/Final Circuit

The original 2N696 has been replaced by a Fairchild SE8010 which has proved to be a better driver. To increase harmonic attenuation, the parallel-tuned output tank has been superseded by a pi-L network, as shown in Fig. 1. No loading control is provided, although a variable output capacitor could be used. I have not found this to be necessary with antennas that are approximately resonant. With the circuit exactly as shown, I get over 10 watts output from 7.0 to 7.2 Mc.

Keyer

The differential keying circuit has been altered as shown in Fig. 2. In the original circuit, leakage through the keying transistor resulted in the transmission of a backwave until the oscillator cuts off. With the revised arrange-

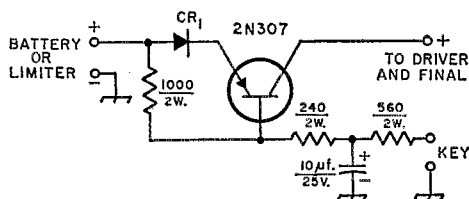


Fig. 2—Revised differential keying circuit. CR₁ is a 1.5-ampere silicon diode, p.i.v. 50 or more. Key terminals go to upper set of relay contacts in Fig. 3 of original article.

ment, the backwave is 30 db. down from the key-down level.

Current Limiter

Fig. 3 shows the circuit of a simple current limiter that will protect the transistor in the final during adjustment, or under any other condition that might cause the transistor to draw excessive current. With this limiter, the maximum current that can be drawn under any condition (even a dead short) is about 1.2 amperes. I keep this limiter in the battery line at all times. The 2N173 should be provided with a large heat sink.

Output Attenuator

As mentioned in the earlier article, when the Field-Day Gallon is not in portable operation,

* 1613 Notre Dame Drive, Mountain View, California 94040.

¹ Daughters, "A Field-Day Gallon," *QST*, March, 1966.

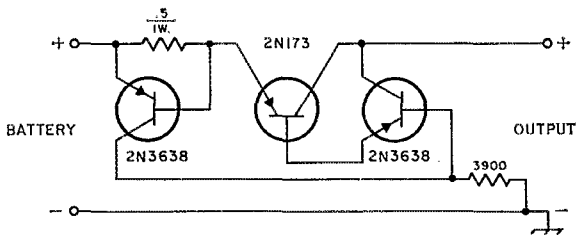


Fig. 3—Circuit of the current regulator. Output current is limited to about 1.2 amperes.

I use it as the driver for my 4X150A amplifier. Since the output of the portable is more than required to drive the amplifier, the attenuator shown in Fig. 4 is used between the two units. Using this attenuator, the driver transistor sees an acceptable load, whether the output of the attenuator is open or shorted. Drive to the final is adjusted by altering the supply voltage to the driver.

Modulation

The portable unit may be safely modulated

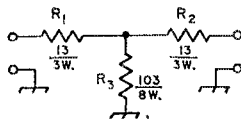


Fig. 4—T attenuator used between the Field-Day Gallon and an amplifier using a 4X150A. R_1 and R_2 are each made up of three 39-ohm 5-per-cent resistors in parallel; R_3 is composed of eight 820-ohm 5-per-cent resistors in parallel. Characteristics are as follows:

$Z_{IN} = 53$ ohms when output is terminated by 50 ohms.

$Z_{OUT} = 53$ ohms when input is driven by 50 ohms.

$Z_{IN} = 25$ ohms when output is shorted.

$Z_{IN} = 116$ ohms when output is open.

Attenuation, 0.5 to 50 Mc. = 4.3 db. ± 0.1 db.

$\frac{P_O}{P_I} = 0.36$.

P_I

by about 7 watts of audio in series with the collector supply to the SE8010 and 2N3919. However, the supply voltage should be lowered to 15 volts for complete safety. The modulator load will be about 15 ohms. QST

Further Notes on the F. D. Gallon

I have constructed a transmitter similar to the one described in the fine article by WB6AIG, and it is performing in every respect as described. However, it appears that the v.f.o. tuning capacitor, C_1 , should be connected from collector to ground, rather than as shown, to provide the desired tuning range. I also recommend a trimmer capacitor of about 50 pf. from collector to ground to facilitate band setting.

As mentioned by WB6AIG, the 2N3919 now comes in a TO-3 case, with the collector in electrical contact with the case. To avoid the large case-to-chassis capacitance which results when a mica washer is used for insulation, I mounted the transistor on an aluminum heat sink provided with cooling fins, and measuring about 3½ by 2 inches. The cooling area is about 22 square inches. (These heat sinks are available commercially, already drilled to fit the TO-3 case.) I mounted the heat sink, in turn, on two bakelite

strips so that the sink is about ¼ inch above the chassis surface. This method of mounting reduces the capacitance to about 6 pf. An additional advantage is that the heat generated by the output transistor is less likely to reach the v.f.o. by conduction and affect its stability.

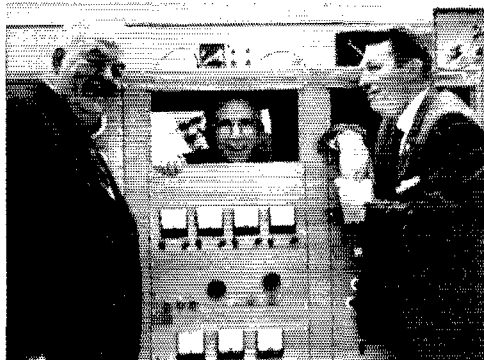
To reduce the possibility of harmonic radiation, mentioned by WB6AIG, I use a 7-Mc. half-wave filter, such as described in the A.R.R.L. *Handbook*, between the transmitter and antenna.

Projects such as the Field-Day Gallon are not expensive, are safe because of the low voltage, and yield a piece of equipment which keeps abreast of the state of the art. The importance of these portable transmitters in emergencies cannot be overemphasized, and with 14 watts output you can be heard easily if attention is devoted to the antenna system.—Denn V. Campbell, W2UJD.

Strays

"A Complete Two-Band Station for the V.H.F. Beginner"—a reprint of four articles that appeared in July, August, September, and October, 1961 *QSTs*—is still available for 50¢ (no stamps, please) from the ARRL, 225 Main Street, Newington, Connecticut 06111.

 "Help! I'm being held prisoner in W1AW's transmitter!" So says famous world-traveler DXer extraordinaire, Gus, W4BPD, during a recent visit to W1AW and ARRL Headquarters. Guarding the rack are W7PHO (l.) and W2GHK (r.). That's W1BDI looking over Gus's shoulder.



a tower about 100 feet away. The transmitter was adequately shielded and coaxial lines were used to feed the antennas. In this case the interference was still bad, but not as severe as the test setup. Also, there didn't appear to be any definite pattern of interference severity from band to band. On 80, a transmatch and open-wire feeders fed a half-wave 80-meter inverted V. The interference was most severe in this case, but still not nearly as bad as the special test setup.

The first step in eliminating the interference was to bypass the speaker leads where they left the amplifier chassis. We made a slight error here because we falsely assumed that one side of each speaker lead was grounded. A 0.01- μ f. disk capacitor was connected across the speaker leads. This reduced the interference level but didn't eliminate it. Upon checking the circuit diagram of the amplifier it was found that individual speaker leads *both* were above chassis ground. Four 0.01- μ f. disks were then installed, between each speaker lead and chassis. In Fig. 1, C_1 and C_2 are an example. This reduced the interference to the point where it was almost gone.

In the next step, shielded lines were run to the speakers. This was 2-conductor line with a shield braid covering the wires. There was no apparent change in the remaining interference. However, Warren Ford, W2GTB, has done considerable work on hi-fi and organ interference, and he has found that in some obstinate cases, shielded speaker leads have helped.

Another study of the amplifier circuit diagram showed the a.c. leads were not bypassed where they entered the chassis. Two 0.01- μ f. disk ceramic capacitors were installed directly from each a.c. lead to chassis ground where the line entered the chassis. This completely cleaned up the interference. It was interesting to note that with the 500-watt rig adjacent to the speaker leads it was possible to light a neon bulb from the curtain rods in the room, and even on the amplifier chassis, indicating a strong r.f. field right at the hi-fi unit. However, no interference could be detected.

To sum up, the basic step needed is to bypass *each* ungrounded speaker lead with a 0.01- μ f. disk capacitor, from the amplifier speaker terminal to chassis. If this doesn't do the job, check the a.c. to make sure that it is bypassed. In stubborn cases, W2GTB's suggestion of shielded speaker

leads, the shield being grounded to the amplifier chassis, might help.

Organ Interference

As long as hi-fi interference was being checked, it was decided to take a look at a Thomas two-manual organ we had. Using the same transmitting setup, the audio system on the organ picked up interference from both s.s.b. and c.w. After considerable tracing of leads in the organ's innards, we bypassed the speaker leads at the amplifier with 0.01- μ f. disks, and also the a.c. line where it entered the power supply. This cleaned up the problem in our case. Again, W2GTB has had some different experiences. He found that on one organ, an Allen, the usual bypassing didn't completely eliminate the interference. In this case a 75,000-ohm, $\frac{1}{2}$ -watt resistor in series with the grid of the first audio stage of the organ cured the trouble.

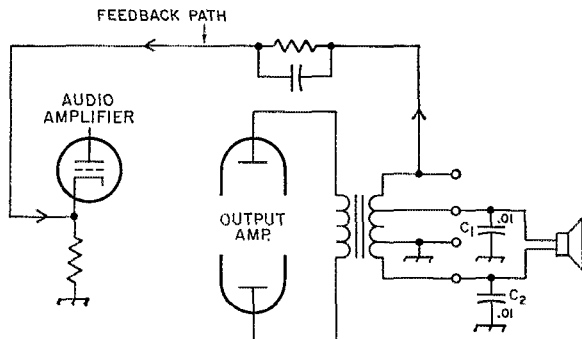
Amateur Responsibility and Public "Image"

It is easy for an amateur to take the position that he isn't responsible for this type of interference and refuse to cooperate with a complainant. While he isn't responsible (aside from harmonic interference to f.m.), an amateur does have certain obligations. Keep one point in mind: When a hi-fi owner hears an amateur station on his "rig," he *assumes* that the amateur is at fault. Merely informing him that his own equipment is to blame isn't an adequate answer. He may have paid a considerable sum for it, and would be rather unhappy to be told that it was no good.

It is your job to point out that simple corrective measures can be taken. Bypassing of speaker leads as discussed earlier will usually clean up the trouble. It is not suggested that *you* install the capacitors. If something should happen to the equipment after you put in the interference suppression, you are almost certain to be blamed. Explain that the corrections are inexpensive and a reliable serviceman can quickly make the installation. Along this line, some service people may claim that installing capacitors will affect the audio quality of the hi-fi unit. This is not true. A 0.01- μ f. capacitor is an effective bypass at radio frequencies, but has no effect at audio frequencies when connected across low-impedance speaker leads.

QST

Fig. 1—This drawing shows the typical hi-fi amplifier output section, with the feedback path that can be the cause of amateur interference. The bypass capacitors, C_1 and C_2 , are 0.01- μ f. disk ceramics. While only a single audio channel and speaker are shown, a hi-fi setup can have several speakers and more than one channel. All speaker output terminals should be bypassed.



SUBSEQUENT to a number of years off the amateur bands because of involvement in building a 50-kw. broadcast station, and a very complex array, I got the itch to get back on the air again recently. Like a lot of others returning after several years' absence, I found that many things had changed! The bands are considerably more crowded, and most phone activity is now on s.s.b., requiring almost entirely new equipment.

After giving the bank account the once-over and securing the NYL's blessing, I began to acquire the necessary equipment, including an amplifier with 1-kw. d.c. capability. At this time the winter season was upon us, with all its glory (and misery), so I would have to do with what amounted to the minimum for an antenna. I wound up with a couple of dipoles (3.5 Mc. and 14 Mc.) fed with the same coax, and only about 10 feet off the roof. The ends of the 3.5-Mc. dipole were attached to the chimneys on the houses either side of me.

After operating but a very, very short time with maximum power, or even the exciter alone, it became apparent that the telephone in my home could not be used as long as I was on the air. Checking with those gracious neighbors who had allowed me to hitch my antenna to their homes confirmed the worst! They were equally as bad off.

Ransacking my memory, I recalled that at one time I was a victim of BCI, but never could I remember having a case of telephone interference (TPI). However, it seemed to me that this surely must be a case of rectification in the microphone button, a bad connection, or something equally simple to correct.

No such luck! After trying the simple bypassing techniques, I was forced to admit that this indeed was something new, and I called the local telephone company. In due time the man arrived and we went to work. He had a larger supply of bypass capacitors, and he did everything called for in the phone-company handbook, the ARRL *Handbook*, and all that either of us could think of at the time. No results.

I might point out here that I live in one of these homes that are prewired as far as the telephone company is concerned. This wiring consists of a six-pair unsheathed cable starting at the arrester box, running in some pattern into almost all rooms of the house, and ending up back at the arrester box. (The telephones are installed by using a tone on the cable, listening with an induction coil and amplifier, drilling the wall and fishing out the wires.)

* 1868 Edsel Drive, Trenton, Mich. 48183.

Telephone QRM

from S.S.B. Transmitters

New Problems Stemming from Updated Line Equipment

BY JAMES R. BALMER,* WSKRS

The situation at this time was beginning to look like and take on all the aspects of a "worst case"! A bit of investigation revealed that another ham living about halfway between me and the exchange building was clean, in spite of the fact that he was using the same power and his antenna was similar to mine. That is, he was until his telephone went on the blink and a nice new shiny one was installed. Now he had all the problems that I did.

The next thing in the major effort was to try shielded wiring for the runs in the house. While this reduced the interference measurably, it did not clear it up completely. In addition, there remained the practical problems of shielding the instrument and, more important, rewiring my home and those of my neighbors. About this time I began to suspect that the instrument itself was the source of the trouble. Chasing down the circuit for the type 500 that I had in my home, I found that they used a couple of varistors in the network package, and another across the receiver unit for a sort of a.g.c. action. None of these varistors was used in the older type 300 that my friend had. Assuredly, then, this must be the cause of the trouble. But what to do about it?

I requested that the telephone company provide me with one of type 300 units and found out, sure enough, that this provided one way of curing the problem. However, the type 300 had long since been declared obsolete in this area and no more were to be installed. Even the units still in service would be removed sometime in the future.

On various occasions during this period, I had anywhere from one to five phone-company persons at the house at one time and, after seeing the problem firsthand, they decided that perhaps a low-pass filter might do the trick. They pro-

cured the parts and built up a unit.

At this same time, we approached the matter with a "let's-bypass-the-varistors" outlook and after obtaining a used type 500 we went to work. Removing the network from the case was the worst part of the job, as they use some sort of potting compound that does not harden and which has the color and consistency of a cross between very thick honey and a good grade of axle grease! However, the varistors were right there in front of us, so we soldered leads to all four terminals and brought them outside of the case where we bypassed each varistor with a 0.01- μ f. capacitor.

After checking back with the telephone company, we found that both approaches worked, but the bypassing was by far the better and, further, was not subject to variations in effectiveness as I changed from band to band. The amount of bypassing used seemed to have no noticeable effect on the audio response.

Sometime during this phase of the investigation, Bell Labs was contacted by the local engineering group, and they (Bell) admitted to having had a problem along this line.

There are many things to be concerned about when making a change on a standardized item such as a telephone. Thorough testing, simplicity of maintenance, minimum inventory of special items, and hundreds more. Contacting Western Electric (the equipment manufacturer for the Bell System) resulted in a test quantity of network assemblies being manufactured minus the varistors. This approach had been decided upon at Bell Labs, unknown to any of us, and we were about to give it the trial-by-fire field test. Many tests were conducted by both Western

Electric and the phone company to make sure that the use of these networks would not degrade the phone service in any manner. The final result was a network (designated locally as 425-RF) with no varistors. This, along with bypassing the line, the receiver, and the microphone button, cleared up the interference 100 per cent!

Time consumed overall, six months.

This cleared up all the type 500 phones (the most-used model). We are still trying to get networks for the "Princess" type, since the type 425 networks are too big to fit this model. Eventually, I suppose that we will have to tackle the tone-dialing units, and the new models with the dial in the handset. But, with the knowledge gained previously, it would appear to be a downhill fight. It would seem that this same treatment would clear up radar and other types of radio frequency interference. It is also possible that this procedure may have cleared up some TVI at the same time but, as TVI was not a problem in this case, I cannot be sure. But take note that the varistors are a strictly nonlinear type of device.

Caution

This article is not meant to give the individual amateur the go-ahead to work on telephones, but, since a lot of time and effort were expended in this matter, it might be of interest to your phone company if all else fails.

Flash: As I finish writing this item, I have been informed that the local company (Michigan Bell Telephone Company) has decided to stock the 425-RF network, so that cases of interference, such as mine, can be dealt with suddenly by the substitution of units. Glory be! **QST**

Strays

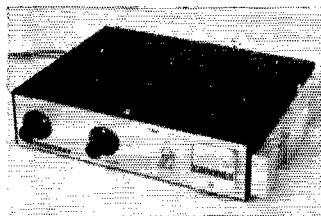


Hams at Great Lakes 21 years ago. (April 1945). Two of them are now with ARRL: Chuck Bolvin, W4LV, Southeastern Division Director, second from left, fourth row; Pete Morrow, W1VG, the League's Advertising Manager, third from left, front row. If you find yourself in the picture, or would like a list of names and calls, drop a line to Cdr. Wilfred Munter, USN (ret), 4135 Illinois St., Apt. 11, San Diego, California 92104

• Recent Equipment —

Lafayette 50-Watt

Mobile Linear Amplifier



THE Lafayette HA-250 Mobile Linear Amplifier is a compact self-contained job capable of running up to about 70 watts d.c. input, on any frequency from 20 to 54 Mc. The driver can be in the power range of 1 to 5 watts, making the amplifier usable with any small 15-, 10- or 6-meter transceiver, including the 50-Mc. battery portable by Lafayette, described in March *QST*.

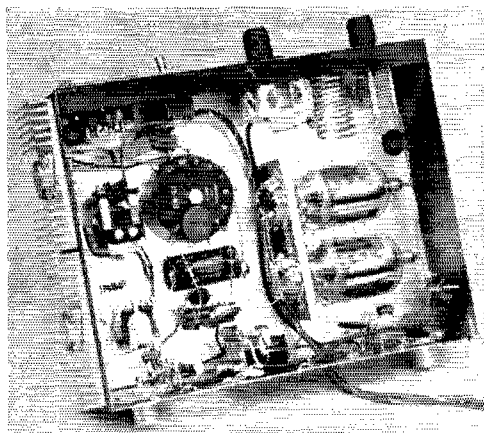
Two triode-connected 12JB6 tubes in parallel are used in grounded-grid, with an untuned input circuit. To change bands it is necessary only to connect a tap wire (provided) at the proper point on the amplifier plate circuit, when operation on 28 or 50 Mc. is intended. A simple r.f.-actuated switching circuit connects the driver output to the amplifier cathode circuit, or lets it run "around" the amplifier if the tube heaters are left turned off. The heater switch also removes voltages from the control relay circuits. It is thus possible to leave the amplifier connected to a transceiver, and use it or not, as the communications needs of the moment dictate. You can save several amperes battery drain this way. The "r.f. sensing circuit" is shown in Fig. 1.

Also of interest is the transistorized power supply. With its small toroid transformer, it is mainly responsible for an amplifier of this power level fitting into such a small and lightweight package. The operating voltage on the 12JB6 plates is about 350 over the range of power inputs given in the performance table.

The amplifier was tested on 50 Mc. with results shown below. The maximum power gain was obtained at the lowest power that would actuate the r.f. sensing relay, about one watt,

Operating Conditions at 50 Mc.

Driver Power, Watts	Plate Input, Watts	Battery Drain at 12 volts	Power output, Watts
1	33	4 amp.	7
2	42	4.6	10
3	53	5	13
4	60	5½	15
5	65	6	17
6	70	6½	18



Interior of the Lafayette HA-250 Linear Amplifier. The power supply transformers and their heat sinks are mounted on the left side of the case. Other power supply components, including the toroid transformer (large circular object) occupy the left half of the case. The pi-network plate circuit is in the upper right.

obtained from the Lafayette HA-650 Transceiver. Another 50-Mc. driver was substituted in order to check operation with up to 6 watts drive. On a.m., the best linearity was obtained in the driving power range of 1 to 3 watts. Power gain, also best in this range, is 6.5 to 8.5 db. The overall efficiency is not too bad, when it is considered that the total amplifier drain from a car battery is 48 to 60 watts, for 7 to 13 watts output at 50 Mc. This includes the tube heaters, which impose a standby drain of 12 watts.

The above power outputs were obtained after the tap on the plate coil was moved over one turn from the point specified in the instruction manual. In the original position the circuit tuned to 50 Mc. with the plate capacitor three-fourths meshed. Efficiency improved markedly when the *L/C* ratio was made higher by moving the tap. It would work a shade better with two more turns than specified, but connected this way the coil probably would not hit 54 Mc. at the all-out position of the tuning capacitor. With the high output capacitance of the tubes

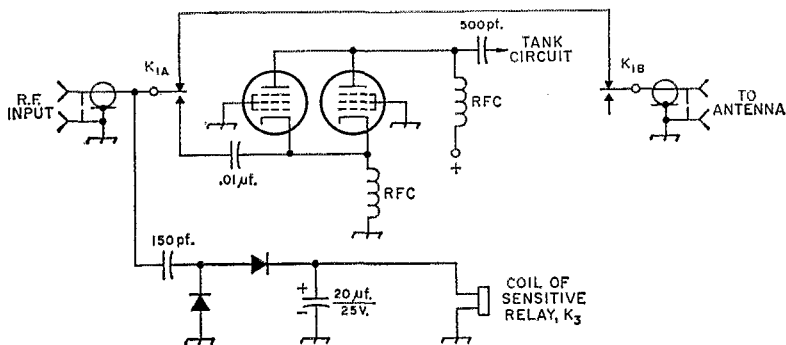


Fig. 1—R.f. sensing circuit of the Lafayette linear amplifier. Power from the driver stage actuates the relay, K_3 , which then closes the circuit from the r.f. input to the amplifier tube cathodes. With the tubes cold, r.f. feeds around the tubes, permitting operation of the station on the driver power only.

in parallel, we'd recommend getting all the coil possible into the circuit at 50 Mc.

Tuning up is about as simple as anything could be. The amplifier has a built-in relative-power indicator, and you just "tune for max.," in both driver and amplifier, whether the latter is turned on or not. The only exception to this procedure would be with an a.m. driver of greater power output than about 3 watts, in which case it would be desirable to adjust driver output for best linearity, using an oscilloscope for at least an initial check. The Heath Monitor Scope is fine for this.

—W1HDQ

Lafayette HA-250 50-Watt Mobile Linear Amplifier

Height: 2 inches.

Width: 9 inches.

Depth: 7 inches.

Weight: 2½ pounds.

Power Requirement: 12 volts d.c., negative ground only; 1 amp. idling, 8 amp. maximum.

Price Class: \$80

Manufacturer: Lafayette Radio Electronics Corp., 111 Jericho Turnpike, Syosset, L.I., N.Y. 11791

Squires-Sanders

SS-1V Video Bandscanner

"PANORAMIC reception" is about 25 years old, and most amateurs have at least a nodding acquaintance with it. Available today in both kit¹ and finished form,² it is slowly acquiring the popularity it has deserved from the start.

The SS-1V Bandscanner offers panoramic reception in a slightly different form, and it takes a little getting used to. The usual panoramic adapter presents a few hundred kilocycles of the band on an oscilloscope screen, and signals show up as vertical traces, or "pips," on the screen. As the receiver is tuned, the pips move across the



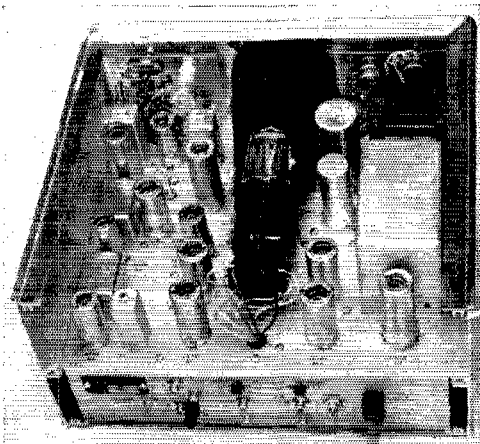
screen, and the signal one hears in the receiver is the one represented by the pip in the center of the screen (when the adapter is properly set up).

The Bandscanner is used with the SS-1R receiver,³ a multiple-conversion set that tunes the ham bands and beyond in 500-kc. segments. The Bandscanner can show the full 500 kc. if desired, or anything less down to a few kilocycles. The main point of difference between the SS-1V and other panoramic accessories is that the presentation doesn't move across the scope face as the receiver is tuned. Instead, a small identification blip extending down below the base line shows where the receiver is set. As the re-

¹"Heathkit HO-10," *QST*, December 1963.

²"Radiophone Band Scanner Panoramic Receiver," *QST*, March 1962.

³"Squires-Sanders SS-1R Receiver," *QST*, May 1964.



A three-quarter wraparound case is used for the SS-1V, similar to that used for the SS-1R receiver. The U-shaped top, back and bottom cover (not shown) is held in place by four screws. Shield can at right houses the 60-kc. high-voltage supply.

ceiver is tuned, this little blip moves across the band.

The ability to show a 500-kc. segment of the spectrum is quite an advantage in keeping track of "dead" bands. While concentrating on 14 Mc. for DX, one has only to flick the receiver's band switch to 21 or 28 Mc. for an instant check on the activity (or lack of it) on those bands. The receiver tuning dial doesn't have to be touched.

The Circuit

The SS-1R receiver has a crystal-controlled front end and a first (bandpass) i.f. of 5.0 to 5.5

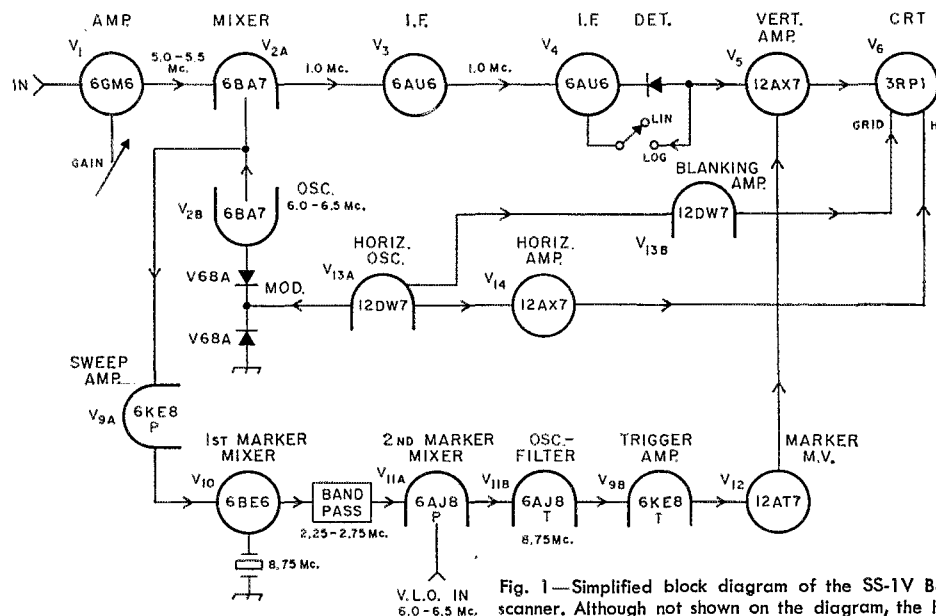


Fig. 1—Simplified block diagram of the SS-1V Band-scanner. Although not shown on the diagram, the high-voltage supply rectifies the stepped-up output of a 60-kc. oscillator, to give 2500 volts for the cathode-ray tube.

Mc. This 500-kc. segment is sampled at the output of the bandpass filter and fed to the input of the SS-1V Bands scanner. After amplification in a 6GM6 bandpass stage (see Fig. 1), the signals are passed on to a 6BA7 mixer stage. The oscillator section of the mixer is frequency-modulated by a sawtooth wave that is also fed to the horizontal deflection plates of the scope. Two voltage-dependent capacitors are used in the modulator.

A two-stage i.f. amplifier follows the mixer. This i.f. at 1 Mc. has six tuned circuits and a bandwidth of about 1 kc. Detected output is amplified in a push-pull amplifier, V_5 , and fed to the vertical deflection plates of the scope. Linear response is obtained when no a.g.c. voltage is used; moving a panel switch to LOG applies detector output to the last i.f. stage and gives a logarithmic response. One normally uses the log response in a crowded band; in a "dead" band the linear setting provides slightly better weak-signal indications.

Thus far the SS-1V is simply a fixed-tuned panoramic presentation of the 500-kc. segment existing in the bandpass i.f. of the receiver. To observe only a portion of the band, the operator twists two panel controls that vary the amplitude of the sawtooth wave (bandwidth) and the d.c. bias on the frequency modulator (offset).

Getting the little downward blip that locates the receiver tuning takes a bit of doing. The swept output from the oscillator V_{2B} is amplified and fed to a crystal-controlled mixer, V_{10} . The output of the mixer, sweeping 2.75 to 2.25 Mc. as the oscillator sweeps 6.0 to 6.5 Mc., is filtered and applied to a second mixer, V_{11A} .

The oscillator signal for this mixer is provided by the tunable oscillator in the receiver. Assume the oscillator is set at 6.3 Mc., as it would be when receiving a 14.3-mc. signal.

Following the second mixer is an "oscillator/filter", a triode and an 8.75-Mc. crystal. It is connected in the Pierce oscillator circuit, but it is operated below the threshold of oscillation. When the output of V_{11A} is exactly 8.75 Mc. (as it will be, in our case, when the output of V_{2B} is 6.3 Mc.) a short pulse is generated and passed along to the trigger amplifier, V_{9B} . A bistable multivibrator, V_{12} , is triggered "on" by the pulse. The leading edge of the resultant step waveform is differentiated and clipped and applied to the scope through the vertical amplifier. (The multivibrator is triggered back to the "off" condition during the "blanking" or retrace period.) In a crowded band it is sometimes difficult to spot the marker immediately, but under these circumstances it is a simple matter to turn down the intensity control. The signals fade down with the control but the marker, with intensity independent of the control, stands out on the scope face.

The overall sensitivity of the system, SS-1R plus SS-1V, is such that one can spot visually

just about as weak a signal as can be copied readily. In other words, once you get used to distinguishing a signal from the background noise, you can dig right down into the noise.

Provision is included for using the Bands scanner to monitor transmissions, and to this end an envelope detector is included. The change-over can be made to work automatically, transmitter monitoring during "transmit" and bandscan while receiving. Also, the Bands scanner can be connected to perform many of the general functions of an oscilloscope.

— WIDX

Squires-Sanders SS-IV Video Bandscanner

Height: 7½ inches

Width: 13⅛ inches

Depth: 13 inches

Weight: 18 pounds

Power Requirements: 50 watts, 115 v.a.c., 50-60 c.p.s.

Price Class: Under \$450.

Manufacturer: Squires-Sanders, Inc.,
Millington, N. J. 07946

WWV Moving to Colorado

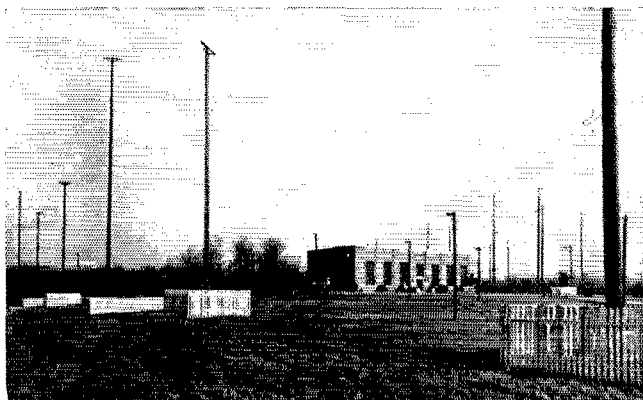
BARRING a last-minute change in plans, the WWV in Greenbelt, Md., will go off the air at 0000 GMT, July 1, 1966. At the same time the new WWV in Fort Collins, Colo., will begin operation. WWVB (60 kc.) and WWVL (20 kc.) have been in operation from Fort Collins for some time.

At the new location, the transmitter building is built into the side of a hill, so that it will have a minimum effect on the radiation from the separate vertical half-wave antennas. High equipment reliability is expected by running the transmitters at half their rated capability. Three 20-kw. transmitters will radiate 10 kw. on 5, 10 and 15 Mc., with a fourth transmitter

on standby. Similarly, four 5-kw. transmitters will operate at 2.5 kw. on 2.5, 20 and 25 Mc. In addition to the separate antennas mentioned above, two identical general-purpose antennas will be on standby and used when a regular antenna is out of order or being serviced.

It is expected that most North American users of the WWV broadcasts will get better reception from the new station. In addition, the transmitted frequencies and time standards will be more accurate. The National Bureau of Standards Radio Standards Laboratory, responsible for the standards, is located at nearby Boulder, Colo.

— WIDX



The Nation Bureau of Standards radio station, WWV, at Greenbelt, Md., (above) will close on July 1, 1966. Simultaneously the new WWV at Fort Collins, Colo., will begin operation. WWV was established in Washington, D. C. in 1923 as the first U. S. standard frequency station. (Photographs of the new WWV were not available at the time of writing.)

• Technical Correspondence

ON USING THE SMITH CHART

Technical Editor, *QST*:

The articles by Gerald Hall on the use of the Smith Chart (*QST*, January and February 1966) were timely, well written, and very interesting. Amateurs may like to know of two variations of the Smith Chart that are available from Kay Electric Company, Pine Brook, New Jersey. One is an expanded-scale chart limiting the user to voltage standing-wave ratios (v.s.w.r.) of 1.58 or less. It is useful in meticulous laboratory-type measurements with almost-matched lines. The second variation is a plastic-encased chart, in both full-scale and expanded-scale versions, with a matte finish on front capable of taking pencil lines or of being erased cleanly for reuse, and a clear plastic backing covering instructions for use on the reverse side. The Emeloid device mentioned by Hall, by the way, also comes with brief directions printed on the back.

In my work with v.s.w.r.'s I have from time to time run across some charts in which the directions "Wavelengths toward Load" and "Wavelengths toward Generator" are reversed. That is, the senses (counterclockwise and clockwise) described by Hall are reversed. These charts are used where the position and shift of position of a voltage minimum in the standing-wave pattern is measured, with respect to the load or the generator, in making an impedance measurement. This is the common practice in making measurements at microwave frequencies in waveguide, for instance, using slotted-line techniques. The amateur should check his charts to make sure that they agree with Hall's description, which is correct for the method of using the chart that he describes.

One further note of interest: In applying matching stubs to an antenna system, for instance, the stub is in parallel with the load in most instances, and the admittance markings (conductance and susceptance) on the chart may be used advantageously. To find admittance, knowing normalized impedance, just extend the radial line from the impedance plot through the center of the chart to the point on the v.s.w.r. circle diametrically opposite the impedance plot.

As Hall implies, practice a little and you will find the Smith Chart as easy to use as a slide rule, and a wonderful help to the experimentalist who likes to play with antenna systems and feed lines. — *Robert D. Hatcher, W3RIL, 2320 Albemarle St., N.W., Washington 8, D. C.*

TRANSISTOR REGENERATIVE DETECTOR

Technical Editor, *QST*:

The article "A 5-Band, 3-Transistor Receiver" in January 1966 *QST* was of considerable interest to me because it shows a receiver based on the transistor regenerative detector, a circuit which has been consistently misunderstood and misdesigned. Like the crystal receiver, another apparently simple device, it has been investigated empirically by the experimentalist and viewed with disdain by the technically competent as too simple to deserve notice.

The author of the article is quoted as comparing his detector to a plate detector "because of certain circuit similarities." This is as opposed, apparently to a possible resemblance to grid-leak detectors, and is understandable in the case of a superficial

examination of the circuit configuration. This is representative of the early and continuing attempts to analyze the functioning of transistor circuits by identifying the vacuum tube analog to permit analysis in familiar terms. There are dangers in this technique, as will be demonstrated.

A vacuum-tube plate (or anode) detector is a large-signal detector, operating without grid current at high initial bias and low initial plate current. Detection efficiency increases with carrier amplitude and negative bias. Detection occurs as a result of the "non-linear relationship that exists between grid voltage and plate current" (Terman, *Radio-Engineering*, first edition, 1932, page 280). Contrast this to the transistor circuit shown, where the static collector current is adjustable over the approximate range 1.0 to 1.5 ma., which is definitely not near cutoff.

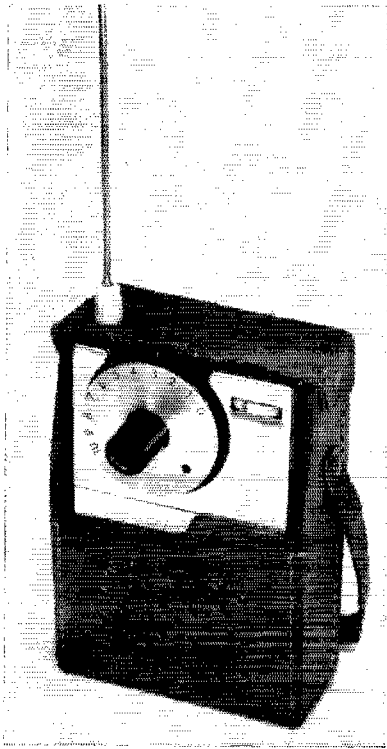
In *Transistor Circuit Engineering*, Shea, first edition, 1957, transistor detection and regenerative detection are considered on pages 289-293. Curves are presented for small signal detection by the 2N78 and the 2N137, showing optimum operating points at emitter currents of 25 and 50 microamperes, respectively. The text discusses the compromise between low emitter current for maximum non-linearity and high detection efficiency, and higher emitter current for increased stage amplification. The interaction of the two phenomena results in a characteristic with a broad peak. Regarding regenerative detectors, "the sensitivity increases as the bias is decreased." The author states that rectification takes place at the emitter diode; I do not agree. Lo, Endres, Zawels, Waldhauer, and Cheng, in *Transistor Electronics*, Prentice-Hall, 1955, pages 424-429, state "Thus the collector detector . . . may be viewed as operating either by virtue of the nonlinear transfer characteristic, or as a result of rectification in the input circuit and subsequent amplification. Indeed it is shown in Sec. 11.12 that irrespective of which nonlinearity is considered basic, the calculated optimum emitter-voltage bias point for the two nonlinearities is the same."

I submit therefore that the published analysis is incorrect, and that optimum operation will not be realized in the published circuit. Indeed, the possible operating point will result in poor operation, discouraging the experimenter who attempts to construct the receiver as described. The optimum bias point does not lie between the values of 1.0 and 1.5 ma., but at a considerably lower value. The stage gain-feedback product must be sufficient to provide regeneration, but this can be controlled by the feedback circuit.

The base-bias network should be modified to provide a 22K resistor from the supply bus to the base feed point, with the 10K potentiometer connected as a rheostat from that point to ground.

These conclusions and recommendation are based on the authorities and references cited, and on my own considerable experimental investigations of regenerative transistor detectors at broadcast frequencies. The principal experimental configuration is a tuned circuit with adjustable antenna and transistor coupling, variable regenerative feedback with a rotatable ticker in the transistor collector circuit, and broad capability of adjustment of the operating point, including the region near zero emitter and collector current. Needless to say, experimental investigations agree with the theory. The effect of regeneration does not seem to be an

A Two-Meter Pocket Receiver



A Solid-State Superregen

BY DOUG DE MAW,* WICER

Many of the solid-state v.h.f. superregen circuits previously published are tricky to get working, require bias batteries, and employ expensive transistors. This circuit is simple, inexpensive to build, and has no gimmicks to complicate the initial setup of the unit. Although this article shows how to modify low-priced transistor radios for use with the 2-meter detector, the 1-transistor front end can be used with most any of the prewired solid-state audio modules that are currently available.

INTERESTED in a short-term project that can be completed in a single evening? Here is a little superregenerative receiver which covers 143 to 149 Mc., receives a.m. signals "solid-copy" fashion when they are well modulated, and operates smoothly without "dead spots" in the tuning range.

The basic assembly is a salvaged 6-transistor a.m. broadcast receiver with its front-end and i.f. sections stripped from the circuit board. An "intermittent" in the r.f.-i.f. section had frustrated all attempts to cure it, but since the audio channel was in good operating condition, it seemed like a good idea to make use of it by adding a 1-transistor 2-meter detector ahead. The final result was a practical and inexpensive shirt-pocket receiver. The original cost of the a.m. radio was under \$5.00, and the added parts to get it operating on 2 meters came to less than \$3.00.

Conversion Information

Most transistor radio circuits are similar and contain three or four transistors in the audio-amplifier section. If possible, sketch the audio circuit on paper for later reference. This part of the circuit can be identified by its audio transformers, speaker connections, electrolytic capacitors and volume control. The a.m. detector is usually a germanium diode and is located at the input terminals of the audio channel. Make certain that a blocking capacitor is between R_3 and the base terminal of the first audio stage to prevent short-circuiting the d.c. bus. Retain the speaker, volume control and switch, battery clips, and earphone jack. These parts will be used later.

Once the unneeded components are removed from the board, the circuit of Fig. 1 can be wired into the open area that remains. Fig. 2 shows the layout used by the author. The original tuning capacitor was removed and a 5-pf. miniature variable was mounted in its place, allowing the tuning shaft to protrude through the original hole in the case. The earphone jack, located at the top of the case, is used as a connector for a whip antenna. Some receivers have the earphone hardware on the side rather than at the top; in that case, relocate the fitting so that the antenna can be plugged into the top of the receiver.

The battery polarity in the 2-meter circuit will have to be juggled to match that of the audio amplifier. Fig. 1A shows how a p-n-p transistor can be used when the positive battery terminal is grounded. Fig. 1B is an alternate circuit which permits the use of an n-p-n transistor. You will note that the negative end of the supply goes

* Assistant Technical Editor.

to the emitter circuit and the collector's d.c. return is to ground. Either circuit will give satisfactory performance and the choice is up to the constructor.

The unused copper strips on the circuit board can be used as tie points for the new components. Make certain that any strips so used are disconnected from the audio amplifier so that short circuits cannot occur when the receiver is tested. A jackknife will serve nicely to remove unwanted sections of the printed-circuit strips.

Circuit Data

The incoming signal is coupled into the receiver by connecting the antenna to a tap on L_1 through a 10-pf. capacitor. For best sensitivity, the exact tap point will have to be determined experimentally. If the tap is placed too far up on L_1 the receiver will not superregenerate because of overcoupling to the antenna. The tap will usually be between $\frac{1}{4}$ and $\frac{1}{2}$ turn from the ground end of L_1 .

The value of R_1 , which establishes the operating bias for Q_1 (or Q_2), will depend upon the type of transistor chosen. The optimum value will permit smooth regeneration and will enable the detector to "start" immediately upon applying battery voltage to the circuit. In the author's model, 0.47 megohm was suitable. However, a resistor value as low as 56,000 ohms was necessary with some transistors tried.

The value to be used for R_2 will depend upon the voltage required by the audio section of the receiver. Some transistor radios use 3 volts, while others use 4½ or 9 volts. In the present case, a 10,000-ohm resistor proved to be satisfactory. If too much resistance is used, the detector will not go into superregeneration. A miniature 50,000-ohm potentiometer can be substituted for the fixed resistor, permitting on-the-nose adjustment of the regeneration. The best operating point is just into the region where the circuit breaks into superregeneration. At that point the sensitivity is maximum.

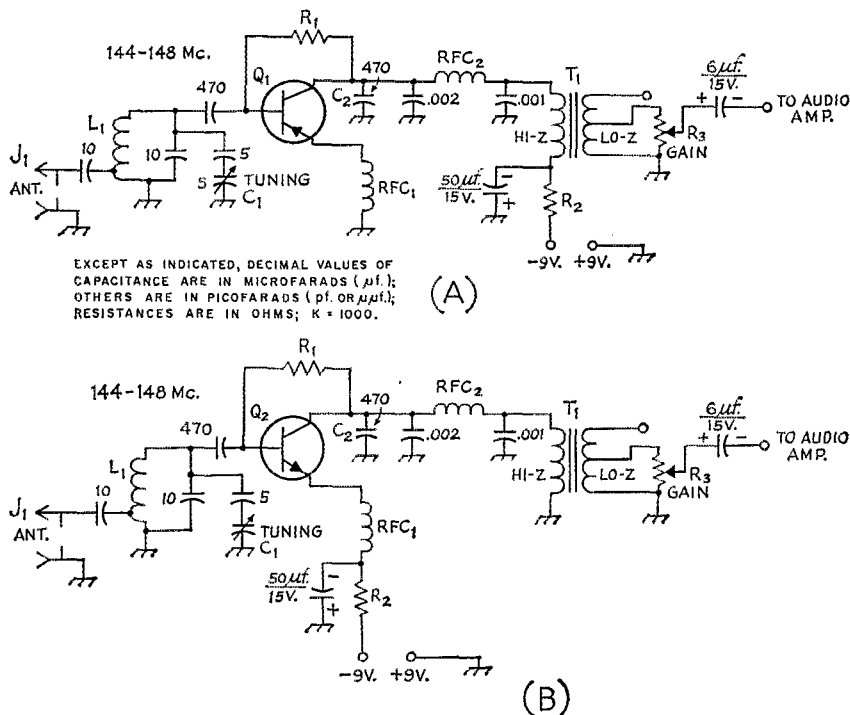


Fig. 1—Schematic diagram of the superregenerative detector. At A, a p-n-p transistor hookup is shown. An n-p-n transistor can be used by changing the circuit polarity as illustrated at B. The circuits are tailored for use with radios that use the positive supply line as common. Decimal-value capacitors are disk ceramic. All other fixed-value capacitors are disk ceramic except those bearing polarity marking, which are electrolytic. Resistors are ½-watt composition.

- C_1 —5-pf. miniature variable capacitor (Hammarlund MAC-5).
- C_2 —See text.
- J_1 —Earphone jack in receiver or phono connector (see text).
- L_1 —4 turns No. 16 bus wire, ¼-inch diam., ½ inch long. Tap ¼ turn from ground end (see text).
- Q_1 —RCA 2N711 suitable. Other usable types include 2N705, 2N2996, 2N960, 2N964, 2N974, and 2N2635.

- Q_2 —N-p-n transistor, RCA 2N706A suitable. Other types include 2N708, 2N918, 40217, and 2N3662.
- R_1, R_2 —See text.
- R_3 —Audio control from modified a.m. receiver (see text).
- RFC₁—1.8- μ h. r.f. choke (Ohmite Z-144 usable).
- RFC₂—2.5-mh. r.f. choke.
- T_1 —Transistor interstage transformer, 10,000 ohms to 2000 ohms c.f. (Lafayette 99R6126 usable). Use ½ of secondary winding.

Audio output from the detector is taken from the collector, passed through a quench-frequency inductor (RFC_2), and coupled into the audio amplifier through a small interstage transformer. Attach C_2 as close to the collector terminal as possible to assure effective bypassing at 144 Mc. The audio gain control, R_3 , an original component from the b.c. receiver, is across one half of the secondary winding of T_1 . Since most pocket a.m. receivers are able to provide 100 milliwatts or more of audio output, the gain control will be useful when listening to strong signals.

The finishing touches can be put to the receiver by installing a miniature phone plug on one end of a 21-inch length of stiff wire and plugging it into J_1 . This wire, which serves as a quarter-wavelength antenna, turns out to be resonant at 145 Mc. A 19-inch whip such as is normally

used for mobile and fixed installations proved to be electrically short on the hand-held receiver, in the absence of a ground plane against which to work. If desired, a phono jack can be used at J_1 , making it an easy matter to attach the receiver to a fixed-station antenna for DX listening. The whip antenna could be mounted in a phono plug, making J_1 adaptable to both fixed and portable antenna use.

How It Works

The completed receiver will "earn its salt" at ham picnics, hidden-transmitter hunts, and for civil-defense monitoring. Other uses for the unit will no doubt become apparent to the builder once it is assembled and ready to use.

In checking the performance of the little superregen, at the author's home the signal from WIAW, some 15 miles distant, completely quieted the hiss noise in the receiver using only the whip antenna. Low-power stations using Communicators were copied Q5 at distances up to 25 miles away — indicating that the receiver was more than just a novelty!

One word of caution: Do not operate the receiver in the immediate vicinity of a 2-meter transmitter. Doing so could result in a burned-out transistor at Q_1 . Also, a certain amount of receiver radiation is inevitable since there is no isolation between the detector and the antenna. It would be wise to avoid using it in the immediate vicinity of other 2-meter stations if you wish to remain on friendly terms with their operators.

If a discarded broadcast receiver is not available, the detector circuit can be used in combination with any of the audio-amplifier modules presently on the bargain market.

Finally, a word of warning for those who have not worked with superregenerative detectors: The receiver is of no value for c.w. or s.s.b., and it is unsatisfactory for n.b.f.m. reception in that the signal will appear as an unmodulated carrier. All signals will be as "broad as a barn." On a.m., don't look for the first-rate audio quality that can be expected from a superhet receiver. The useful features of the superregen are its good sensitivity, its a.g.c. action — which may surpass that of many communications receivers — and its inherent noise-limiting ability, which is especially helpful when listening on 2 meters in noisy areas.

QST



Fig. 2—Inside view of the pocket receiver. The detector circuit is at the top of the unit. Audio gain control R_3 is at the upper left. Transformer T_1 is shown at the lower left corner of the circuit board, just below the 2.5-mh. r.f. choke, RFC_2 . The audio-amplifier circuit is visible at the lower right.

Strays

WA4LQN was working W5HTV mobile, who was en route home from the Huntsville, Alabama Hamfest. W5HTV suddenly interrupted his transmission with "Oh, oh . . . looks like somebody drowned ahead . . . they're pulling him out of the water . . . lots of people and cars here . . . standby" (two minutes of silence) "Well, everything is okay, it was just a baptizing . . ."

A 71-year-old ham, ZL1ANI, living alone in Buller Street, Waihi, New Zealand, struggled to his transmitter to send out an appeal for help after he suffered a heart attack. Thirty-five miles away in Matamata, ZL1ACL, E. C. Amon, answered his call. A doctor and an ambulance were sent to the home of the sick man, and he was taken to the hospital.

The author points the way to a functional application of the popular Command-series receivers. This article describes a simple method by which the BC-455, and like receivers in this group, can be placed in operation without the need for extensive effort on the part of the user.

BC-455

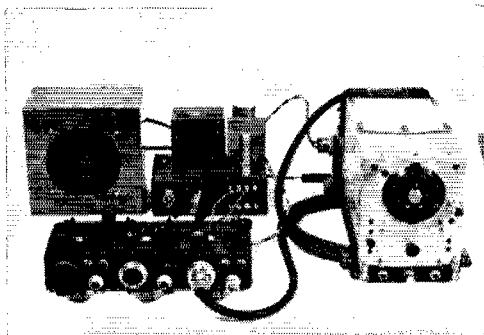
Unconverted

BY WILLIAM L. HOLBROOK,* WA6WPD

IN the past years, the BC-455 and other Command-type receivers have gained quite a bit of popularity among hams in portable, mobile, and fixed-station applications. Most of the articles concerning these units call for some degree of conversion before they become useful to the amateur. These conversions are fairly simple and basically require the removal of the accessory plug on the front panel, then putting in a gain control, phone jack, and b.f.o. switch in place of the accessory plug. For 12-volt operation, the filaments must be rewired and a suitable power supply must be built. This results in a fairly neat and dependable receiver setup for the 40- or 80-meter ham bands (BC-455 and BC-454, respectively).

These units can be put into operation, "military style," as I did, by putting the receiver (with its dynamotor) into the fused rack MT-7A/ARR-2, and plugging cables from the battery and remote-control box into the appropriate jacks on the rear of the rack. Also, headphones can be plugged into any one of six headphone jacks.

* 1575 Verbena Drive, Palm Springs, California.



A look at the BC-455 receiving setup. The receiver is at the right, the control box in the foreground, and the speaker and power supply are at the rear.

The hookup and operation of the receiver and its associated equipment are explained in the following paragraphs.

The Remote-Control Box

The remote-control box (BC-450) is a metal box, measuring about $4 \times 9\frac{1}{2}$ inches, in which there are three volume controls, three on-off/c.w./m.c.w. switches, three phone-jack selectors, four phone plugs, and remote-tuning verniers for the simultaneous operation of three receivers. These units can be purchased for a couple of dollars from most surplus-radio supply houses along with connecting plugs that cost about 50 cents each.

The control box is connected to the jack next to the fuse clips on the top rear of the receiver's rack with 8-conductor cable, such as Belden S418. Also, a flexible shaft can be connected, if desired, from a spindle knob on the receiver to another spindle knob on the control box in order to utilize one of the remote-tuning verniers.

Power Supply

A common problem with surplus equipment is the power supply. My solution to this problem, with the BC-455, was to mount the standard DM-32 28-volt dynamotor on the mounting platform of the receiver and then connect 24 volts to the 2-prong jack on the side of the rack.

The power supply I use is shown in the photo at the left and in Fig. 1. This supply uses a 24-volt filament transformer, rated at about 1.5 amp. or more. The receiver can be powered in emergencies by two 12-volt storage batteries connected in series. Because of moderate current drain on the battery, it should be possible to operate the receiver from the storage batteries for several hours, a real benefit during emergency conditions.

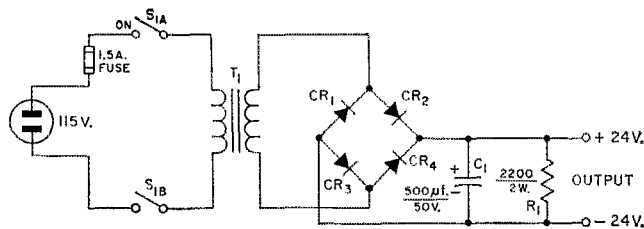


Fig. 1—Schematic diagram of the power supply used by the author. C₁ is electrolytic. R₁ is composition. CR₁—CR₄, incl.—Selenium bridge-rectifier stack, 36 volts input at 1.5 amp., or four 50-p.i.v. 2-amp. silicon diodes, bridge-connected as shown. S₁—D.p.s.t. toggle switch. T₁—24-volt, 2-ampere transformer.

Receiver and Rack

The BC-455, and its 80-meter counterpart, the BC-454, is a 6-tube superheterodyne using a 12SK7 as an r.f. amplifier stage, a 12K8 as the mixer, and two more 12SK7s as the i.f. amplifiers. The second detector and b.f.o. is a 12SR7, while a 12A6 is used as the audio amplifier. The metal case of the receiver serves to shield the unit.

Triple, double, or single receiver racks can be obtained, depending on the number of receivers to be operated. The schematic diagram of a single rack is shown in Fig. 2.

As already mentioned, the 2-prong connector on the side of the rack is where the 24 volts is connected to the unit. The control box is connected to the 8-prong jack on the top of the rack by means of a cable. Nothing needs to be connected to the two 6-prong fittings on the other side of the rack. Cables from the modulator units of the SCR-274N transmitters are connected to these jacks for side-tone operation and play no role in the operation of the receiver.

Directly below the power connector are two phone jacks, designated as A and B (J₁₂ and J₁₃, respectively, in Fig. 2). Two other jacks, also designated A and B (J₁₄ and J₁₅), are located at the front of the rack along with a selector switch. This switch, like the phone switches on the control box, is used to switch either the A or B phone jacks, including the

jacks on the control box, into the receiver's output. In this way, as many as three headphones can be plugged into either the A or B phone jacks, depending on which position the phone-line selector switch on the control box, or the one on the rack (S₃), is in.

All six of the phone jacks (both the A and B phone lines) can be switched into the output by changing the positions of the phone switch on the control box to either the A or B position, then placing the switch on the rack in the opposite position.

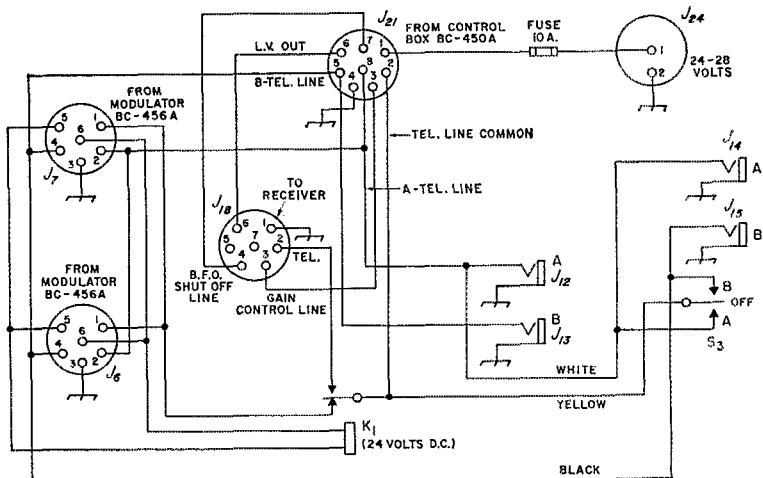
Finishing Up

The necessity for major conversions, such as working over the tuning-capacitor assembly for greater bandspread, removing the a.v.c. for better c.w. reception, and the addition of a noise limiter can best be decided by the reader. However, all that remains to be done is to plug the power supply into the wall socket, turn the on-off switch to the desired mode (c.w. or m.c.w.) and attach a speaker or low-impedance phones to one of the phone jacks.²

I know that you'll be as pleased with the performance of the receiver as I was. QST

² If a speaker is used, the low-impedance output of the receiver (approx. 600 ohms) will have to be matched to the speaker. This can be done by inserting a 500-ohm line-to-voice-coil transformer between the headphone jack and the speaker. — Editor.

Fig. 2—Schematic diagram of the MT-7A/ARR-2 receiver rack. Original designators for the receptacles and their pin numbers have been retained for ease of identification. All jacks are shown as viewed from the inside. K₁ is not used for basic receiver operation.



A NOISE-LOCATOR RECEIVER

Battery Operation and Wide Frequency Range for Finding Noise Sources

BY DOUG DEMAW,* WICER

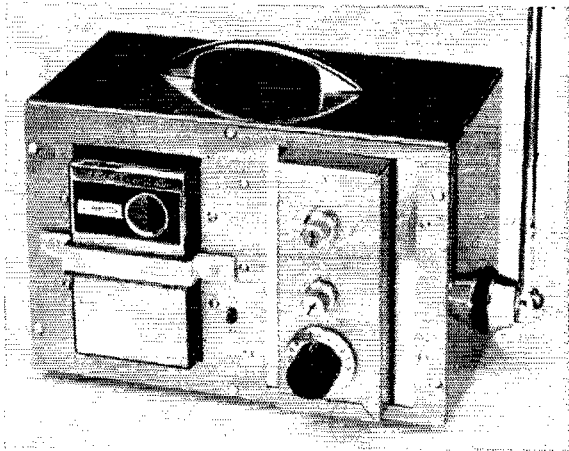
MAN-made radio-interference noise is caused by a variety of devices, some of which require painstaking effort to locate. Many of these noise sources can be tracked down by listening to a portable receiver and seeking out the area where the noise is the loudest. Such a receiver should be light weight, dry-battery powered, and should tune from the broadcast band through some portion of the v.h.f. spectrum. Additionally, since such a receiver will enjoy but periodic use, the cost of the unit should be nominal. This article describes a receiver that tunes from the broadcast band through 225 Mc., operates from a pair of replacement-type 9-volt batteries, and is made up from readily available components. It can be used to locate man-made noises as described in a recent article in *QST*.¹

The Circuit

The heart of the noise-locator receiver is an 8-transistor pocket radio. This unit serves independently as a 550 to 1650-ke. receiver when searching in that part of the spectrum. By setting the tuning dial to 1650 kc. and activating the h.f. plug-in tuner shown in Figs. 1 and 2, the pocket receiver serves as a fixed-tuned i.f. and audio channel during reception in the 2 to 25-Mc. range. A second plug-in tuner covers the range between 75 and 225 Mc.

Both tuners are transistorized, each containing a mixer and oscillator. Because of the simplicity of this type of circuit, the receiver has very poor front-end selectivity, and strong oscillator harmonics result in a double tuning range, enabling the operator to tune quickly to the frequency of greatest noisiness. The 25-75 Mc. range is covered on oscillator harmonics. Because of the poor image ratio the receiver is useful only as a noise-locating device, and should not be expected to perform as a communications receiver.

The tuners are wired to operate with the positive terminal of the battery grounded. Since most transistor radios are set up in that fashion, this makes it possible to use a single 9-volt battery to power the entire receiver should the builder desire to do so. However, in its present form the



8-transistor radio has its own 9-volt battery and the battery voltage for the tuners is secured from a separate source, BT_1 .

The i.f. output signal is fed into a ferrite loop antenna (L_{13}) which is mounted adjacent to the built-in antenna of the transistor radio. L_{13} is tuned to resonance at 1650 kc. by adjusting C_6 , a 3-30 trimmer. By placing L_{13} in close proximity to the built-in antenna in the transistor radio, excellent coupling at the i.f. results.

When tuning from 2 to 225 Mc., the signals are picked up by a whip antenna which is mounted on the side of the cabinet. A standard auto radio antenna is used in the author's model and provides more than ample sensitivity for noise hunting, even with the whip fully collapsed.

Construction

It is not practical to specify dimensions for the over-all unit because the transistor radio selected by the builder will dictate the mounting technique to be used. The tuners, however, can be built in a manner similar to that shown in Fig. 1. Each is housed in a $5\frac{1}{4} \times 3 \times 2\frac{1}{8}$ inch Minibox which has a 4-pin male connector (P_1 and P_2) mounted on one wall to facilitate plugging the tuner into the main cabinet.

The case which houses the composite receiver is a 9 x 6 x 5-inch utility box. The front panel contains all parts of the receiver except the antenna, which is mounted on the box itself. A nibbling tool was used to cut the holes in the panel. One of the holes is made slightly larger than the plug-in assemblies and the other hole is cut slightly larger than the outer dimensions of the transistor radio used. An aluminum bracket is mounted behind the converter hole and contains a 4-pin socket, J_1 , which mates with P_1 (or P_2)

* Assistant Technical Editor, *QST*.

¹ Nelson, Electrical Interference, Part I, April 1966 *QST*; Part II, May 1966 *QST*.

With simplicity and low cost the keynotes, this noise-locator receiver was designed as a follow-up to the two-part article by WA6 FQG in April and May QST. This portable receiver can be used to pinpoint the source of electrical noise in your neighborhood.

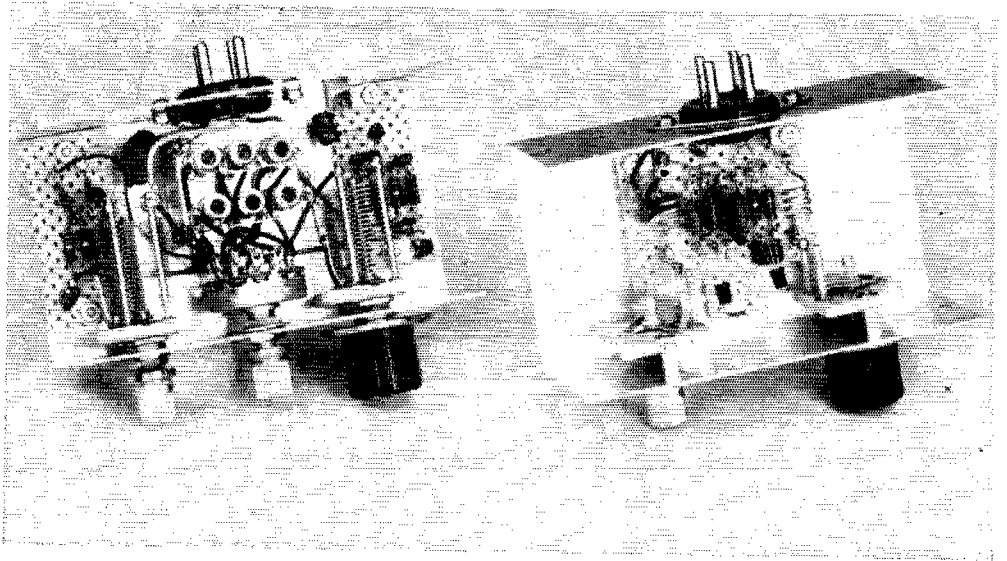


Fig. 1—Interior view of the plug-in converters. The h.f. tuner is at the left. Coil assembly is at center on aluminum bracket. Holes are drilled in line with the slug-adjustment screw of each coil (bottom of Minibox) to facilitate tune-up when cover is in place. Mixer circuit is built on perforated board at left of box. Oscillator is assembled on board at right of box. V.h.f. tuner is unit at right. Single perforated board is used to contain entire mixer-oscillator circuit.

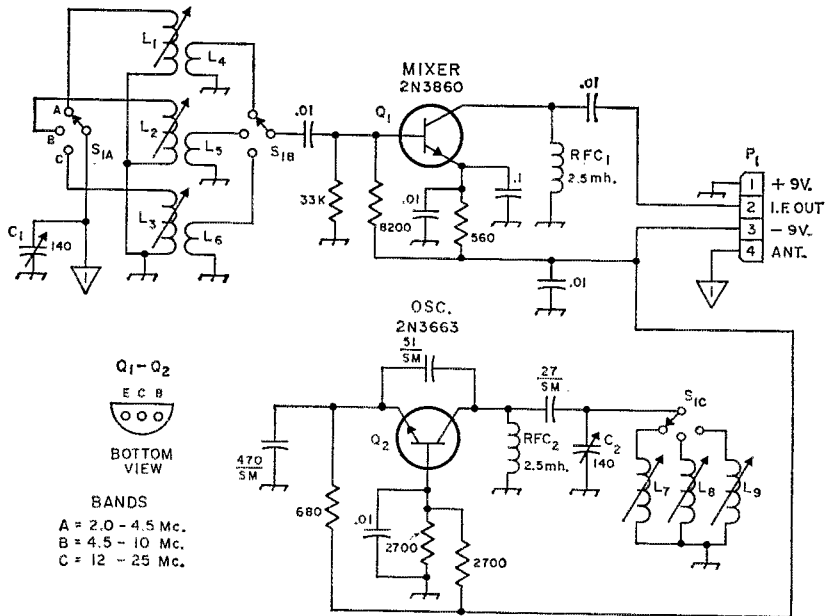


Fig. 2—Schematic diagram of the h.f. plug-in tuner. Decimal value capacitances are in $\mu\text{f.}$; others are in pf. SM = silver mica; others are disk ceramic. Resistances are in ohms ($K = 1000$); resistors are $\frac{1}{2}$ -watt composition.

C_1, C_3 —140-pf. midget variable (Hammarlund HF-140 or equivalent).

L_1, L_7 —35–60 $\mu\text{h.}$ slug-tuned coil (Miller 4509).

L_2, L_8 —5–9 $\mu\text{h.}$ slug-tuned coil (Miller 4505).

L_3, L_9 —0.4–0.8 $\mu\text{h.}$ slug-tuned coil (Miller 4501).

L_4 —16 turns No. 30 enam. wound over cold end of L_1 .

L_5 —5 turns No. 30 enam. wound over cold end of L_3 .

L_6 —2 turns No. 30 enam. wound over cold end of L_3 .

P_1 —4-pin male plug (Amphenol 86CP4).

Q_1 —G. E. 2N3860.

Q_2 —G. E. 2N3663.

$\text{RFC}_1, \text{RFC}_2$ —Subminiature 2.5 mh. r.f. choke (Miller 70F253A1).

S_1 —Phenolic rotary, 1 section, 3 poles, 4 positions; 4th position not used (Mallory 3234J).

Fig. 3—Circuit of the v.h.f. plug-in converter. Decimal value capacitances are in $\mu\text{f.}$, others are in pf. SM = silver mica, others are disk ceramic. Resistances are in ohms ($K = 1000$); resistors are $\frac{1}{2}$ -watt composition.

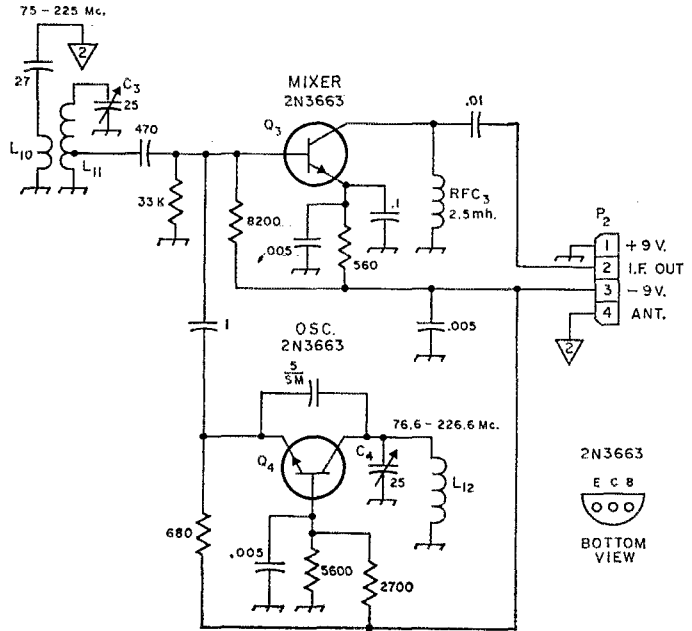
C_3, C_4 —25-pf. miniature variable (Millen 20025).
 L_{10} —2-turns No. 22 enam. wire $\frac{1}{4}$ -inch dia. inside cold end of L_9 .

L_{11}, L_{12} —5 turns No. 18 bus wire, $\frac{3}{16}$ -inch dia. by 1 inch long.

P_2 —4-pin male plug (Amphenol 86CP4).

Q_3, Q_4 —G. E. 2N3663.

RFC_3 —Subminiature 2.5-mh. r.f. choke (Miller 70F253A1).



when the converter is plugged in. Another aluminum bracket is placed behind the hole for the broadcast receiver and is of such depth as to assure that the volume control and tuning knob protrude far enough beyond the panel to make them accessible to the operator. These dimensions will be dependent upon the type of radio chosen for the project.

The 9-volt battery for the converters is mounted on the back of the converter bracket with an aluminum clamp as shown below. S_2 is panel

mounted between the converter and the broadcast receiver.

The i.f. coupling loop, L_{13} , is mounted on a small bracket which is attached to the pocket receiver's mounting plate. (See photo next page.) With the pocket receiver in place, L_{11} should be in parallel with, and no more than 1 inch away from, the loop antenna in the broadcast receiver. The closer the coupling, the greater the transfer of i.f. energy. Again, the exact method of mounting for L_{13} and C_5 will depend on the type of receiver purchased and its physical layout.

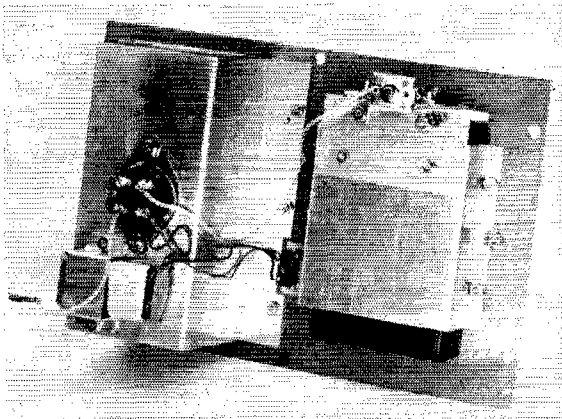
A small aluminum bracket is placed across the front of pocket receiver to hold it in place in the main cabinet. In the model shown, felt padding was placed behind the pocket receiver and between the front aluminum bracket and the receiver, to prevent the receiver's case from being scratched. The padding also serves to hold the receiver snugly in place.

The outer cabinet is topped off with rubber feet to prevent damage to table tops and other smooth surfaces. A handle is bolted to the top of the case to permit it to be carried about.

Testing the Converters

To permit converter adjustments without the units being plugged into the main assembly, a 7-inch 4-conductor test cable can be used between P_1 (or P_2) and J_1 .

Using the jumper cable, connect the 2-25-Mc. tuner to J_1 . Turn the broadcast receiver on and set it to 1650 kc. Turn S_2 on and S_1 to position A. Adjust C_1 and C_2 so that their plates are fully meshed. Connect a signal generator to the base of the whip antenna (or to pin 4 of J_1) through a 10-pf. capacitor. With the generator delivering output at 2 Mc., adjust L_7 until the signal is



Aluminum bracket at left holds plug-in converters in place. Nine-volt converter battery is held in place on back of same bracket. Loop antenna L_{13} and its tuning capacitor are at top of bracket at right. Converter on-off switch is mounted between the two brackets. Wire and clip at lower left of photo are for connecting circuit to case-mounted whip antenna.

heard. Next, adjust L_1 for maximum received signal at 2 Mc. The same procedure is used during adjustments on band B, starting with a 4.5-Mc. signal and adjusting L_8 , then L_2 . On band C, start with a 12-Mc. signal and adjust L_9 , then L_3 .

While listening to a signal of moderate strength, adjust the i.f. inductor, L_{13} , to resonance at 1650 kc. by tuning C_5 for maximum received signal. No further adjustments to C_5 should be required.

The v.h.f. plug-in tuner requires no adjustment and should cover from 75 to 225 Mc. If not, compressing or spreading the turns of L_{11} and L_{12} should bring the tuned circuits into resonance at the desired frequency.

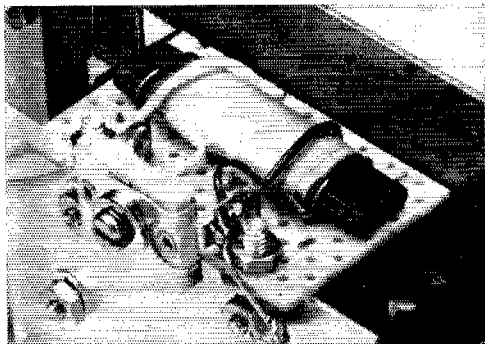
When the overall receiver is performing properly, there should be a distinct increase in hiss noise when S_2 is turned on. With the whip antenna extended, a myriad of short-wave signals should be heard as the h.f. converter is tuned through its range. On band A, images from the broadcast band should be discernable. FM and TV images may appear when operating in position C. A similar condition should result when the v.h.f. tuner is being used.

Using the Receiver

When searching for the source of a particular noise, first sweep through the tuning range of the receiver to determine the frequency at which the noise is the loudest. Then check different areas of the neighborhood to find out where the noise is the loudest. The technique of "zeroing in" is fully described in May 1966, *QST*, page 39.

The noise-locator receiver may be used in a car by plugging the car antenna into the unit, or by allowing the receiver's whip antenna to protrude from the window of the car. In some cases ignition noise from the car may be too strong to permit satisfactory use of the receiver with the motor running.

The little broadcast-band receiver may frequently serve by itself in locating noise. For this reason, the U-shaped retaining clamp on the



Close-up look at the i.f. coupling loop, L_{13} . No. 6 spade bolts are used to secure perforated-board assembly to main bracket. Note close proximity of loop-antenna assembly to top of broadcast receiver, whose loop antenna is just inside the plastic case and is parallel to i.f. loop inductor, L_{11} .

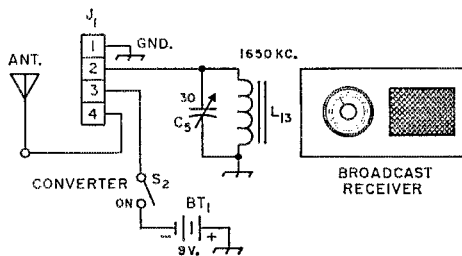


Fig. 4—Hookup of the converter jack, antenna, and i.f. BT_1 —9-volt transistor radio battery.
 C_5 —3–30-pf. compression trimmer.
 J_1 —4-pin tube socket (Amphenol 78S4).
 L_{13} —Ferrite loop antenna for broadcast band (Miller 2005 or equivalent).
 S_2 —S.p.s.f. slide switch.

author's model was made readily removable so that the receiver could be divorced from the rest of the package at a moment's notice. This feature could be especially useful if the family transistor radio is to be used as part of the composite unit.

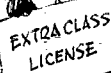
An inexpensive noise-locating receiver such as this should make a good club project. It works well, and if noise generated by line-operated equipment is troublesome in your area, is well worth the effort required in building it. **QST**

Strays

The Quarter Century Wireless Association group in the West Gulf Division is planning a breakfast for old timers and club members, as well as for prospective members, at 7:30 A.M. Sunday, June 5, at the West Gulf Division ARRL Convention.

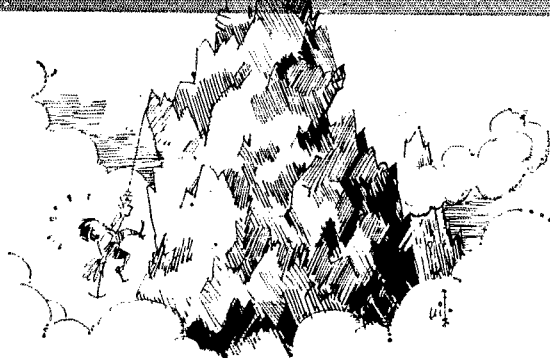
A memorial scholarship has been established honoring John M. Grasso, Jr., K1IKJ of New Britain, Conn., who was killed in action in Viet Nam. The grant, to a student at New England Technical Institute in Hartford, is restricted to residents of New Britain.

Anyone interested in telecommunications in the space age and fine printing ought to get himself a copy of *Telecommunications in the Space Age*. This 10 × 13-inch handsomely printed papercovered 258-page book is available for \$6.00 (U.S.) from Gaston Lionel Franco, 91 Av. des Champs-Elysees, Paris, France. With the introduction written by Gerald Gross, W3GG, recently retired Secretary General of the International Telecommunications Union, this book gives an idea of the impact of telecommunications, particularly space telecommunications, on man's life. The text is good, and the photographs (both black-and-white and color) are superb. There is included in the book a brief chapter devoted to amateur radio. The author says, "We are convinced that governments are wise to encourage amateur radio; it is valuable . . ." Because this book was edited and published in Europe, it has an international flavor not generally found in books on this side of the Atlantic.



EXTRA CLASS
LICENSE

MEETING THE CHALLENGE



Northwest Amateurs

Aim at Higher Licenses

BY W. R. WATSON,* K7JHA

THE year 1965 will no doubt be remembered by most of the amateur radio fraternity as the year when inventory was taken from top to bottom. In a business language, there was an abundance of assets tabulated; but unfortunately, too many of these assets were frozen due to lack of development. In the amateur language, there are too many who possessed the potential for further development but had no incentive to do so. After all, what incentive was there? With the exception of Novices and Technicians, amateurs could operate without restriction on any band, or with any mode with the simplest of qualifications consistent with FCC rules. The "inventory" exposed many weaknesses, which if allowed to continue, could impose a threat to the continued justification of the radio amateur to occupy valuable and strategic spectrums of the airways. Justification is the vital lifeline of amateur radio which must be maintained year after year through services which we perform in the public interest, and by the ways in which the spectrum is utilized to accomplish these purposes. Advances in technique, theory, equipment use, and operation, require the same attention year after year to maintain a justification for us to hold frequencies.

And so, the challenge was issued. The now-famed FCC docket was met with various reactions.

When the FCC Docket was released and its contents definitely known, a number of amateurs met on the air in the Northwest and for two or three weeks discussed the details. One thing was evident: lack of technical assistance for those who desired to prepare for a higher-grade license. On April 4, 1965, a poll was taken and the Northwest Technical Net was organized to meet each Sunday at 3 P.M. on 3970 kc. The preamble for the net reads as follows: "This net is organized for the purpose of assisting all radio amateurs in obtaining higher grade licenses, improving their present status, or assisting in solving individual technical problems."

For the first two months the net engaged in a review of basic fundamentals as a foundation for discussing the requirements of the Amateur Extra Class license. Since June, ten questions taken from the ARRL *License Manual* have been reviewed each week followed by questions and comments from each of the participants on the net. It has been learned also that there are many who do not check

in but prefer to just sit back and listen. The Net Secretary, K7CTP, reports at this time that about 140 different amateurs have checked in since the net started, covering representation from Washington, Oregon, Idaho, along with some British Columbia visitors. K7JHA is the "Moderator" and NCS.

In the early days of the net, much time was devoted to the technical assistance reference material which would become involved. With the exception of a necessary mathematical brush-up which was left to the individuals as needed, reference material was held to the essentials, primarily the ARRL *Handbook* which most amateurs have on hand and which contains practically all of the subject material required. The questions and answers from the manual are expanded in an effort to provide a wider understanding of the subject to allow for various ways in which the question may be phrased in the actual examination. Net language is maintained at a technical level consistent with amateur requirements, lest the net lose its effectiveness. Response from the many participants has been most encouraging, and while it was feared at the outset that some "hot" discussions, probably in "semantics," might occur, such incidents never appeared. A very congenial group of amateurs with varied interests has developed with a common interest, the technical aspect of amateur radio.

How are the results to be measured? I doubt if we will ever know in full. The net issues no certificates, guarantees no definite results for the individual, has no recognition as a bona fide affiliated net with any organization except by possible registration in a net directory, has no money in the bank, charges no dues, puts out no bulletins, or many other things associated with other net activities; but one thing is apparent — there are hundreds, possibly thousands, of amateurs who will answer the challenge in preparation for the day when the FCC issues their findings and the proposal is adopted. Many are already taking action to which the Northwest Technical Net can testify by the participation each week on the net. There is no doubt room for other such nets across the country which will be welcomed by many fellow amateurs.

Like the challenge of emergencies in which amateurs excel and are reputed, the challenge of upgrading amateur radio will likewise be met by the true amateur.

* 1005 East 1st Ave., Ellensburg, Washington.

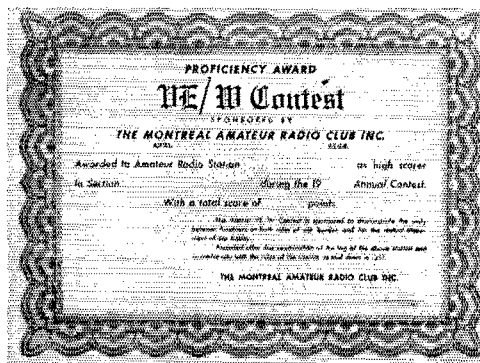
QST

VE/W

Contest

Results — 1965

Across-the-border-test another success!



TOP C.W. SCORES

W9LNQ	145,440	K6QPH	126,720
W9AQW	145,080	VE2NI	125,334
WB2ALF	138,240	K5OCX	125,000
K4VDL	132,000	W2TSL	121,440
W0TDR	128,040	W9YB	121,440
W4YGY	128,040		

TOP PHONE: VE2NI VE7BQB

ON behalf of the Montreal Amateur Radio Club, Inc., VE2AE is pleased to submit the following results of the 1965 VE/W Contest. The affair was once again a fine success according to the comments of the majority of participants.

Top scorer W9LNQ with 145,440 points receives, in addition to the Illinois award, a handsome trophy. Second-place scorer W9AQW from Indiana was not far behind with 145,080 points. Top Canadian scorer was VE2NI with 125,334.

The Contest Committee of the MARC hopes the 1966 event will see even more activity in both modes. Mark your calendar for the 1966 VE/W Contest, September 24-26, 1966. Rules will appear in September QST.

ATLANTIC DIVISION

<i>Eastern Pennsylvania</i>	
K3YQJ	81,180
W3MPX	58,200
W3APX	40,920
W3QOP	27,540
W3CWS	17,160
K3ZOL	7,500
W3ADE	4,180
W3CBF	2,560
<i>Delaware</i>	
K3ZMI	60,000
W3HC	30,400
K3LCK	5,760
<i>Maryland-D.C.</i>	
W3HQ	105,600
W3AY	99,600
K3CUW	58,740

W3MCG	49,500
W3OFU	22,080
K3FHU	11,760
W3CRA	11,340
W3AZI	3,360
W3MSR	3,200
<i>Southern New Jersey</i>	
W2EXB	116,840
K4RAD/2	97,800
W3AAQY/2	8,160

<i>Western New York</i>	
WB2MFX	58,080
W2ADN	42,400
W2RPP	28,080
W2BMY	22,800
W2UXZ	20,400
W42FR	15,120
WB2OYE	1,800
W2TKG	1,440

Western Pennsylvania

W3GJY	33,480
W3BHM	14,400
W3BGE	14,280

CENTRAL DIVISION

Illinois

W9LNQ	145,440
W9KQU	121,680
W9TQL	102,520
W9NQL	69,600
W9LUD	64,020
W9YYG	55,200
W9BJQ	36,180
W9TCU	21,060
W9QWM	21,000
K9ISP	7,560
W9JUN	4,880
W9OBA	3,600
W9BMD	1,260

Indiana

W9AQW	145,080
W9YB	121,440
W9LW	99,600
W9HRB	31,200
W9QHB	1,080

Wisconsin

W9AIB	78,920
K9GDF	65,340
W9YTT	48,000
W9LHH	47,400
W9LWJ	24,000

DAKOTA DIVISION

Minnesota

W0GKX	83,160
W0KDS	75,600
W0IKP	54,780
W0KDA	15,540
W0KQU	480

DELTA DIVISION

Arkansas

WA5HS	42,000
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Louisiana

WA5ERC	31,680
W5NSE	16,210

Mississippi

W5AMZ	89,100
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Tennessee

K4UWH	21,420
W4ZWZ	16,880

GREAT LAKES DIVISION

Kentucky

K4KSR	40,200
W4TTE	24,840

Michigan

W3YUW/8	112,800
K8YEK	93,720
W8BNP	50,400
W8OAH	36,600
K8VRF	16,560

K8YCW	9,720
W8NPE	3,000

Ohio

W8DWP	69,300
K8QJ	57,000
W8ANN	46,080
W8QYT	33,120
W8AMQ	31,200
W8LH/8	28,080
W8AGYX	27,600
W8ALJ	25,520
W8GOC	22,770
K8YSO	10,500
W8AYB	7,200
W8LWH	5,400
W8LVT	4,800

HUDSON DIVISION

Eastern New York

WA2HLH	91,440
WB2CPV	81,840
W2TER	69,000
WB2JYV	42,720
WA2LJM	7,200
WB2HZY	1,800

N.Y.C.-L.I.

WB2FON	50,760
WB2FAJ	46,980
WB2PTS	40,740
WB2CKS	40,400
WB2PL	14,400
WB2QA	14,280
WB2MJD	14,040
W2OBU	3,300

Northern New Jersey

WB2ALF	138,240
W2TSL	121,440
W2KFP	112,300
W2LQP	86,200
W2KHT	56,380
W2HWP	48,840
W2PDT	46,200
WB2NZI	43,560
WA2OTJ	5,000
K2UUT	3,600

MIDWEST DIVISION

Iowa

W0HZC	85,800
W0RRS	17,280
W0DRE	7,560

Kansas

K0GZD	17,960
W0KQQ	15,660

Missouri

W0TDR	128,040
W0QWS	76,200
W0GAX	72,000
K0GSV	40,260
K0JPL	36,520
W0QVZ	35,200
K0YGR	32,400
W0EJL	12,060
K0LYM	10,440
W0EJNE	2,100

Nebraska

K0QIX/0	40,500
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WABGVJ.....26,400	<i>San Joaquin Valley</i>	W7KUZ.....32,760	<i>Ontario</i>
WAPCIB.....10,500	K6RTK.....49,140	W7ENA.....11,040	VE3BOG.....105,651
NEW ENGLAND DIVISION	<i>Santa Clara Valley</i>	W7CRA.....8,280	VE3BK.....64,445
<i>Connecticut</i>	W46GEY.....90,420	<i>Los Angeles</i>	VE3DXD.....91,080
W1TS.....70,620	WB6CEP.....80,520	K6QPH.....126,720	VE3DUS.....54,775
W1BHV.....69,960	WB1FM.....24,780	W46VLW.....75,900	VE3IR.....80,166
W1WY.....53,400	W46AQY.....22,340	W6OEO.....55,620	VE3IDH.....59,850
W1FCH.....44,880	W6CLAI.....21,120	WB6KNK.....54,600	VE3DDU.....58,740
K1HMS.....41,580	WB6HYD.....14,400	WB6RLL.....50,100	VE3RTU.....68,428
K1PKQ.....31,680	ROANOKE DIVISION	W6AM.....50,040	VE3PGU.....56,763
W1FHM.....22,140	<i>North Carolina</i>	W6RCV.....49,200	VE3EFS.....47,250
W1GYYT.....8,640	W4OMW.....61,380	K6YT.....47,520	VE3FBB.....43,558
<i>Eastern Massachusetts</i>	W4TWS.....49,140	WB6MJK.....37,400	VE3CCB.....38,220
W1MX.....96,600	K2QIG4.....41,360	WB6PCV.....27,510	VE3EKW.....22,172
W1AQE.....52,500	W4L5LA.....7,600	W46MVG.....18,560	VE3DGB.....19,920
W1BVT.....25,620	<i>South Carolina</i>	<i>Orange</i>	VE3FHQ.....17,802
K1WJD.....5,400	W4HGW.....24,520	W46WTD.....55,620	VE3AGN.....17,640
W4IDHQ.....4,420	<i>Virginia</i>	WB6NRK.....30,720	VE3ETX.....17,286
W4IDWZ.....2,160	K4VDL.....132,000	WB6MLN.....26,400	VE3FDP.....15,444
<i>Maine</i>	W4YGY.....128,040	W46JZZ.....17,120	VE3GBK.....14,700
W1GKT.....45,900	W43ZB.....113,520	<i>San Diego</i>	VE3RFD.....11,640
W1UOT.....28,140	W4CQI.....80,520	WB6KNN.....35,520	VE3ATL.....5,451
<i>New Hampshire</i>	W4DMLX.....30,780	WB6LW.....31,680	VE3BBQ.....5,184
WHITE.....17,600	W4WSP.....21,600	WB8IEX.....30,240	VE3CNA.....3,978
K2EPP/1.....18,200	W4DVT.....7,200	<i>Santa Barbara</i>	VE3EXR.....Check Log
W18WX.....7,540	<i>West Virginia</i>	WB6LIV.....43,560	VE3DU.....Check Log
<i>Rhode Island</i>	W48KTV.....19,320	W60UL.....28,320	<i>Manitoba</i>
W4IFAV.....25,620	W4SDGE.....11,340	W6PYW.....2,400	VE4ZX.....51,864
W4IBLC.....20,520	ROCKY MOUNTAIN DIVISION	WEST GULF DIVISION	VE4QX.....31,200
<i>Vermont</i>	<i>Colorado</i>	<i>Northern Texas</i>	VE4EF.....29,400
W1WZF.....9,000	K4ZOH/8.....12,000	W5FTD.....114,180	<i>Saskatchewan</i>
<i>Western Massachusetts</i>	<i>New Mexico</i>	K2EIU/5.....18,240	VE5US.....116,736
W1E2D.....33,200	W8BZY/5.....29,200	<i>Oklahoma</i>	VE5DK.....78,435
NORTHWESTERN DIVISION	W5DZA.....38,800	K5OCX.....125,000	VE5JU.....68,853
<i>Alaska</i>	W5ODJ.....27,600	W4SKI/5.....68,640	VE5JI.....61,854
KL7MF.....14,720	W5OXE.....5,940	K5JVF.....24,000	VE5KT.....53,568
<i>Idaho</i>	<i>Utah</i>	<i>Southern Texas</i>	VE5DC.....36,108
W7BUE.....27,540	K7SQD.....25,200	W5LJT.....20,000	VE5DZ.....7,623
K7YWM.....26,460	K7CIS.....18,240	W45VZ.....14,400	<i>Alberta</i>
<i>Oregon</i>	W47AUW.....8,160	K5BYV.....2,520	VE6UP.....53,295
W47CAQ.....38,400	W47BME.....1,260	CANADIAN DIVISION	VE6AJC.....39,456
K7QNG.....38,340	<i>Wyoming</i>	<i>Labrador</i>	VE6AKY.....28,251
W4AXK/7.....14,980	W7TSM.....24,000	VO2NA.....17,094	VE6TK.....24,897
W47CGR.....5,040	SOUTHEASTERN DIVISION	<i>Newfoundland</i>	VE6VY.....24,231
W7LNG.....4,800	<i>Eastern Florida</i>	VO1HQ.....34,425	VE6ABV.....20,592
<i>Washington</i>	W4YDD.....92,400	Maritimes	VE6WG.....13,158
W7GYF.....12,000	W4TA.....34,600	<i>N.S.-N.B.-P.E.I.</i>	VE6AQL.....12,765
K7VCG.....14,520	W4LIV.....66,000	VE1ON.....71,256	VE6BE.....Check Log
K7YDM.....4,000	W4ALCO.....56,100	VE1ADH.....52,578	<i>B.C.-V.Q.C.</i>
W47ASM.....3,600	K4IXG.....48,600	VE1VB.....31,734	VE7BMC.....92,628
PACIFIC DIVISION	K4RQE.....43,400	VE1ARJ.....28,380	VE7BKF.....57,645
<i>East Bay</i>	W4HDS.....6,720	VE1ARJ.....28,380	VE7BPM.....47,685
W46YNY.....27,760	W44UPW.....3,120	VE1DB.....15,876	VE7BNY.....30,969
W6TYM.....23,640	<i>Georgia</i>	<i>Quebec</i>	VE7AGN.....23,895
K6IRN.....19,260	W4BEY.....64,240	VE2NI.....125,334	VE7BTD.....19,182
WB6ETY.....5,100	K4J3Z.....59,400	VE2BVY.....72,345	VE7CQ.....15,066
<i>Nevada</i>	K4BAI.....15,680	VE2DR.....53,460	VE7BLO.....9,078
W7BKK.....28,800	<i>West Indies</i>	VE2HW.....43,182	VE7BPA.....4,586
W7YU.....7,000	KP4BBN.....30,400	VE2DA.....39,480	VE7BO.....6,600
<i>Sacramento Valley</i>	<i>Western Florida</i>	VE2BLB.....38,064	VE7ASB.....3,456
K6DQB.....46,440	K4VYF.....87,120	VE2ATU.....35,868	VE7BBB.....936
W46JDT.....28,620	SOUTHWESTERN DIVISION	VE2BFC.....31,050	VE7RZ.....312
<i>San Francisco</i>	<i>Arizona</i>	VE2BOW.....31,050	VE7AFW.....Check Log
W4MSM.....80,080	W7ZMD.....119,780	VE2VAL.....22,008	<i>Nut</i>
W6WLV.....12,600	W7AYY.....41,040	VE2BV.....19,992	VE8NO.....56,224
		VE2BUW.....12,555	VE8BB.....43,974
		VE2AQJ.....10,350	PHONE RESULTS
		VE2AQI.....3,672	<i>Quebec</i>
		VE2EN.....3,402	VE2NI.....1,800
		VE2CP.....1,215	<i>B.C.</i>
			VE7BQB.....12

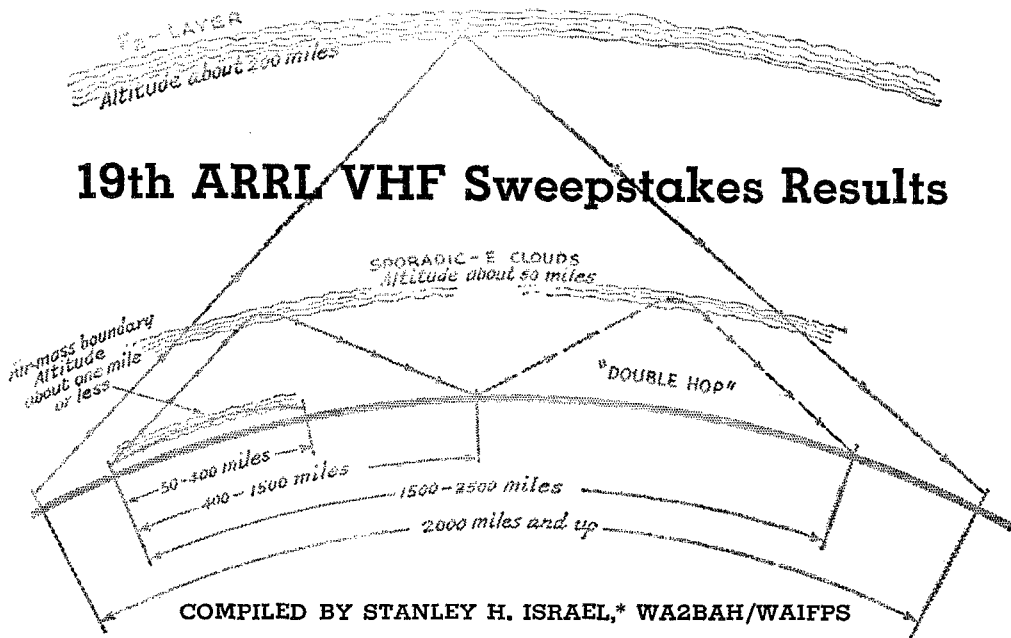
Strays

The Stray containing explanations for abbreviations given to military electronic equipment on page 67 of *QST* for September 1965 stated, "The number gives the stage of development." H. Hans Brakob, a radioman first class, USN, wrote us and pointed out that the above statement implies that the higher the number, the higher the stage of development of the equipment. As Brakob points out, the number is strictly for identification purposes only. For example, all FRTs are, by definition, Fixed Radio Transmitters. This is a large area to cover, and the numbers are not assigned by de-

velopment. In the FRT series are huge v.l.f. transmitters, small v.h.f. transmitters, sophisticated data transmission devices, etc. Thus, a highly elaborate s.s.b. system may have a small number and a relatively crude l.f. transmitter may have a high number. In other words, the number bears no relationship to the state of development.

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.

19th ARRL VHF Sweepstakes Results



WHERE were you the weekend of the VHF SS (January 8-9, 1966)? If you were in the Arizona section, you would have been enjoying the 70-75 degree weather too much to operate the contest seriously. If you were in New England, where below zero weather was prevalent, chances are that you would have experienced no openings — poor groundwave conditions during most of the contest; you were lucky if you didn't lose your beams! (This weather factor most likely accounts for the decrease in the number of logs received; over 1100 this year compared to about 1400 last year.) If you were in the New York City or Philadelphia area, you would have heard hundreds of stations working the contest; some of them running up contact totals over 500. If you were in Texas or Oklahoma, you would have been favored by good sporadic-E skip which helped some operators in the 5th call area run up multipliers equal to those of the fellows with well-equipped stations on the east coast. If you were out West, you would have heard many portable stations, some of them many thousands of feet above sea level, running up high contact totals and taking advantage of forward scatter propagation to catch extra sections.

The principal factor, as in the past, is the tremendous effort made by club members to run up a good score for the group in which they are a participant. It should be noted that at least three separate entries, each one from a different member is needed in order to qualify for the club scores listing. All awards are scheduled for mid-June mailing.

* Secretarial Assistant, ARRL.

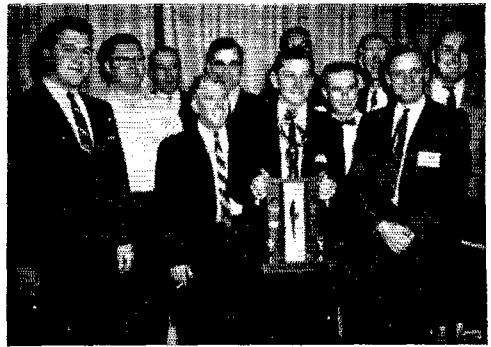
Highlights

K3IPM, who surprised no one, turned in the highest score for one operator, making 601 contacts in 13 sections for over 27-K. Although Stan's score accounts for only one of the 93 Packrat entries, it alone would have been enough to put the Mt. Airy club over two thirds of the way up the club list. WASBCA/8, operated by the Cleveland 50 Mc. DX Club, turned in the highest multi-op score. Their 6-meter equipment, manned by some of the most experienced v.h.f. contesters in the 8th call area, consisted of a kilowatt a.m., c.w., and s.s.b., fed into a pair of 6-element beams spaced at a full wavelength about 180 feet up on a self-supporting tower. For receiving on 6, a parametric amplifier was used ahead of a homebrew converter and a 75S-3 receiver. Besides successfully completing all scatter schedules, being heard almost consistently throughout the contest all the way to New England and achieving contact with some rare sections by all-night operation, the WASBCA/8 crew took advantage of the sporadic-E opening that occurred Sunday. They made 334 QSOs in 20 ARRL sections on 6 meters alone, and picked up 161 contacts and an extra section on 2 meters (W2AZL, NNNJ) by using a Zeus, Interceptor and on that band two 11-element beams up 110 feet. This group was well prepared to take advantage of anything that came their way and you can imagine what it must have been like to sit at their operating position. Their multiplier of 21 was tops for the contest. Next in line with 16 sections each were WA2FGK, WA5AUA and WA2BAH/1. This is the first time that a station, away from the eastern seaboard area, has been able to come up with the most sections worked and the highest score in either the single or multi-op category.

Out in Chicago, K9RVG, Illinois section certificate winner and Central Division leader, pulled a real eye-opener and submitted the highest score for a station operating on two meters only. His fine showing, 242 contacts in 8 sections, for a score of 8732 points, further demonstrates the capabilities of the aroused Midwest gang, who are now flexing their muscles. You can bet that the fellows on the east coast, who have gotten used to taking the honors for the past 18 years, won't accept this lying down. Now that it has been proven that one doesn't have to live on the east coast to top a v.h.f. contest, nationwide, you can look for increased competition among the better equipped stations in the U. S. and Canada.

Of the 54 stations reporting 220 activity, W3CL topped the list with 41 contacts using a 4X150 rig to a 16 element colinear. A homebrew converter ahead of a 75A-2 receiver was used.

The York VHF Society presents the new Sections Award trophy at the Oakville "do", a gathering of v.h.f.'rs every Saturday night following each ARRL v.h.f. contest for presentation of the 6 Meter Trophy, 2 Meter, 25 watt Trophy and now the York VHF Society Sections Award. Left to right: VE3s ASO ENV FY EZC CLL DSE (President with trophy) DWQ CIL AIB KQ and AL.



Club Comments

"Several of the boys turned in very noteworthy performances this year. WA3EHD, who lost his sight recently, due to an accident, managed to make 161 contacts and the only assistance required was in logging. An unfortunate note during the contest was the death of one of our elder members, K3LBT. His last contact was with our club station, W3CCX." — *W3MFF, Mt. Airy V.H.F. Club.*

"This year, we had a little extra promotion to stir up members, with prizes and a local contest with the Brown Sugar Six Meter Net. We believe our President won the steak dinner. It paid off as we did better than last year, but it's still tough to beat the Eastern clubs." — *W8D1W, Dayton Amateur Radio Association.*

"The VHF SS is really great for promoting club enthusiasm and local v.h.f. activity. It was good practice also for exercising our ability to be as flexible as possible in our operating procedure." — *WA2JWO/2, Albany Amateur Radio Association.*

"There is a lot of new blood developing in the club and the contest helps to stimulate togetherness for the good of the organization. We gave a club trophy to the high scoring station (WA6GAG/6) in our club." — *W6FNE, Southern California V.H.F. Club.*

NOVICE CERTIFICATE WINNERS

WN1ECR	WN3DYT	WN8PXL
WN2TES	WN2ETI/3	WN8QPN
WN2TGW	WN4BHK	WN8SOW
WN2UKF	WL7FIB	WN9PHV

CLUB SCORES

Club	Aggregate	Valid Entries	Certificate Winner	Club	Aggregate	Valid Entries	Certificate Winner
Mt. Airy V.H.F. Club (Pa.)	623,949	93	K3IPM/3	Central Michigan Amateur Radio Club	12,450	13	W8CKK
South Jersey Radio Assn.	197,939	52	WA2EMB	Argonne Amateur Radio Club (Ill.)	11,716	10	W9LGI
Rochester V.H.F. Group	140,802	94	K2YCO	Columbia University Amateur Radio Club (N. Y.)	10,648	3	WB6NIK/2
Reading Radio Club (Pa.)	98,669	50	W3BN ¹	Reynolds Amateur Radio Club (Tex.)	10,520	6	WA5AUA
Dayton Amateur Radio Assn.	91,732	43	WA8AKK ²	Hartford County Amateur Radio Assn. (Conn.)	8849	5	W1HDQ
Mobile Sixers Radio Club (Pa.)	83,010	27	W3IZU	East Coast V.H.F. Society (N. J.)	8324	6	WB2KPD
Albany Amateur Radio Assn. (N. Y.)	49,492	26	WA2JWO/2	York V.H.F. Society (Ont.)	8268	4	VE3DSE
6 Meter Club of Chicago	47,548	29	WA9KAY	Huntsville Amateur Radio Club (Ala.)	7351	11	WA4DBQ
Hampden County Radio Assn. (Mass.)	46,730	41	K1ANF	Calhoun County Amateur Radio Club (Mich.)	6313	4	K8YVE
Southern California V.H.F. Radio Club	40,491	15	WA6GAG/6	Lawndale Chicago Boys' Club Amateur Radio Assn.	6270	8	K9RCN
Central New Jersey V.H.F. Society	39,596	9	WB2KLD	Syracuse V.H.F. Club	6198	7	K2QWD
Greater Pittsburgh V.H.F. Society	37,971	25	W3KWH ³	Six Up Amateur Radio Club of Burlington (N. J.)	6146	3	WB2CEX
Rock Creek Amateur Radio Assn. (Md.)	35,866	18	W3LUL	Mid-Island Radio Club (N. Y.)	6132	4	W2SEU
6 & 2 Ham Club (Ill.)	34,837	15	W9EET	Ranocas Valley Amateur Radio Assn. (N. J.)	5999	3	WB2LWZ
Springfield Amateur Radio Club (Ohio)	26,984	16	K8DEO	West Side Radio Club of Toronto (Ont.)	5956	3	VE3AIB
Midwest V.H.F.-U.H.F. Amateur Assn.	23,600	9	K9RVG	Mid-Hudson V.H.F. Society	5894	5	K2ARO
National Capital V.H.F. Society	22,624	8	W3NG	Hamfesters Club (Ill.)	5826	4	WA91WU
Germantown Radio Club (Pa.)	22,104	5	K3ZPG	Fulton Amateur Radio Club (N. Y.)	5662	3	K2DUR
6 Meter Club of Dallas	21,768	9	WA5EOI	New Providence Amateur Radio Club (N. J.)	5490	4	WB2GPG
Scarborough Amateur Radio Club	20,980	19	VE3EZC	1200 Radio Club (Mass.)	5444	4	K1CHY
Audubon Radio Club (N. J.)	19,606	5	WB2NOK	Arctic Amateur Radio Club (Alaska)	5181	15	KL7FCH
Opecon Radio Society (W. Va.)	19,549	16	W8AEC	Greater New Orleans Amateur Radio Club	4842	4	WA5DXA
Gloucester County Amateur Radio Club (N. J.)	18,316	5	W2LVW	Bootlegger Radio Club (N. Y.)	3261	4	WB2RZL
Keystone V.H.F. Club (Pa.)	17,735	4	.....	Sattelite Amateur Radio Club (Cal.)	3102	10	WB6DIK
Bergen Amateur Radio Assn. (N. J.)	16,896	10	WA2IDH	Decatur Amateur Radio Club (Ala.)	2584	3	K4WHW
Communications Club of New Rochelle (N. Y.)	14,662	3	.....	Pennsylvania Wireless Assn.	950	3	K3OQK
Miamisburg Wireless Assn. (Ohio)	14,127	6	WA8DZU				
Delaware 6 Meter Net	14,099	4	K3UHU				
Dutchess County V.H.F. Society (N. Y.)	13,784	6	W2LWI				
Skokie Six Meter Indians (Ill.)	13,290	9	WA9KAW				

¹ K3RZF opr.

² W8U1 opr.

³ W3ZG1 opr.

DIVISION LEADERS

Single Operator		Multioperator
K3IPM/3	Atlantic	K3IPX/3
K9RVG	Central	K9DZK
K0DTA	Dakota	.....
K4EJQ/4	Delta	WA4YFL
WA8AKK	Great Lakes	WA8BCA/8
W2NNL	Hudson	WA2FGK
K0KMW	Midwest	K0IJJ
K1MRI	New England	WA2BAH/1
K7BBO	Northwestern	.....
WB6DUB	Pacific	K6AAW/6
K4SUM	Roanoke	WA4CYR
W0AJY	Rocky Mt.	.....
K4WHW	Southeastern	WA4QPL/4
WA6GAG/6	Southwestern	WB6ERG/6
WA5EOI	West Gulf	K5CFM
VE3DWL	Canadian	VE3ASO

Soapbox

"Great contest! It got so that I didn't hear anyone that I hadn't worked already" — *WNRUH*. "When I got a 5-7 report from all of a mile away, I decided to check my antenna. Coax blown off antenna by high winds of Saturday night." — *K2QJL*. "What happened to WNY section?" — *W3BWU* (op. of *WA8BAK*) ED NOTE: "Look in the tabulations, there are over 100 entries . . . hi!" "Four modes were used on six meters: a.m., s.s.b., c.w., and RTTY" — *W3BWU* (op of *WA8BAK*). "From Milton, Wisconsin, band conditions were below average. Area contacts contributed mostly to my score, with many a station exchanging contacts on both 2 and 6." — *WA9FJM*. "The 6-meter activity was down considerably this year, however, I was very pleased to see the 2-meter gang turn out in force this time. We will have 5 new 432 Mc. stations on in this area by June." — *K4EJQ/4*. "Sure would like to see contest start 2 hours earlier and end 2 hours earlier as in June." — *W3NSH*. "Heard E. Pa., VE3, W2, and W4 but unable to raise them" — *K5ALO*. "Cold wave (-9 degrees Sat.

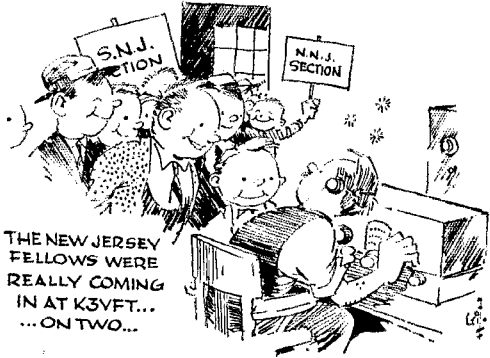
night) caused worst groundwater conditions ever experienced in a January contest." — *K2CBA/2*. "Wonderful contest!" — *W2NNL*. "Lost all beams (50, 144, 432) in a gale around midnight. Put up a new 2 meter beam Sunday (in zero weather of course). End-fed my 432 feedline for 6." — *W1HDQ*. "A near victory for Murphy. All day Saturday I had very poor modulation due to difficulty in tuning up a week-old rig. I left the gas funnel at home, finally tied the beam in one position to prevent windmilling in 40 m.p.h. wind, and the generator had to be warmed up in the car for an hour Sunday morning due to -10 degree temperature. But all and all I learned much (through many mistakes) and had a great time." — *K1PKQ/1*. "Sections hard to get, DX sigs weaker than usual. Sunday night brought some c.w. activity." — *K1BTF*. "Lost my antennas half way through the contest." — *WA1DZJ/1*. "Despite risking our necks on an icy roof to fix our frozen rotor (as a result of the season's first storm,) and freezing in an unheated garage, we still managed to rack up more points and as much fun as our last VHF contest." — *WA1PCD/DWL*. "Conditions poor Saturday evening due to a blizzard. Sunday evening pretty good. Listened on 432, but heard nothing. One QSO on 220Mc." — *K1OYB*. "WA1ELM climbed tower to fix the 2-meter rotor, he was blown across roof and would have been blown away except that he grabbed a guy wire. After this we all stayed inside." — *W1HPM/1*. "Our worst showing in 21 consecutive ARRL contests. Blizzard conditions (18 inches plus high winds) forced evacuation of QTH after 2½ hours. Good thing, we would have been snow bound for 3 days. Never heard the snow static so bad (30 over 9)" — *W1ALE*. "Most frustrating thing was to sit on that cold, windy ridge and hear W2BV ask if anyone was working W4's!" — *W4GFY/4*. "Los Alamos, with an altitude of 7300 ft., overlooks the two principal cities in New Mexico, Albuquerque and Santa Fe. It makes a fine VHF location. However, although Albuquerque has a fair amount of VHF activity, Santa Fe has only one active VHF station present. It sure would be nice to have a location like this back in the East." — *W50J.M*. "With the temperature 70-75 both days everyone was outdoors." — *K7YSE*. "Little activity on 432 and 1296 this time." — *W6GFD*. "Contest activity low, conditions sub-normal, and no E-Skip worked, 6 started to open around 1500 GMT on 9th, but no readable signals, then closed up again. Worked Okla., Ark., Mo., and Kansas, but missed N.Tex due to conditions and activity." — *W5WAX*. "Temperature down to zero but a very hot contest most of the time." — *VE3EZC*.

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. 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.

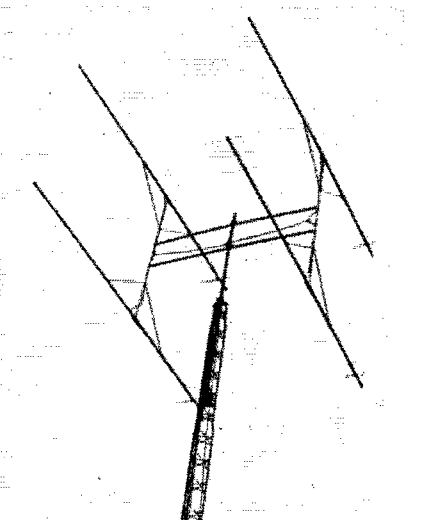
ATLANTIC DIVISION

<i>Delaware</i>		K3EOD	13,034-343- 9-ABC	W3HKZ	7828-206- 9-ABC	K3GLK	5200-130-10-AB	K8KTY	2912-112- 3-AB
K3UHU	10,600-265-10-AB	W3GEW	12,920-340- 9-AB	K8TPM	7638-201- 9-AB	W3WZC	5044-194- 3-AB	W3HTX	2912-101- 4-ABC
K3FFD	3774-104- 8-A	K3KVS	12,138-289-11-ABCD	W3WJC	7612-173-12-AB	K3TRY	4752-132- 8-AB	W3ZRR	2834-109- 3-AB
K3OBU	2875- 63-13-B	W3SAO	11,968-352- 7-ABC	K3RCV	7200-225- 6-AB	K3PXT	4732-169- 4-A	W3GHT	2820- 94- 5-AB
WA3DYG	1312- 41- 6-AB	K3ZPN	11,628-307- 9-AB	K3WGH	7120-178-10-ABC	K3IUV/3	4680-156- 5-5-AB	K3EHQ	2808-108- 3-ABC
W3HC	705- 24- 5-AB	K3AUI	11,118-327- 7-ABC	K3HJ	7056-168-11-AB	K3OWY	4544-142- 6-A	W3ZLD	2788- 82- 7-A
K3URP	588- 21- 4-A	K3PGB	11,080-277-10-A	K3GAS	7040-220- 6-ABC	K3KUB	4500-150- 5-AB	W3QAN	2760-115- 2-AB
K3TKQ	300- 15- 3-A	W3ITU	10,480-262-10-AB	K3HSS	7040-220- 6-ABC	WA3EPS	4498-173- 3-A	W3QNV	2660- 95- 4-AB
K3NYG	234- 9- 3-A	K3WEU	10,336-272- 9-A	W3JSD	7020-195- 8-ABC	K3MGO	4256-112- 9-AB	K3QMK	2626-101- 3-AB
<i>Eastern Pennsylvania</i>		W3BNT	10,122-241-11-AB	W3KXN	6460-190- 7-AB	WA3EJD	4186-161- 3-AB	W3BBC	2470- 95- 3-AB
K3IPM/3	27,646-601-13-ABC	W3MNXW	10,120-232-12-A	K3AQH	6688-209- 6-AB	K3YJH	3936-123- 6-AB	K3FXP	2430- 81- 5-A
W3KKN	25,784-586-12-ABC	K3ZVD	9888-309- 6-AB	K3DAQ	6480-180- 8-A	W3MXU	3636-101- 8-A	K3P8X	2418- 93- 3-AB
W3MFY	25,632-534-14-ABC	K3UJD	9758-287- 7-ABC	WA3BBA	6460-190- 7-AB	K3VEQ	3450-108- 6-ABC	W3QF	2380- 85- 4-AC
WA3CAG	20,930-455-13-ABC	W3CCX	*9252-257- 8-ABC	W3BOY	6300-210- 5-AB	W3IA	3423-107- 6-B	W3BAH	2340- 78- 5-AB
W3CL	16,984-386-12-ABC	K3ZAB	9856-236- 9-ABC	K3IGX	6016-188- 6-A	WA3BWF	3406-131- 3-AB	K3TEJ/3	2314- 89- 3-AB
W3LHF	16,160-404-10-ABC	K3UD	9758-287- 7-ABC	K3ATL/3	5890-155- 9-AB	K3OBY	3354-129- 3-ABC	WN8ETI/3A	2280- 76- 5-B
K3DUV	15,680-392-10-AB	W3MVF	9030-301- 5-AB	K3IUZ	5814-153- 9-AB	K3HNP	3328-104- 6-ABC	K3S2G	2258- 81- 4-AB
K3JJZ	14,516-382- 9-ABC	K3ZPG	8448-264- 6-AB	W3ELI	5796-161- 8-AB	K3MSV	3262-102- 6-ABC	W3BQU	2220- 74- 5-A
K3ACR	13,755-328-11-A	K3GQJ	8400-280- 5-ABC	K3FYU	5776-152- 9-A	W3UCA	3264- 96- 7-ABC	K3MTK/3B	2210- 65- 7-A
		W3MNV	8968-236- 9-ABC	K3RIT	5740-205- 4-AB	W3HYO	3240-120- 6-B	WA3DJN	2132- 82- 3-A
		K3ZEP	8448-264- 6-AB	K3TEP	5550-185- 5-AB	W3FGQ	3150-105- 5-AB	WA3BTE	2130- 71- 5-AB
		K3GJG	8400-280- 5-ABC	K3YPL	5436-151- 8-A	W3NSI	3144-131- 2-ABC	K3FOC	2088- 87- 2-AB
		K3ZBR	8280-230- 8-AB	K3WGJ	5400-180- 5-ABC	W3HVO	3140-105- 5-AB	K3YFD	2052- 86- 2-AB
		W3LUW	8176-257- 6-AB	W3AJF	5396-142- 9-ABC	W3BUR	3132- 87- 8-AB	K3HUI	1988- 71- 4-AB
				W3BRU	5310-177- 6-AB	K3LAV	3120-120- 3-ABC	WA3BHF	1946- 70- 4-AB
				W3CJU	5310-177- 5-ABC	K3EMA	3068-118- 3-ABC	K3TBY	1898- 73- 3-AB
						W3GXB	2940-105- 4-BC	K3EKJ	1800- 75- 2-AB

WN3EVQ 1800-60-5-B	W38ST 288-12-2-AB	K3LUFK 2160-72-5-AB	W2NSF 12,540-285-12-AB	WB2PGE/2 3510-135-3-AB
WA3ARC 1792-64-4-A	K3EQU 288-12-2-A	K3WTD 2054-79-3-AB	W2REB 11,600-265-12-AB	WB2CEX 3502-103-7-AB
W3FEYJ 1764-63-4-AB	K3OEA 286-13-1-B	W3CPM 2040-68-5-B	W2PAU 10,628-232-13-AB	WB2JEP 3360-112-5-B
WA3EJN 1707-57-5-A	K3NDY 240-8-5-A	WA3AQS 1960-70-4-AB	W2ZUL 9864-274-8-AB	WN2UVB
K3FYX 1708-61-4-AB	K3ABK 240-10-2-B	W3AIR 1872-52-8-B	WB2NOK 8732-242-8-AB	W2GQO 2970-99-5-B
K3AFT 1680-60-4-A	K3LWN 132-6-1-A	K3FRO 1624-58-4-AB	W2LWV 8700-218-10-AB	WB2CDF/2 2772-99-4-AB
K3GXV 1680-60-4-A	K3ODM 22-1-1-A	W3PFI 1624-58-4-B	W2ORA 7786-229-7-AB	WB2IFC 2600-100-3-AB
W3EYN 1656-60-2-AB	W3HZU (7 ops.) 8274-197-11-ABD	W3CTY 1600-50-6-A	W2OSD 6992-184-9-AB	WB2EHY 2574-99-3-AB
W3WJ 1636-60-2-AB	W3CLQ (K3DLS, W3CLQ) 8010-201-10-AB	W3BYJ 1530-51-5-A	WB2EEH 6970-205-7-ABC	W2ADA 2464-88-4-AB
W3BJG 1649-49-7-AB	W3IXL (WA3BIV, W3IXL) 7956-221-8-AB	W3BNL 1196-46-3-B	W2BAY 6018-177-7-ABC	WB2MNM 2288-88-3-AB
K3CHN 1638-63-3-A	W3AD/3 (7 ops.) 7551-200-9-AB	W3KUH 858-33-3-B	W2BY 6000-150-10-ABC	WN2RUH 2158-83-3-B
WA3BRO 1624-52-4-A		K3LIR 702-27-3-A	W2WV 6000-177-7-ABC	K2EJW 2128-76-4-B
W3KPK 1612-62-3-A		WN3DYT 702-27-3-B	W2OQN 5610-165-7-AB	W2EJW 2080-80-3-A
W3BIV 1596-61-2-AB		W3FNU 678-26-3-B		WN2TEN/2 1952-61-6-B
K3LBT 1560-60-3-AB		WN3ELA 678-26-3-B		WN2TOE 1846-71-3-B
W3UQC 1512-63-2-AB				W2DMU 1794-69-3-A
W3ITH 1500-50-5-A				W3GVB 1690-65-3-AB
K3VMY 1496-68-1-AB				WA2ABF/2 1656-69-2-AB
K3JXC 1482-57-3-AB				K2HOD 1568-49-6-AB
W3RAY 1362-61-2-AB				WB2SPJ 1401-54-3-A
K3IOJ 1364-62-1-AB				W2HBE 1316-47-1-AB
K3MEM 1352-52-3-AB				WA2WCF 1300-50-3-AB
W3FCF 1352-52-3-A				WB2FOC 1288-46-4-B
W3ATX 1276-58-1-AB				WB2OAD 1204-43-4-AB
WA3BRV 1248-52-2-A				WB2LZW 1170-45-3-A
WA3BHE 1224-51-2-B				W2SDO 992-31-6-B
WA3BCD 1218-44-4-A				K2HBY 2 936-39-2-AB
K3ALQ/3 1200-50-2-A				WN2RRA
WN3ETM 1188-54-1-B				W2BQ 744-31-2-B
W3GS 1184-37-6-A				WN2UEY 696-29-2-AB
K3ESL 1176-49-2-A				WB2SZK 672-29-2-AB
W3AMB 1162-61-1-B				K2IEO 624-26-2-B
K3YDZ 988-38-3-A				W2SDP 504-21-2-B
K3DLS 984-42-2-BC				W2AIZ 448-16-4-B
K3CBE 968-44-1-AB				K2MZP 240-10-2-A
K3GZT 962-37-3-A				WB2SPJ/2 240-10-2-A
WA3AFN 924-42-1-B				WB2LXA/2 77-4-1-A
K3LAM 912-38-2-A				K2QJ 44-2-1-A
WA3BBA/3 910-35-3-A				W2BGP 44-2-1-B
K3FPV 858-39-1-B				K2AA/2 (13 ops.) 10,368-324-6-AB
WA3DML 832-32-3-A				K2RRC (K28 MLO RRC) 6384-168-9-AB
K3VWS 792-36-1-AB				K2MKD (K28 MKD UDA) 3270-109-5-AB
W3CDS 792-36-1-B				W2FY8/2 (W2FY8 WA2KWS) 520-20-3-B
K3HWZ 728-28-3-A				Western New York
K3LLL 702-27-3-AB				K2YCO 6222-183-7-ABC
K3CXR 660-30-1-B				W2RPO 4560-152-5-AB
K3KDC 660-30-1-A				K2ISP 4200-140-5-A
K3WQO 638-29-1-AB				WA2TEY 4200-140-5-AB
WA3BPW 605-28-1-B				
WA3CPQ 550-25-1-B				
K3OQK 520-20-3-A				
K3SFP 506-23-1-B				
K3YFS 484-22-1-B				
W3DYX 462-21-1-AB				
WA3EFD 462-21-1-A				
K3WJE 440-20-1-AB				
W3EFK 440-20-1-AB				
W3IAX 406-17-2-A				
W3ZT/3 384-16-2-B				
K3GOZ/3 374-17-1-A				
K3GAY 336-14-2-B				
K3ESL/3 330-15-1-A				
W3NG 5032-148-7-AB				
K3VFT 4896-144-7-AB				
W3LUL 4704-112-11-B				
K3FPE 4110-137-5-AB				
W3RZQ 3400-100-7-A				
K3ZOD 3120-98-6-A				
K3ZNS 3060-90-7-A				
K3PPP 2850-95-5-AB				
K3RWY 2800-100-4-AB				
W3IBK 2688-81-6-AB				
K3ICH 2560-80-6-A				
K3LFN 2250-75-5-AB				
K3YGH (W38 GFN JUZ) 7200-200-8-ABC				
WA3BIV/3 (W3IXL, WA3BIV) 6902-203-7-AB				
K3CIV (K3CIV, W3IXL) 6698-197-7-AB				
W3HOW (7 ops.) 3572-94-9-A				
WA3DXL (2 ops.) 3514-127-4-A				
<i>Mid.-D.C.</i>				
W3NG 5032-148-7-AB				
K3VFT 4896-144-7-AB				
W3LUL 4704-112-11-B				
K3FPE 4110-137-5-AB				
W3RZQ 3400-100-7-A				
K3ZOD 3120-98-6-A				
K3ZNS 3060-90-7-A				
K3PPP 2850-95-5-AB				
K3RWY 2800-100-4-AB				
W3IBK 2688-81-6-AB				
K3ICH 2560-80-6-A				
K3LFN 2250-75-5-AB				
WN3DSM 616-22-4-B				
WN3EOP 816-22-4-B				
WN3EQ 588-21-4-B				
K3MZF 504-21-2-B				
WA3CEK 504-18-4-B				
WN3EFP 492-14-4-B				
K3VAQ 360-15-2-B				
WN3EDZ 312-12-3-B				
W3AHQ 264-11-2-B				
K3IPX/3 (6 ops.) 11,344-282-11-AB				
W3LKU/3 (5 ops.) 5544-126-12-AB				
W3HSP (4 ops.) 5236-154-7-AB				
K3OZQ (K38 ORC OZQ) 2142-64-7-B				
K3VHS (4 ops.) 1800-60-5-A				
<i>Southern New Jersey</i>				
W2EIF 15,700-425-12-ABC				
WA2EMR 14,259-340-11-ABD				
WB2MPH 5460-182-5-AB				
W2LZA 5338-157-7-ABC				
W2JAV/2 5168-152-7-AB				
WB2LWZ 5010-167-5-A				
W2RLV 4880-122-10-AB				
WB2RVE 4550-175-3-AB				
WA2QZQ 4368-157-4-AB				
W2EWN 4350-145-5-AB				
K2DFE 4320-120-8-AB				
WN2TGW 4128-129-6-B				
W2NSJ 4114-121-7-AB				
K2EGH 4032-112-8-A				
K2SQM 4012-118-7-A				
WA2MGV 3936-123-6-AB				
WB2SIF 3600-100-8-AB				
WA2ZMS 3581-128-4-AB				
K2BPX 3570-105-7-AB				



WA2FGK (high scoring Hudson Division multi-op) at the controls of the rig which has brought 22 states his way on 144 Mc. since August, 1965. You're wrong if you think his antenna (80 element quad) didn't have much to do with it.





Multi-operator station WB2EDF. (L-R) WB2TEO, WN2TJF, WB2SKQ and WB2EDF. A fine effort from the N.Y.C.-L.I. section.

- WA2ZNC 4080-170- 2-
- K2LGI 3784- 86-12-BD
- K2MHS 3738-134- 4-A
- WB2NFY 3668-131- 4-A
- K2JA 3480-145- 2-AB
- WA2KND 3480-145- 2-AB
- WB2GJL 3458-123- 3-AB
- W2QY 3312-138- 2-AB
- WA2EJ8 2850- 95- 5-AB
- WA2LHM 2834-109- 3-AB
- WA2YPT 2832-118- 2-AB
- K2DUR 2300-100- 4-AB
- WB2JFI 2544-106- 2-AB
- WA2HWC 2520-105- 2-AB
- K2WVW 2496-104- 2-AB
- WA2YTK 2448-102- 2-AB
- W2MPM 2424-101- 2-AB
- WA2KVN 2400-100- 2-AB
- WA2SOO 2262- 87- 3-AB
- WB2IGZ 2232- 83- 2-AB
- W2PDI 2210- 85- 3-AB
- W2IAD 2184- 84- 3-B
- WB2MAB 2156- 98- 1-A
- K2BRJ 1896- 79- 2-AB
- WA2GCF 1892- 86- 1-AB
- K2UFX 1870- 85- 1-AB
- WA2FVG 1800- 75- 2-AB
- K2QWD 1786- 47- 9-A
- K3HHS/2 1752- 73- 2-AB
- WA2BKV 1742- 87- 3-AB
- K2RZ1 1716- 78- 1-AB
- WA2TJS 1632- 68- 2-A
- K2GATZ 1562- 71- 1-AB
- K2OPC 1474- 67- 1-A
- WB2DCC 1440- 60- 2-A
- WB2QFI 1408- 64- 1-A
- WB2PFP 1364- 82- 1-A
- WB2LZM 1342- 61- 1-AB
- WA2UTM 1320- 60- 1-A
- WB2FDZ 1320- 60- 1-A
- WB2FZB 1320- 60- 1-A
- K2HRE 1320- 59- 1-A
- WB2IUM 1264- 57- 1-A
- K2YMM 1248- 52- 2-B
- WA2CER 1232- 56- 1-A
- WA2IYZ 1188- 54- 1-A
- WB2FAN 1188- 51- 1-A
- WB2RVV 1144- 52- 1-A
- K2CEH 1140- 38- 5-B
- W2ICE 1122- 51- 1-AB
- WA2FAR 1100- 50- 1-A
- WB2RZL 1079- 42- 3-A
- K2TJZ 1056- 44- 2-A
- W2ALL 1056- 48- 1-AB
- W2YBK 1034- 47- 1-AB

- WA2AQQ 1034- 47- 1-A
- WA2MQN/2 1032- 43- 2-A
- WA2GLA 1014- 39- 3-A
- K2SQJ 1012- 46- 1-A
- K2AVA/2 968- 44- 1-AB
- K2BAV 946- 43- 1-AB
- W2LYR 936- 39- 2-AB
- K2ZNC 924- 42- 1-A
- W2UTH 924- 42- 1-AB
- WA2YSD 924- 42- 1-A
- WB2HJZ 902- 41- 1-A
- W2RUJ 890- 40- 1-AB
- WA2ZWO 880- 40- 1-A
- K2OIG 836- 38- 1-A
- K2PEY 792- 36- 1-ABD
- K2PKF 792- 33- 2-AB
- K2ZTF 792- 36- 1-A
- W2OVF 792- 36- 1-AB
- WA2IEL 792- 33- 2-AB
- WA2JUV 770- 35- 1-A
- K2ZRZ 754- 29- 3-A
- WB2KOL 726- 33- 1-A
- K2DZV 720- 30- 2-AB
- K2TFY 720- 30- 2-AB
- WA2AI 696- 29- 2-B
- WA2YRH 682- 31- 1-AB
- WA2YFM 638- 29- 1-AB
- WA2GWH 602- 25- 2-AB
- WA2ZQN 600- 25- 2-B
- W2BLO 598- 23- 3-B
- W2RIS 550- 25- 1-A
- WA2YFK 528- 24- 1-A
- K2OUE 508- 23- 1-AB
- WA2WSE 466- 20- 1-AB
- K2VUL 440- 20- 1-R
- WB2MBP 440- 20- 1-AB
- WB2NSD 440- 20- 1-A
- WA2NVL 418- 19- 1-AB
- WN2BMD 418- 19- 1-AB
- W2PHT 396- 19- 1-B
- WA2MQM 396- 18- 1-A
- K2ACQ 288- 12- 2-D
- K3RTR 286- 13- 1-A
- WB2GNC 286- 13- 1-A
- W2VYV 240- 10- 2-AB
- W2FRL/2 220- 10- 1-A
- K2YQJ 176- 8- 1-A
- K2RTU 154- 7- 1-A
- K2KLP 132- 6- 1-R
- W2BDE 110- 5- 1-B
- W2ZC 110- 5- 1-B
- W2OW (14 oprs.) 5814-171- 7-AB
- K2ZWI (6 oprs.) 3198-124- 3-AB
- WB2HLL (W2AZCQ) 2328- 97- 2-AB
- WA5AJY/2 (WB2BNX, WA5JAY) 1131- 14- 3-B
- K2HCF (K2 HDY UCD) 660- 30- 1-A

Western Pennsylvania

- W3KWH* 6210-135-13-AB
- WA3BAK* 5040-140- 8-AB
- K3ZVB 4484-118- 9-AB
- K3VHG 3024-108- 4-AB
- WA2BNO 2041- 79- 3-A
- K3WZN 1901- 68- 4-A
- K3TRN 1612- 62- 3-A
- K3VA5 1352- 52- 3-AB
- W3DJM 1286- 51- 3-A
- K3FGQ 1296- 54- 2-AB
- K3EDO 1066- 41- 3-AB
- K3QBL 1008- 42- 2-A
- K3FIW 900- 40- 2-A
- K3CPI 856- 39- 3-A
- K3ULC 806- 31- 2-A
- K3NOA 768- 32- 2-AB
- K3LWT 648- 27- 2-A
- K3WOD 624- 26- 2-A
- K3TRC 600- 25- 2-A
- W43BNS 550- 25- 1-AB
- K3MPD 520- 20- 3-A
- W3KJM 420- 15- 4-AB
- K3TTP 384- 16- 2-A
- W3EWW 384- 16- 2-A
- K3THL 386- 15- 1-A
- K3EHL 220- 10- 1-A
- K3JVJ 178- 8- 1-B
- W3IUD 44- 2- 1-B
- K3JRO/3 (8 oprs.) 7524-209- 8-AB
- W43HG/3 (K3S ZFP ZHL, WA3BGE) 4794-141- 7-AB
- K3HKK/3 (5 oprs.) 4654-127- 8-ABD
- WA3CXF (5 oprs.) 1716- 69- 3-AB
- K3FGL/3 (4 oprs.) 1350- 45- 5-A
- WA3BH (K3PKI, WA3BOL) 880- 40- 1-AB

CENTRAL DIVISION

Illinois

- K9RVG 8732-242- 8-B
- K9HMB 7200-150-14-AB
- WA9KAY 5920-185- 6-AB
- W9VWY/9 5746-169- 7-B
- K9ZVW 5580-186- 5-ABC
- K9ZWU 5460-182- 5-ABC
- WA9FIH 5160-172- 5-ABC
- KL7EBB/3 5040-140- 8-AB
- W9MCG 4350-145- 5-ABC
- WA9FYB 4350-145- 5-AB
- WA9KAW 3740-110- 7-AB
- W9LGI 3728-117- 6-B
- WA9IW 3450-115- 5-AB
- K9HPW 3240-108- 5-B
- K9BDJ 2800-100- 4-ABC
- W9EET 2800-100- 4-AB
- W9DJZ 2700- 90- 5-A
- WA9MH 2184- 91- 2-AB
- WA9NGB 2040- 85- 2-AB
- WA8CJJ/9 2016- 72- 1-B
- WA9CUK 1988- 71- 4-A
- K9RCN 1950- 75- 3-AB
- WA9OKO 1848- 66- 4-A
- WA9FJX 1770- 39- 5-A
- WA9JL 1742- 07- 3-A
- WA9KGA 1680- 60- 4-A
- K9AMG 1624- 58- 4-A
- W9CFK 1624- 58- 4-A
- K9FHM 1586- 61- 3-AB

- K9DKI 1560- 60- 3-A
- K9YJQ 1560- 65- 2-AB
- WA9CXB 1560- 60- 3-AB
- K9OQN 1540- 70- 1-A
- WA9OQN 1386- 63- 1-AB
- WA9AJJ 1296- 54- 2-A
- K9ZPS 1224- 51- 2-A
- W9PMLJ 1200- 50- 2-AB
- WA9LCF 1111- 51- 1-A
- W9AFA 1092- 42- 3-A
- WN9PHV* 1064- 38- 4-B
- K9VTT 960- 40- 2-A
- WA9FEG 960- 40- 2-A
- WA9VB 956- 39- 2-AB
- WA9IPA 936- 39- 2-B
- WA9MSZ 936- 39- 2-B
- WA9IRZ 912- 38- 2-B
- W9FVB 884- 34- 3-A
- W9ZEW 864- 36- 2-AB
- W9QVE 840- 35- 2-B
- K9DTB 832- 32- 3-A
- WA9BWB 792- 33- 2-A
- WA9EHL 792- 33- 2-B
- WA9EJL 770- 35- 1-A
- WA9BRY 768- 32- 1-AB
- K9BXT 750- 25- 1-AB
- WA9OBQ 744- 31- 2-B
- WA9FXH 696- 29- 2-B
- WA9KIO 672- 28- 2-A
- WA9KQD 672- 28- 2-B
- K9VXQ 672- 28- 2-B
- K9BPT 650- 25- 1-AB
- W9KVA 550- 25- 1-A
- W9WIC 484- 22- 1-AB
- WA9OCX 462- 21- 1-B
- W9PVB/9 456- 19- 2-A
- W9HOW 440- 20- 1-A
- W9BOD 396- 18- 1-AB
- K9PML 384- 16- 2-B
- WA9JKT 364- 14- 3-A
- W9DJR 360- 15- 1-AB
- WA9PAI 352- 16- 1-A
- WA9QV 390- 15- 1-B
- WA9CWD 308- 11- 4-A
- WA9JAD 286- 13- 1-A
- W9CMD 284- 12- 1-A
- W9CPT 244- 11- 2-A
- W9AAQ 242- 12- 1-B
- WA9HV 242- 11- 1-B
- WN9PWV 242- 13- 1-B
- WA9EFS 220- 10- 1-A
- W9CPT 214- 11- 2-A
- W9BYD 198- 9- 1-B
- K9BVW 176- 8- 1-A
- W9DCP 132- 6- 1-A
- WN9PDI 132- 6- 1-B
- WA9AIS 74- 2- 1-B
- W9EJX (WA98 ERH KXZ LOM) 8512-266- 6-AB
- WA9OU (WA98 OUU PGX) 7640-191-10-AB
- WA9FJV (W498 BSSP PUV) 7200-306- 8-AB
- WA9QCO (WA98 FXK QCO) 7008-219- 6-AB
- WA9NTC (WA98 JAD NTC) 4992-156- 6-A
- WA9DUB (W498 JAD NTC) 4571- 78- 3-AB
- WA9MVD (WA98 CLW MVD) 3638-107- 7-AB
- K9ONA/9 (WA98 IRY IRZ) 1608- 67- 2-AB
- K9YTB (WA98 EJD MUT) 1066- 41- 3-A
- WA9DOA (WB8XV, WN9QKB) 962- 37- 3-AB

Indiana

- K9QCB 4968-138- 8-ABC
- K9VTT 3584-112- 6-B
- WN88OW/9 2106- 81- 3-B
- K9JTZ 992- 57- 4-A
- W9CJZ (K9JZK) 884- 32- 3-B
- W9HDR 884- 34- 3-A
- WA9QJU/9 720- 30- 2-AB
- K98FY 700- 25- 4-AB
- K9WHF 672- 24- 4-AB
- WN9QLN/9 576- 24- 2-B
- WA8FV/9 216- 9- 2-A
- WN9PYB 120- 5- 2-B
- WN9OSX 22- 1- 1-B
- K9JZK (K9JZK, WA9AFA) 9240-220-11-AB
- W9BZN/9 (5 oprs.) 3570-105- 7-AB

Wisconsin

- WA9CBP 3258-146- 8-AB
- WA9JFM 3210-107- 5-AB
- K9CYF 2160- 72- 5-AB

- W9DYU 1768- 68- 3-A
- K9OXY 1120- 35- 6-AB
- W9KHH 480- 20- 2-A
- W9TQ 448- 16- 4-B
- W9WQA 216- 9- 2-B
- K9OQN/9 154- 7- 1-A
- WA9AQL 154- 7- 1-B
- W9KXK 88- 4- 1-B
- K9EWF (5 oprs.) 1022- 42- 3-B

DAKOTA DIVISION

- Minnesota*
- K0DTA 1620- 54- 5-AB
- W9DWM 1106- 10- 4-A
- South Dakota*
- K9FKJ 495- 17- 5-AB

DELTA DIVISION

- Arkansas*
- WA5NOB 790- 26- 7-AB
- K5ETU 110- 5- 1-AB
- Louisiana*
- WA5DXA 2142- 63- 7-A
- WA5FBQ 1500- 50- 5-A
- WA5JVL 936- 39- 3-A
- WA5KEC 264- 11- 2-A
- Mississippi*
- WA8DOM/5 44- 2- 1-B
- Tennessee*
- K4EJQ/4 3620- 92-10-AB
- W4WZC 1422- 41- 8-AB
- K4FFW/4 450- 15- 5-A
- K4UWH/4 210- 10- 2-A
- WA4YPL (WA48 HLS YFL, WB48A) 962- 37- 3-AB

GREAT LAKES DIVISION

- Michigan*
- W8NSH 7042-200- 9-AB
- K8VEX 3462- 93- 7-AB
- W8CKK 2890- 85- 7-AB
- K8YVE 2822- 83- 7-AB
- W8AEF 2822- 83- 7-AB
- WN8QPN* 1768- 68- 3-B
- W8VRF 586- 61- 3-B
- W8AAE 1540- 55- 4-B
- W8FBZ/8 1144- 52- 1-A
- W8MGO 1372- 49- 1-A
- K8WEE 936- 39- 2-A
- K8SBY 504- 21- 2-B
- W8AMKU 484- 22- 1-A
- W8IBB 432- 12- 2-B
- W8ASJE 352- 16- 1-B
- K8SHX 330- 15- 1-AB
- W8BC1 242- 11- 1-B
- W8AKZY 198- 9- 1-AB
- K8AFT 176- 8- 1-B
- W8LPH 176- 8- 1-AB
- W8GCO 110- 6- 1-B
- K8ZRK 88- 4- 1-B
- W8TJQ (W88 BQD, TJQ) 5304-158- 7-AB
- W8NWW (4 oprs.) 1952- 61- 6-AB
- W8MIF (6 oprs.) 1635- 55- 5-AB
- W8BHF (2 oprs.) 1195- 58- 3-AB
- W8PWP (W88 PWZ, PXA) 266- 10- 4-A
- Ohio*
- W8AKK1* 9792-272- 8-AB
- K8DEO 9500-270- 9-AB
- W8MOW 6720-210- 6-AB
- W8NNE 5430-181- 5-AB
- W8KKF 5372-158- 7-AB
- W8GGE 5304-156- 7-A
- W8DZU 4828-142- 7-A
- W8ARGQ 4650-155- 5-AB
- K9OWB 4620-165- 4-AB
- W8LXW 4590-153- 5-A
- K8VHJ 410- 127- 5-AB
- W8JRN 4108-158- 3-AB
- K8ZES 3996-111- 8-BCD
- W8SPQI 3952-152- 3-AB
- K8JNE 3840-128- 5-AB
- K8MPC 322- 12- 4-AB
- K8KTX 3000-100- 5-AB

WRDPW 2884-103-4-AB
 KRGDV 2814-101-4-AB
 WASIKM 2520-90-4-AB
 WZOF 2400-100-2-AB
 WARMMSB 2210-85-3-B
 W8PTT 2112-88-2-AB
 W8MOH 2080-80-3-A
 WARDP/2 2054-79-3-A
 K8WQJ 2024-92-1-AB
 W8HIVK 2002-77-3-B
 W8PGF 1989-77-3-A
 W8HWD 1976-76-3-B
 W8SK 1060-70-4-AB
 WARDRC 1920-80-2-A
 K8ZQQ 1764-63-4-A
 K8ALO 1736-62-4-B
 WASLYM 1584-66-2-AB
 W8RLXZ 1512-63-2-B
 W8ARFZ 1440-60-2-B
 W8RKL 1392-58-2-AB
 W8AMSA 1392-58-2-A
 W8SPXL 1378-53-3-B
 W8AAEY 1320-55-2-B
 K8BSC 1260-42-5-A
 KR8ZN 1260-42-5-A
 WASBOA 1200-50-2-AB
 W8KSE 1162-51-1-AB
 W8DWT 1104-42-2-B
 KNIGK 1066-41-3-B
 W8N8PFO 1068-41-3-B
 K8TUY 988-44-1-AB
 W8PTF 960-40-2-B
 K8EHL 924-42-1-A
 W8OZF 902-41-1-A
 W8WAW 888-37-2-B
 W8YCP 840-35-2-A
 W8ADZ8 767-30-3-B
 W8ASHH 704-32-1-A
 W8ADTU 680-30-1-AB
 K8OTS 648-27-2-A
 W8WYH 638-29-1-B
 W88BNW 624-26-2-A
 W8SIFU 550-25-1-AB
 W8BOY 528-24-1-B
 W8RLY 528-24-1-B
 W8SLTA 528-22-2-B
 K8A0H/8 504-21-2-B
 W8ASHC 504-21-2-A
 K8AVS 450-15-5-B
 W8ARHD 440-21-2-B
 W8REHW 374-17-1-B
 W8ARRW 286-13-1-A
 W8SHCC/8 242-11-1-B
 K8JXE/8 220-10-1-A
 W88QNR/8 154-7-1-B
 W8RKM/8 132-6-1-B
 W8SHVK/8 44-2-1-B
 W88BCA/8 (10 ops.) 30,690-495-21-AB
 W8CCI (10 ops.) 16,541-376-12-AB
 W88RXC (W888 LIS LIT LIU) 712-241-6-AB
 W8KCCX (K83SAN) 784GFG, W88KCCX) 681-29-2-AB

HUDSON DIVISION
Eastern New York
 W2LWI 5350-107-15-B
 WB2POM 3510-117-5-AB
 WA2ZPD 3264-102-6-B
 WA2JWO 3200-100-6-AB
 K2ARO 2700-75-8-B
 K2CBA/2 2508-68-9-A
 K2GCH 2280-60-9-AB
 K2DNR 2040-75-10-B
 WA2YRF 2016-72-4-AB
 W2CTH 1920-60-6-AB
 WA2MCP 1856-58-6-AB
 WA2DTE 1800-60-5-AB
 W2HZZ 1768-52-7-B
 W2DSK 1680-61-4-AB
 K2UKE 1596-42-9-B
 WA2OYV 1540-55-4-AB
 WA2GGD 1470-49-5-AB
 WB2CJQ 1386-50-4-AB
 WA2WSY 1260-45-4-AB

W2HCS 1170-39-5-AB
 K2BGU 1166-31-7-AB
 WB2JRS 1120-35-6-B
 WB2UIU 1120-40-4-AB
 WA2RWR 928-29-6-A
 WB2UEW 898-32-4-AB
 K2KJT 868-31-1-AB
 K2BUF 780-30-3-B
 K2VNV 750-25-5-B
 K2CWX 644-23-4-B
 WB2OYN 576-21-2-A
 W2IP 480-15-6-B
 WA2HRE 176-17-4-B
 WB2NPR 442-17-3-B
 WA2GXM 416-16-3-B
 W2CJS 408-17-2-AB
 WA2JWL 364-14-3-A
 WB2QVX 360-15-2-A
 WB2HZE 286-11-3-AB
 WB2RUC 198-9-1-AB
 WB2IUT 168-7-2-B
 K2VAC/2 (6 ops.) 9272-244-9-AB
 WB2NVJ (WB28 NVJ RFC) 7888-232-7-AB

WA1FHA/2 (WA2NRJ, WB2HZY) 3232-101-6-AB
 WB2PZL (WB2PZL, W2NRLE) 2464-88-4-AB
 WB2OIM (WB28 OIM OWZ I RBG) 1920-64-5-AB
N.Y.C.-L.I.
 WB6NIK/2 6545-194-7-AB
 WB2LUU 4128-129-6-AB
 WB2MRK 3960-132-5-ABC
 WB2QLP 3840-120-6-AB
 W2AEF 3791-112-7-A
 WN2TCS 3660-122-5-B
 WA2QCF 3600-100-8-AB
 WB2MZE 3028-89-7-B
 W28MU 2464-77-6-ABC
 W2KXG 2070-69-5-B
 K2LCK 1680-56-5-B
 W2DBQ 1536-48-6-B
 WA2DRK 1428-42-7-B
 WB2MEO 1290-43-5-B
 WB2RRA 1290-43-5-A
 WN2UHA 1230-41-5-B
 W2OUQ 1148-41-4-B
 WB2URQ 980-35-4-B
 WB2RQM 952-34-4-B
 WN2TWL 952-34-4-B
 WN2VGR 896-32-4-B
 WA2EXP 840-30-4-B
 WN2UZU 728-26-4-B
 WB2QLM 700-25-4-B
 WA2LEN/2 312-12-3-A
 W2TNI 260-10-3-B
 WB2PGR 132-6-1-B
 W2ZSD 112-4-4-B
 WN2TJE 110-5-1-B

WB2EDF (WB28 EDF SKQ TEO) 12,954-354-8-AB
 WB2UW (WB2UWM, WN28 TWV UPH) 2670-89-5-AB
 WB2LCP (WB28 LCP UIV) 2040-68-5-A
Northern New Jersey
 W2NNL 13,310-304-12-AB
 WA2FYH/2 10,320-258-10-AB
 WB2KLL 10,208-232-12-AB
 WA2WIL 9430-205-13-AB
 WA2UDT 9400-235-10-AB
 W7PUA/2 6930-165-11-BD
 WB2KPD 5168-152-7-AB
 WB2MZH 5160-172-5-AB
 W2AQO 4370-95-13-B
 W2GQR 3450-115-5-AB
 W2SXO 3400-100-7-A
 WA2IDH 3200-100-6-AB
 W2MHJ/2 3090-103-5-B

WA2ZWB 2652-78-7-A
 WA2ERX 2550-75-7-AB
 WB2LIC 2464-77-6-A
 WA2UHE 2448-68-8-A
 WB2GPG 2310-77-5-B
 WB2NHT 2232-82-4-B
 WB2GKB 2268-81-4-A
 WB2PZB 2250-75-5-B
 WB2NCB 1938-57-7-B
 WB2OTL 1904-68-4-AB
 WB2NCX 1830-61-5-AB
 WA2ZDA 1800-60-5-AB

K2GLS 1680-56-5-AB
 WB2OYK 1638-59-4-AB
 WN2UKF 1352-52-3-B
 W2HXJ 1230-41-5-AB
 WA2ZSN 1148-41-4-AB
 WA2FWE 1120-40-4-AB
 W28MJ 780-30-3-AB
 W2QCR 560-20-4-B
 WB2QNE 456-19-2-AB
 K2GNA 442-17-3-AB
 WB28W 432-18-2-AB
 WB2MHE 408-17-2-A
 K28KV 156-6-3-B
 K2VNV 144-6-2-B
 W2BLQ 72-3-2-B
 WA2IQU 66-3-1-B
 WA2PGK (K28 LNS UYH, WA2EFG) 1,720-360-16-AB
 W2JIB/2 (K28 EPB HMD, W2JIB) 12,370-358-8-AB
 WB2PAZ (WB28 GRL PAZ STR) 2058-69-5-AB
 WA2OOD (WA2OOD, WB2TAR) 1350-47-5-B

WA0JRJ (W0RQO, WA08 BLD JRJ) 2100-75-4-AB
 K0LIR (8 ops.) 1248-52-2-AB

NEW ENGLAND DIVISION
Connecticut
 K1MRI 13,904-316-12-A
 K1ED 8316-198-11-B
 W1HDQ 5497-120-13-AB
 W1WHL 4160-104-10-ABC
 W1FNS 3680-115-6-B
 K1PKQ/1 2464-77-6-B
 K1KKK 2460-82-5-AB
 K1PAI 1824-76-2-B
 WA1CYM 1428-51-4-B
 W1WNO 960-40-2-AB
 W1DXE 952-44-4-R
 K1SKF 744-31-2-B
 W1GJL 720-30-2-B
 WA1CWM 730-30-2-AB
 K1AOY 696-29-2-B
 WA2BAH/1 (5 ops.) 20,304-395-16-ABCDE
 W1MEH (W1MEH, K1LOM) 8998-159-12-BC
 K1MUJ/1 (4 ops.) 4692-138-7-AB
 WA1BAZ (K1VQW, WA1BAZ) 3870-130-5-AB
 W1AWP (W1Q3 WEP) 1222-47-3-B

Eastern Massachusetts
 W1EJL 6426-153-11-AB
 WA1DZJ/1 3995-118-7-A
 K1BTF 3348-93-8-B
 W18M 2340-84-10-AB
 K1CHY 2460-82-5-AB
 W1OOP 2432-65-9-ABC
 W1QIB 1500-50-5-AB
 W1BWS 1290-43-5-A
 K1CQX 756-27-4-BC
 W1BXL 728-26-4-AB
 W1NFFY 676-26-3-B
 WA1DBN 176-8-1-B
 WA1CBG (4 ops.) 3040-168-5-AB
 K1VY (K1VY, WA1ABU) 3696-78-14-A
 K1RWS/1 (K1RWS, WA1CYX) 1036-37-4-AB
 WA1FCD (WA18 DWL FUD) 624-24-3-B

Maine
 K1MTJ 972-27-8-B
 K1OYB 330-11-5-ABC

New Hampshire
 W1ASZ/1 884-26-7-B



K9RVG of Chicago, Illinois with the rig that did the trick. Highest score for a station operating only on two.

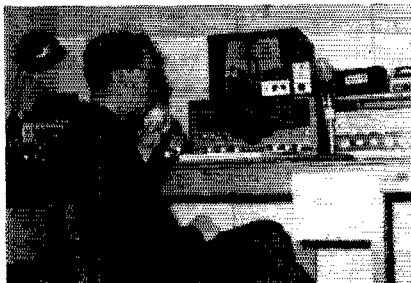




The operating position at WB2MRK, Manhattan island. It's not a new country, but Phil is sure doing his best to pull that S-2 signal through the noise for a new 432 Mc. QSO. A 4X1.50 tripler is used with a converter built from the ARRL Handbook. Phil's antenna for 432 is a 64-element colinear.

K1FTG 130-5-3-AB	W1KUE 132-6-1-A
W1HPM (K1WPM)	W1KAM 110-5-1-A
WA18 DFL/ELM)	K1WVX 22-1-1-A
5436-151-8- ABC	W1WEL 22-1-1-B
W1ALE (W1S ALE	K1UVP/L (K1UVP)
YQH) 630-21-5-AB	WIUDD/1
W1WLE (W1S	9000-225-10-AB
W1WLE) 2072-74-4-B	W1UWX/1 (W1S EZZ
K1PKZ 1950-75-3-B	W1WXL 4250-125-7-AB
K1NJC/1	WA1BTU/1 (K1S NJC
1800-50-8-A	PKZ, WALDZZ)
WA1CYK 1680-70-2-B	1600-50-6-A
W1FAB 1586-61-3-AB	W1GIV (2 oprs.)
K1ULZ 1470-49-5-B	1440-50-2-B
W1NECR/1	W1MNO/1 (2 oprs.)
1464-61-2-B	176-8-1-B
W1JWV 1428-51-4-AB	
W1NDM	
1320-44-5-A	
W1ALL/1	
1032-43-2-B	
W1ESA 1032-43-2-B	
K1PAMK 1008-42-2-B	
W1INY 912-38-2-B	
K1IJJ 888-37-2-B	
W1IC 888-37-2-AB	
K1NAMK 825-29-5-A	
K1WXU 816-34-2-A	
K1IJJ 792-35-2-B	
W1QY 792-22-2-A	
K1ESN 756-27-4-A	
W1VNH 744-31-2-B	
K1RPF 720-30-2-B	
K1LDT 690-29-2-B	
W1ALDNB 672-25-2-B	
W1UCB 624-26-2-AB	
W1UPE 624-26-2-AB	
K1EPI 504-21-2-A	
W1DGA/1	
504-21-2-B	
K1CZZ 384-16-2-B	
W1QWJ 330-11-5-D	
K1EFH 288-12-2-A	
W1AICOR 234-9-3-AB	

From the West, WB6DUB puts his rig through the paces. Dick finds that using a pair of 6146B's in the Seneca is well worth the investment. He's the certificate winner for the S.C.V. section.



WA6CQG/6	858-33-3-AB
W6GDO	532-19-4- ABCD
W6KDJ	234-9-3-B
K6AAW/6 (K6AAW,	
WA6RCY)	
WB2OV/B (4 oprs.)	250-75-5-AB
1848-66-4-B	
San Francisco	
WB6FZH	22-1-1-B
San Joaquin Valley	
K6UJG	1376-43-6-AB
WB6NFT	1290-43-5-AB
Santa Clara Valley	
WB6DUB	5272-146-6-AB
K6DTR	1800-60-5-AB

ROANOKE DIVISION	
North Carolina	
W4EPV	1717-52-7-A
W4FDO/4	1036-37-4-AB
South Carolina	
WA4LTS	3990-95-11-A
Virginia	
K4SUM	5244-138-9-AB
WA4TYZ	2670-89-5-AB
W4VJG	2040-51-10-B
WN4BHK/4	
1932-69-4-B	
W4KVI	1118-43-3-B
W4GFY/4	390-15-3-B
WA4CYR (WA4S CYR	
MZG)	6264-174-8-AB
K4LHB (K3LHZ,	
K4LHB)	2910-97-5-AB

NORTHWESTERN DIVISION	
Alaska	
KL7FCH	506-23-1-B
KL7ENZ	484-23-1-AB
KL7EUV	362-21-1-AB
KL7AEC	396-18-1-AB
KL7BLQ	396-18-1-B
WL7FB/4	396-18-1-B
KL7FHN	374-17-1-B
W8KNC/KL7	874-17-1-AB
KL7TFFH	363-17-1-B
WL7EUV	363-17-1-B
KL7FCG	286-13-1-B
KL7AZJ	264-12-1-AB
KL7EWH	253-12-1-B
KL7ECC	154-7-1-B
KL7ENO	110-5-1-B
Oregon	
WA7BJU/7	840-35-2-AB
Washington	
K7BBO	2212-79-4-A

ROCKY MOUNTAIN DIVISION	
Colorado	
W0AJY	1800-75-2-AB
W0IJR	650-25-3-A
WA0KQD	88-4-1-A
New Mexico	
WA5ETF	784-28-4- ABC
W5OJM	754-29-3-AB

PACIFIC DIVISION	
East Bay	
K6JHV/1	2820-94-5-B
Sacramento Valley	
W6WLI	1092-39-4-B
WA6JDT	924-33-4-B

SOUTHEASTERN DIVISION	
Alabama	
K4WHV	1696-53-6-AB
WA4DBQ	1232-44-4-A
WB4ALW	1156-34-7-AB
WA4KMA	1140-38-5-AB
WA4EHS	910-35-3-A
W4EKL	870-29-5-AB
W4UVM	812-29-4-A
WA4PHF	696-29-2-AB
W4ERN	648-22-5-A
W5GVE/4	510-17-5-AB
W4YRM	504-21-2-AB
W4YFN	494-19-3-A
K4TUT	456-19-2-A
WA4WZF	418-19-1-A
WA4YXJ	384-16-2-A
K4AAO	264-11-2-A
K4VJL	110-5-1-A
Georgia	
K4YZE	312-13-2-B
WN4RB	154-7-1-B
WA4QPL/4 (10 oprs.)	5922-165-8-AB

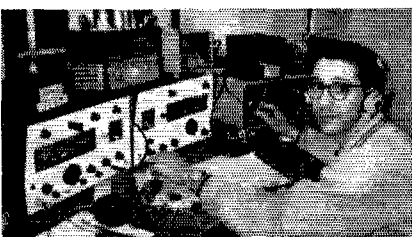
SOUTHWESTERN DIVISION	
Arizona	
K7YSE	576-24-2-A
W7AYE	308-14-1-A
Los Angeles	
WA6GAG/6	6210-207-5-AB
WA6WKF	5040-180-4-A
WB6HRI	3224-124-3-AB
WB6ITG	2860-110-3-AB
WB6GFD	2548-98-3- ABC
WB6IRZ	2262-87-3-AB
WA6UJ	1911-74-3-A
WA6QWE	1666-66-4-B
WB6QXY	1664-64-3-A
WB6KTY	1568-56-4-A
K6IOW	1508-58-3-A
WA6ARC	1417-55-3-A
WB6KGG	884-34-3-AB
WA6KIK	672-28-2-A
WF6NE/6	384-16-2-AB
KH6EVT/6	154-7-1-A
K6BPC	4 (4 oprs.)
WA6ZNP (WA6S KIIC	
ZNP, WB6IMV)	2604-93-4-AB
Orange	
W6GZK	2520-90-4-AB
WB6PHO	792-33-2-AB
K6DLY	208-8-3-B
WB6IMVU	144-6-2-A
WB6ERG/6 (WA6VTD,	
WB6ERG)	11,060-395-4-AB
San Diego	
WN6RGS	1040-40-3-B
W6UJF/6 (W6UJF,	
WB6EUW, WN6PUI)	4228-151-4-AB
Santa Barbara	
WB6DIK	528-24-1-AB
K6VHK	336-18-1-B
WA6UEF	396-18-1-AB
WA6UXP	396-18-1-AB
WN6OAN	330-15-1-B
WA6DRU	230-13-1-AB
WB6KWI	220-10-1-AB
WB6NJP/6	198-9-1-B
W1KNV/6	176-8-1-B
WIPL/6	176-8-1-B

CANADIAN DIVISION	
Ontario	
VE3DWL	6880-215-6-AB
VE3EBC	4200-150-4-B
VE3CRU	4060-145-4-B
VE3AIR	3108-111-4-ABD
VE3DSE	2940-105-4-AB
VE3CSO	2856-102-4-AB
VE3BYU	2520-100-4-AB
VE3CBM	2314-89-3-B
VE3AR	2232-93-2-B
VE3EBC	1808-73-4-B
VE3DSQ	1846-71-3-AB
VE3CIL	1512-54-4-B
VE3GAB	1332-56-2-B
VE3ENJ	1296-54-2-B
VE3EIL	1272-53-2-B
VE3BBO	1248-62-2-B
VE3CUA	1232-44-4-AB
VE3FOE	1200-60-2-B
VE3HR	1080-45-2-B
VE3DWQ	960-40-9-B
VE3CUI	880-40-1-B
VE3AGU	868-31-4-AB
VE3GAF	864-36-2-AB
VE3DRX	828-34-1-AB
VE3CPI	812-29-4-AB
VE3EYV	750-25-5-B
VE3DTP	682-31-1-B
VE3DAY	648-27-2-B
VE3AL	638-29-1-B
VE3BHF/9	624-26-2-B
VE3GAG	616-28-1-AB
VE3CWR	504-21-2-B
VE3DFA	504-21-2-B
VE3FCE	352-16-1-B
VE3FXX	312-12-3-A
VE3EWD	264-12-1-B
VE3EAG	264-12-1-B
VE3DJB	198-9-1-B
VE3ASO (VE3S ASO	
CDX FIB)	6426-188-7-ABD
VE3SAU (9 oprs.)	4788-126-9-AB
Quebec	
VE2BZH	1792-64-4-B
VE2ALE	1708-61-4-B

WEST GULF DIVISION	
North Texas	
WA5EOI	6164-134-13-A
K5IYB	5192-118-12-A
W5JWJ	2376-66-8-A
WA5ODT	2176-64-7-A
WA5JTM	2108-62-7-A

1 K3RZF, opr. 2 K3HJA, opr. 3 K3YQS, opr. 4 Novice award winner, 5 WA3BCD, opr. 6 K3ZAA, opr. 7 K3KWC, opr. 8 W3ZGL, opr. 9 WB3WU, opr. 10 W8EZE, opr. 11 WSUU, opr. 12 WA80A, opr. 13 W2TFS, opr. 14 WA2ZZF, opr. 15 Hq. staff, not eligible for award, 16 K1WHS, opr. 17 WA6ZTY, opr. 18 WA4BBY, opr. 19 VE3FOL, opr. 20
 Check Logs: K1FQL/1, WB2GY8. **QST**

It's W1BGD at the 2-meter position at WA2BA-H/1, East Hartland, Connecticut.



SETTING UP A CIVIL DEFENSE RADIO STATION

BY DAVID T. GEISER,* WA2ANU

WA2ANU, a member of the Old Timers Club, a First Class Commercial Operator, and a Registered Professional Engineer, gives a thorough report of an intentionally "ham" effort to set up a Civil Defense amateur and CB station from a cost and technical standpoint. From either view, the article is well worth reading.

THE author is the Oneida County (New York) Assistant Radio Officer in charge of activating the 10- and 11-meter bands in CD service. Preliminary analysis showed that the least expensive method would probably involve modification or use of some form of Citizens Band equipment, and discussions with various amateurs showed that this approach, even in the 10-meter band, would meet a high degree of unreasoning opposition unless backed by an exact example showing the troubles and cost of a conventional "ham" approach.

This is the story of that approach, taking a sample of each of the amateur methods of assembling a station that "We wouldn't mind using in emergencies." All troubles are reported, as are all expenses, so that the article may also have some use as a check-list for emergency operation. It is all true.

Equipment and Costs

The assumption was made that an amateur and a CB station would be accumulated and assembled without use of any existing station equipment. The assembler faces three costs — initial purchase, cost of repair and modification, and the time needed for assembly of parts or units into a complete station. Only the transmission line, antenna tuner, and antenna were to be common to the two stations.

Analysis indicated that, in quantity, complete ham or CB stations could be made for approximately \$50 from CB gear, and that the ham approach would be much more expensive. The balance sheet on the facing page is the "ham" approach, up to the point where the gear was ready for loading into the car for transport to the test site.

* Snowden Hill Road, New Hartford, New York 13413

Problems

Parkinson, I believe, formulated the law that problems expand to fill the time available. This certainly was the case, and their history may be a good check-list of what to expect.

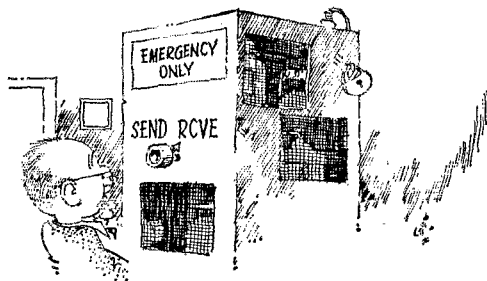
Receiver Problems

The BC454 was working when received. A 50,000-ohm potentiometer, s.p.s.t. switch, and headphone jack were purchased for modification. During checkout, shorts developed in one capacitor and across one i.f. transformer mica insulator. These were repaired.

The converter output was mis-tuned and low-frequency signals leaked into it on the power lines. One air variable and two ceramic capacitors corrected these problems. Additionally, while packing the car for the first day of two days' tests, the converter was dropped, disabling it and the entire 10-meter receiver combination. This was not realized until the setup was made at the test site.

The headphones were modified by adding a plug.

A receiver was borrowed for the next day. Its owner did not have an instruction book, so it could not be integrated into the control circuits for muting. Transmit-receive switching thus required not only switching, but also changing a.f. and r.f. gain controls. The frequency calibration was also about 100 kc. in error.



Transmitter Problems

The transmitter was advertised by the dealer as "35 Watts for a Dollar a Watt," and was guaranteed "working." After we jointly took a good hard look inside, the dealer reduced the price to \$29.50 and threw in a handful of free parts. He could have then advertised it for "a dollar a fault," for 29 faults were found and

<i>Item</i>	<i>Source/Condition</i>	<i>Initial Cost</i>	<i>Repair/Mod.</i>	<i>Time</i>
<i>10-Meter Rcvr</i>				
BC-454	Surplus	\$ 6.95	\$ 2.55	4 hr.
Xtal Converter	New	25.65	1.05	1 hr.
		(Incl. Post)		
Power Supply	Homebrew	11.95	—	2 hr.
Headphones	New	2.50	.40	—
SUBTOTAL		\$47.05	\$ 4.00	7 hr.
<i>10-Meter Xmtr</i>				
DX35	Secondhand	\$29.50	\$ 6.00	8 hr.
Xtals (2)	New	10.00	—	—
Microphone	New	6.50	.30	—
SUBTOTAL		\$46.00	\$ 6.30	8 hr.
<i>Amateur Control and Interconnection Circuits</i>				
T-R Switching	Homebrew	\$19.50	—	4 hr.
<i>Amateur Totals</i>		<i>Initial Cost</i>	\$112.55	
		<i>Repair & Mod.</i>	10.30	
		<i>Time</i>	19 hours	
<i>CB Station</i>				
Xceiver Kit	New	\$73.80	\$.10	33 hr.
		(Incl. Post.)		
Extra Xtals	New	8.00	2.30	1 hr.
<i>CB Totals</i>		<i>Initial Cost</i>	\$ 81.80	
		<i>Repair & Mod.</i>	2.40	
		<i>Time</i>	34 hours	
<i>Antenna</i>				
20 Ft. Vertical	Secondhand	\$ 5.00	—	—
Coax Cable	Surplus	1.50	\$10.80	1 hr.
Ant. Tuner	Homebrew	6.80	—	2 hr.
<i>Antenna Totals</i>		<i>Initial Cost</i>	\$ 13.30	
		<i>Repair & Mod.</i>	10.80	
		<i>Time</i>	3 hours	
<i>Total Costs</i>		<i>Initial Cost</i>	\$207.65	
		<i>Repair & Mod.</i>	23.50	
		<i>Time</i>	56 hours	
(Note that the above does not include source or cost of primary power.)				

repaired. None of the faults kept the unit from working; they just kept it from working well, or were bad workmanship. The repaired DX35 on PHONE position puts out a 4-watt unmodulated and 10-watt modulated carrier on 10 meters.

The crystals were specially ordered, the order identifying the DX35 as the using transmitter and including the circuit. Two were ordered, one for 29.62 mc. output and the other for 29.49 mc. The first was about 1400 c.p.s. high, the second 2400 c.p.s. high. This is close enough for ordinary a.m.-net work, but poor by ordinary RACES or CB standards. It is hard to stay under 0.005% error with the pressure-type crystals required by ordinary ham rigs.

Like the headphones, the mike required a plug.

Control and Interconnection Circuit Problems

No problems were encountered with the original setup. Use of the unplanned receiver

voided the chance of receiver muting, and a substitute interconnecting cable had a BNC r.f. connector with only one slot in it.

CB Station Problems

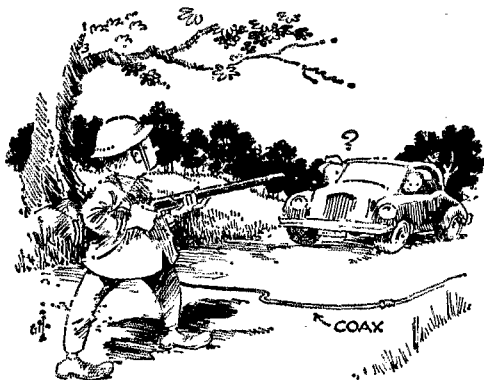
The manufacturer shipped the wrong channel receiving crystal, and one transmitting crystal and pilot lamp were defective. One rosin joint was made during assembly. The antenna output connector was different from the DX35's SO-239, so an adaptor had to be made. This (in the financial accounting) appears under "Interconnections."

Antenna Problems

The surplus coax cable was found to have a 3 db. loss, and had to be replaced with new cable. At the transmitter site, we soon found that most drivers seem to go out of the way to run their cars across new coaxial cable, and so we had to protect it.

Power Supply Problems

Both the electric power and telephone companies were asked the availability of a gasoline-driven 115 v.a.c. generator of 300 watts or more output with little radio noise. Neither had one available. The test was thus run with an \$82-inverter (175 watts continuous output) mounted in the car. The battery was too dead to start the car at the end of the second test, but two boys happened by and gave the car a starting push downhill.

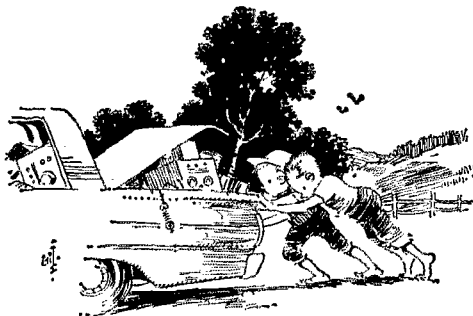


Miscellaneous Problems

Kit suppliers are putting lots more stuff into less space these days. The CB-kit supplier helped by furnishing thin solder, but thin soldering irons are needed, too. In my case, I found it necessary (before a third finished with the CB kit) to buy a large adjustable magnifying glass with Fluorescent Halo illumination. It greatly eased assembly.

A More Economical Approach

Civil Defense communication is characteristically single channel transmit and receive; the



less operator adjustment necessary or possible the better. For this reason, a crystal-controlled single-channel transceiver with push-to-talk is very desirable.

I would suggest that the Heathkit GW-12 is the most economical approach to CB CD. Basic price with crystals and microphone new is \$34.95. With new crystals and coil trimming, it should be easily converted to 10-meter RACES frequencies. I would estimate that two stations (one ham, one CB, with antenna) would total \$100 or less.

There is also expected to be a somewhat-increased supply of used CB equipment, some easily convertible to ham bands.

In any case, there are balances between the purchase of different equipment or use of regular station equipment in emergencies, balance between new, second-hand, homebrew, and surplus equipment, all balances affected by initial cost, repair and modification costs, and the time needed to make up the station.

Conclusion

To say the least, the effort was educational, which (after all) was its basic purpose. The figures and experience are offered for whatever benefit they may be to the emergency and Civil Defense fraternity. QST

Strays

According to the magazine, *Radio*, Russian radio amateurs are now permitted to operate RTTY. Two of the first hams to come up on RTTY are UB5s AC and UN. In addition, the Headquarters station, UA3KAA, may transmit bulletins on RTTY. Operating procedures, frequency shifts, etc., appear to conform to international amateur practice.

- . . . -

From time to time *QST* has printed versions of the origin of the word "ham." Along these same lines, Pete Morrow, W1VG, thought our readers would be interested in an alleged reason for the adoption of the word "lid" to designate a poor operator.

The story goes back to the day of line telegraphing. In many offices, especially railroad offices, there were several sounders. As you know, a sounder makes clicks instead of solid characters as we do

in c.w. It was difficult for each man to read his own sounder when the others were going, and various methods were employed to give an individual tone to each sounder. One of the most popular was to put a tobacco can between the sounder itself and its wooden echo case. The lid of the tobacco can was raised or lowered to change the nature of the sound of the clicks, making the sound more resonant, more metallic sounding, etc.

However, the experts made fun of this, (as some of our better c.w. operators today belittle the use of sharp filters, Q-multipliers, etc.) saying they could do the separating of the sounds by ear. An expert could read his own or any other sounder through the interference in the room caused by the several others. It seems that an expert operator would call the tobacco can man a *can lid operator*, later shortened to *lid operator*, and later to just *lid*.



AMATEUR RADIO PUBLIC SERVICE CORPS

CONDUCTED BY GEORGE HART,* WINJM

Is Your Net Registered?

In 1952 ARRL headquarters produced the first annual cross-indexed net directory. It contained 254 net names, occupied ten legal-size pages. It was hailed at the time as the last word in current amateur network information.

In 1964 we hit a peak of 709 net names and 34 pages. The 1965 net directory contains 578 net names and takes up 28 pages. All these documents were distributed free on request to anyone asking for them, as one of the many services of ARRL in the interest of amateur radio public service. When you are talking about distributing 3,000 (about the average) 34-page legal-size documents in a year, you are talking about a lot of paper, a lot of postage, a lot of labor just in distribution.

But think of the fun in compilation! It takes the full available time of one man for a solid month to receive, sort, interpret, enter, tabulate, check, double check, triple check and see the copy properly put on stencils.

A long time ago, we started to cast about for some method of cutting down the amount of time required to be spent in preparation of copy for the directory just at the busiest time of year. We finally settled on a registration term for each net. What this meant, in effect, was that any net registration was good for one year, regardless of what time of year the registration was received. After eleven months, the listed net manager would receive a notification card from us to the effect that his registration term was almost up and we would require a complete new registration in order to retain the net in our "active" file. This distributed some of the work load of entering nets in our card file (and removing those which had "expired") over the year instead of concentrating it in a month or less as had been the previous custom.

* National Emergency Coordinator.

But the net directory is a publication of the League and has a deadline, as most of 'em have. It has to be in distribution by early fall if it is to be useful to those planning seasonal on-the-air activities, which traditionally start to jell by Sept. 1. In order to make this deadline, we have to set a date on which we will start the arduous task of compilation, using those registrations in our card file which are "current" — that is, less than a year old.

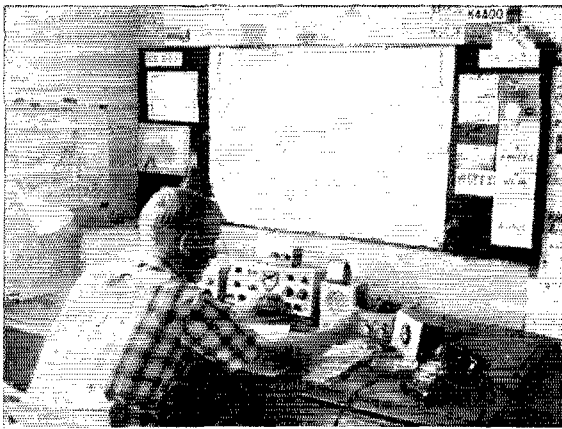
Year by year we have moved this date a little earlier, until last year we had it set at August 1. This proved to give us insufficient time to make the Sept. 1 distribution deadline, largely caused by demands on departmental personnel for other duties. So this year we are setting it at July 15. This may seem pretty early to register a net for the fall season, but actually *it makes no difference* when you register it, provided you do so at least once a year and every time there are any changes in basic data. If your registration is less than a year old at registration deadline (July 15, this year) and there have been no changes, *it is not necessary* to re-register it before deadline.

What we want to do, you see, is spread the registrations and re-registrations through the year, so there will not be the deluge which each year threatens to inundate us just as we are getting ready to put out a new directory. So, we ask you *please* to observe the following two basic procedures in registering and re-registering your nets:

(1) Notify us *immediately* of any changes in basic registration data as and when they occur. If you submit a complete new registration at this time (Form CD-85), it will be so considered in our file and no further registration will be required for a full year from the date the info is received. Basic data include full name of net, frequency, days, time and purpose.

NET REGISTRATION				
Name of Net.....	.....		
Net Designation (if any).....	Freq.....	Mgr.....	.....
Days.....	Starts.....	Ends.....	GMT	
Direct coverage.....	.....		
Purpose of Net.....	.....			NTS?.....
Liaisons.....	.....		
Previously registered?.....	Submitted by.....			(Your call)
CD-85 (R664)				

CD-85 is the form to use when registering your net for the net directory. Don't have one? They're available from ARRL Hq. A facsimile can be used, just follow the above form and refer to the instructions elsewhere in this column.



John Hellyer, CE3OX, spent over 18 hours trying to track down a concentrated form of blood plasma for a 7-year-old boy suffering from hemophilia. With the aid of several U.S. amateurs, the plasma was located and flown to Chile. See the Diary for details.

(Photo by Marcelo Montealegre.)

(2) Submit a complete re-registration one year or less from the last registration, *whether or not there are any changes*. We customarily send out notification cards when your registration is eleven months old, but we cannot guarantee to do this. It is *your* responsibility to re-register your net.

Whose responsibility, did we say? Well, that depends on whom your net designated to take care of this chore. We suggest *one person* be so designated and that *only* he send in the data (preferably on a CD-85). This avoids receipt of conflicting information; we go by the last info received prior to deadline. — WINJIM.

How to Register Your Net

Take a look at your copy of the 1965 directory. You will note that column 9 contains the date on which the net was last registered prior to the compilation of the directory information. If this date was before July 15, 1965, and no new registration has been submitted subsequent to that date, your net *will not* appear in the new directory unless it is registered prior to July 15, 1966. If the registration date is after July 15, 1965, and no changes have been made, please *do not* register at this time.

In keeping with the policy regarding the NCEFs, we will not register any net that meets on any of the *full time* calling frequencies, or within their respective guard bands.

Please use CD-85 (available from ARRL) or facsimile, or give us the information requested below on a card or piece of paper. Use one card for each net registered. Even if you do use CD-85, refer to the data below for explanation of exactly what we need. Incorrect or sloppy registrations may result in your net appearing incorrectly or not at all. Only nets operating in the amateur bands and rendering a public service are eligible for registration.

1. *Name of Net*. On the top line (two lines if you need them) of CD-85, write the name of your net *exactly* as you wish it to appear in the net directory. If the name of the net has changed from the last registration, let us know what the old name was, so we can cancel the old registration. Do not write, in this space, anything you *do not* wish to appear in the name.

2. *Net designation*. This is optional. Many nets, especially c.w. nets, have designations used in the net call-up that are useful net directory data. If you have one, let us know. Some examples are EAN for Eastern Area Net and NCN for Northern California Net.

3. *Frequency*, or frequencies in kc. If your net operates

on more than one frequency, be sure to include both or all and correlate them with days and times. Frequency bands or segments are not sufficient.

4. *Call of Net Manager*. Just his call letters, please, nothing else. If no official with that title, give us the call of the amateur from whom further information on the net may be obtained.

5. *Days*. Tell us *which* days of the week, not how many. If not properly entered, this may disqualify your net from registration. "Daily" means *every* day, including Sunday and holidays. Make sure the days given are in accordance with the time used; that is, don't give the days according to local time, then give the time in GMT. We suspect a few are still doing this.

6. *Net starting time(s)* and ending time(s). All nets are registered in (Greenwich Mean Time (GMT), otherwise known as "zulu" or "zebra" time. If you don't know how to convert (shame on you), use your local time, but be sure to let us know *what time zone* that is. The expression "local time" means absolutely nothing. If your net operates an hour earlier six months of the year (*i.e.*, "day-light savings" time), put an asterisk (*) after your operating time so this can be shown in the directory.

7. *Direct Coverage*. The coverage area assigned the net (if part of a system) or the coverage provided by *regular* participants. Do not include coverage provided through liaison with other nets. Do not put down such meaningless phrases as "50-mile radius" unless you tell us the center of the circle it's the radius of.

8. *Purpose of Net*. Please, not a lecture, just a one or two word description. Does the net fall in the category of an emergency net (E), a traffic net (T), or both (ET), or some special purpose (S)? If the latter, be sure to indicate *what* special purpose. Don't say "training" unless you indicate training in *what*.

9. *NTS?* Indicate whether or not your net is a part of the ARRL National Traffic System. If you don't know, it probably isn't.

10. *Liaisons*. NTS nets indicate their NTS liaison net; other nets may indicate any net with which they conduct *regular* liaison.

11. *Previously registered?* Give us your latest registration date, if you know it. If not, the year. If you don't know that, just say yes. If this is a newly formed net, it will save us some searching if you just say no.

12. Give us your call letters. If you have more than one call, give us the one by which you are best known. This makes you responsible for all the information in the registration. Unauthenticated registrations will not be entered.

Don't forget, **July 15** is the deadline. On that date we start compiling the net directory, and we hope to have it in distribution by **September 1**. — WIBGD.

National Traffic System

A couple of months ago we received a letter of resignation from an NTS net manager. Nothing so earth-shaking about this; in our day we've received many of 'em. But



During the 1965 Christmas holiday, Grant Dobson, VE7BQB (left) visited TWN manager Bob Howe, K7NHL. Grant was visiting some relatives in Tucson, and he and Bob were able to have a good rag chew session on various traffic and net matters.

this letter came from the only remaining original NTS manager signifying, you might say, the passing of an era. The subject of this column this month will be the past history of the amateur career of this man, Percy C. Noble, W1BVR, with special emphasis on his NTS contributions.

We don't want it to sound like a eulogy. Perce was in the office just the other day, hale and hearty and with the same iron grip as ever, his first visit to the new headquarters building since the plasters left. He stayed but a short time, then was off again, the personification of a busy man interested in going places and doing things without dilly-dallying. What is he up to now? Who knows? We know one thing, though. You won't find him sitting in a rocking chair, doing nothing.

We first knew Perce in the early thirties, when he was radio aide for the First Corps Area, Army Amateur Radio System, sporting the AARS call WLG and active in the system almost every night. We are sure he was active in amateur operating before then, but let's not go too far back. During this time also he was RM for the Western Mass. section, and according to section reports a mighty good one, as you might expect. So naturally, he was elected SCM in 1934, and then in 1936 became director of the New England Division.

He remained director for eighteen years, right through the war years. He was involved in the first flat-footed tie vote in a director election in League history, in 1945, but won the run-off election by a wide margin. After that, no one could even come close to defeating him, although several tried. In 1954 he was elected a vice president of the League and served in this capacity until his resignation in 1960.

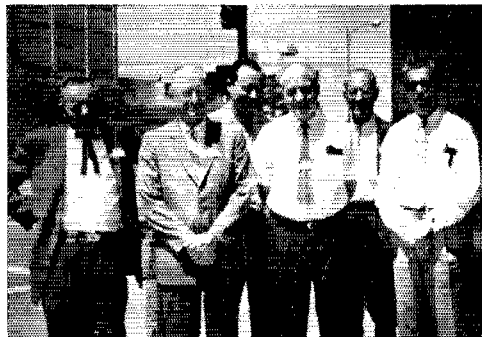
This is the briefest kind of a thumbnail sketch of a varied amateur radio career about which few amateurs know and even fewer appreciate, for Perce is not a garrulous individual. He does what there is to be done with quiet efficiency and lets results speak for themselves.

Seventeen years ago, when NTS was still on the drawing board, we sent out a brief description of the plan and asked for volunteers for managerial posts at the newly-created regional and area levels. W1BVR's call is prominent among the list of volunteers, and before the system was in operation (target: Oct. 3, 1949) he had plans for the activation of 1RN on a fullscale basis. The First Regional Net went into actual operation on Sept. 19, two weeks before the rest of NTS started operation. By the time the target date of Oct. 3 came, 1RN was a going concern, already having broken in its first shaky legs.

From then until March of 1966, when Perce finally decided it was time he gave someone else a crack at the job he loved so well, W1BVR and 1RN were practically synonymous in NTS. During his long term as manager he also served as ARRL director, vice president, SCM, RM,

and held various other Communications Department field organization appointments.

No one deserves a rest more than Perce. We know all NTSers everywhere will join us in wishing him joy in whatever he does. For it was Percy Noble, W1BVR, and pioneer amateurs like him, many of them now forgotten, who nursed NTS through its first shaky sessions and caused it to become the worthwhile amateur radio public service facility it now is. — W1NJM.



At the National Convention last year, W7PBV snapped this photo of a few of the notables. Left to right we have: W7JU/K7JU (former SEC, Nev.), W4GF (FCC), K6IIA, K6BEE, W6NY (Past ARRL Director), W7CTK.

March Report:

Net	Ses-sions	Traffic	Rate	Average	Representa-tion (%)
EAN.....	31	1721	1,224	55.5	96.8
CAN.....	31	1416	1,072	45.6	100
PAN.....	31	1431	967	46.2	100
1RN.....	58	449	351	7.4	92.2
2RN.....	61	448	699	7.3	100
3RN.....	62	690	463	11.1	100
4RN.....	57	635	427	11.1	96.7
RN5.....	62	811	408	13.2	95.3
RN6.....	62				95.6
RN7.....	31	444	458	14.3	79.7 ¹
8RN.....	62	422	307	6.8	95.2
9RN.....	31	571	394	18.6	100 ¹
TEN.....	62	821	672	13.2	86.2
FCN.....	30	122	213	4.1	90.0 ¹
TWN.....	31	327	342	10.6	76.1 ¹
Sections ²	1955	11,336		7.3	
TCC Eastern.....	124 ³	855			
TCC Central.....	93 ³	806			
TCC Pacific.....	124 ³	1100			
Summary.....	2,595	24,405	EAN	8.4	Several
Records.....	2,472	33,340	1,420	14.2	100

¹ Representation based on one or less sessions per day.

² Section/Local nets reporting (68): M1SN, M1N (Minn.); ILN (Ill.); R1N, R1SPN (R.I.); EM1N, W1N (Mass.); OQN (Ont.-Que.); MOSSB, MOTTN, PHD (Mo.); NTTN (Tex.); PTTN, EPA, WPA (Pa.); WSN (Wash.); Iowa 75, Iowa TLON (Iowa); CHNN (Colo.); LAN (La.); OHSSB, OSN, BN (Ohio); PTN (Maine); CPN (Conn.); MDD, MDD5 (Md.-Del.-D.C.); BUN (Utah); WSBN, Badger Emergency (Wis.); BCEN, BCSN (B.C.); VSN, VSBNE, VSNL, VN (Va.); ETPN, TPN, TSSB (Tenn.); NJN, NJ6&2, NJE&T (N.J.); Wolverine, QMN (fast), QMN (slow), Mich. 6 meter (Mich.); NCN, NCNL, NCSB (N.C.); GN, GTN (Ga.); M1NP, M1PN, M1N (Man.); WFPN, QFN, FMTN (Fla.); Q1N (Ind.); SCSB (S.C.); AENB, AENH, AENM, AENP, AENR, AENT (Ala.); OZK (Ark.); KTN (Ky.); NCN (Cal.).

³ TCC functions not counted as net sessions.

Only one new record this month. We are pleased to note the continuing improvement in the representation figures. Five nets hit the 100% mark and all but three made better than 90%. Keep it up!

With signs of increased solar activity, the bands are slowly coming back to normal. Gone are the days when a

NATIONAL CALLING AND EMERGENCY FREQUENCIES (kc.)

FULL TIME

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

PART TIME

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

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

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

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

W6 was needed to QNB for the 1RN fellows, and the TCC men will have to dust off their 20-meter rigs to handle their cross country skeds. Now is the time to start recruiting for our section nets and getting some of the better ops into the higher levels of the system. It's a lot easier learning net procedure and message handling form when conditions are reasonable.

K1WJD remarks that representation seems to be on the upswing, but traffic is definitely down. W9DYG comments that all's well on CAN. WB6JUH is happy with the 100% representation on PAN this month and hopes it will continue. WIBVR submits his last report as 1RN manager. Milt Chaffee, W1EFW, is the new 1RN manager. Despite a few internal problems, 2RN is rolling along, sez WA2GQZ. K3MVO is proud of the 3RN crew; they hit 100% representation for the second month in a row. K5IBZ noticed a definite drop in traffic on RN5 this month. Conditions seem to be pretty good, but the QRN is coming back (time to get out the audio limiters, boys). K7JHA compliments Wash., Ore. and B.C. for the 100% representation and welcomes a regular Alberta outlet on RN7. Starting in the middle of April, RN7 will operate at 0245z. W9QLW has been sending a newsy bulletin each month with his report. It makes interesting reading and is a good source for quotable material. W0LGG reports a good month for TEN. VE3BZB has high hopes for regular Maritime representation from the newly formed Atlantic Provinces Net.

Transcontinental Corps: W3EML has issued TCC certificates to: W1s BGD EFW EMG NJM, W2s GVH SEL, WA2s BLV RUE, WB2AEJ, W3s EML NEM, K3s FHR MVO, W4DVT, K4VDL, W5s CHT RYP, K8s KMQ NJW QKY, WA8GYT and W9OHJ. Another TCC sked on RTTY is in the works and should be in operation shortly. This time, it will be Station B. W4ZJY is hopeful that the reporting percentage will improve. March was a fairly good month, sez W7DZX. Traffic is up from a year ago and reports were 100% again.

March report:

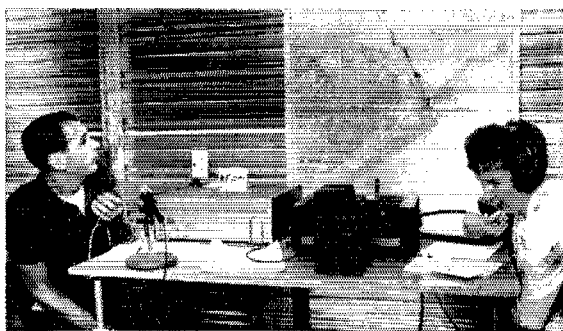
Area	Functions	% Successful	Traffic	Out-of-Net Traffic
Eastern	124	96.8	2232	855
Central	93	87.1	1668	806
Pacific	124	93.8	2200	1100
Summary	341	92.9	6100	2761

TCC roster: Eastern Area (W3EML, Dir.)—W1s BGD EFW EMG NJM, K1ZND, W2s GVH SEL, K2SIL/8, WA2s BLV UPC UWA, WB2AEJ, W3s EML FAF NEM, K3FHR MVO, W4DVT, K4VDL, WA4UMX, W5s CHT RYP, K8s KMQ NJW QKY, WA8s CFJ GYT HVR, W9OHJ, Central Area (W4ZJY, Dir.)—W4s OGG ZJY, WA5JOL, W9s CXY DYG JOZ VAY ZYK, WA9s BWY NFS, W0HXB/4, K9s AEM GSY.

Net reports. Northeast Area Barnyard reports 27 sessions, 644 check-ins, 3 traffic. 20 meter SSB reports 23 sessions, 363 check-ins and 2715 traffic. North American SSB Net reports 27 sessions, 933 check-ins and 728 traffic. Mike Farad Emergency and Traffic Net reports 37 sessions, 497 check-ins, 482 traffic. 7290 Net reports 47 sessions, 1574 check-ins, 751 traffic. HBN reports 31 sessions, 455 check-ins and 699 traffic. Interstate SSB Net reports 1184 check-ins and 476 traffic.

Diary of the AREC

While traveling in Ecuador in search of rare birds, an ornithologist, his wife and a student who was traveling with them were attacked by some natives. The student was able to escape and get help, but the doctor and his wife were severely cut and left for dead. Help arrived several hours after the attack and the two were taken to a hospital for treatment. When the student was sure the doctor and his wife were in good hands, he attempted to contact their respective families to reassure them of their safety. Since commercial communications were either not available or at best unreliable, HC5EJ was sought out and asked to get a message back to Boston, where the families of the explorers were. K1GHT was contacted on November 6, and delivered the first messages. Later he, HC1HL, HC1WD and HC5EJ maintained contact to relay traffic and make arrangements for the transporta-



WA5KKG (left) and WA5FQC operate from net control station W5ORI during the Channel Derby held on Feb. 6. They maintained contact with mobile and portable units stationed at various points along the course.

tion of the victims back to the states and for additional medical care. Health and welfare traffic was also handled between the stations.—K1GHT.

While traveling to work on Dec. 13, WA5KZP came upon a wreck some 35 miles south of Alamogordo, New Mexico. A large car had hit a small foreign model head on during a passing maneuver. WA5FLG, New Mexico SCM, was contacted and requested to call the state police for assistance. WA5KZP assisted the injured passengers and gathered data for the police. Despite the first aid that was administered, two of the three passengers died. Other stations assisting were K5HTT, SEC, K5ONE, and K5FPO.—WA5FLG, SCM New Mexico.

During the late afternoon of March 3, the second worst tornado in Mississippi history struck Jackson. The Mississippi Sideband Net, the Gulf Coast Sideband Net and the RACES net were activated, starting around 1800 CST and continued through the night, handling emergency and priority traffic, both incoming and outgoing. Fixed, portable and mobile stations were used in Jackson and several units were on the spot in the disaster area. Those stations known to have participated were: W5s EPT CQJ NNZ IZS ODV IAJ OYH EMM HTV JHS OHE EVY FXZ, K5s HCI UTE PPI KAF GSY, WA5s DQP EBT FII CKL GEK CAC.—W5EMM, SCM Miss.

At about 2130z, March 4, WA3ESV heard HC2JF calling "CQ Texas, Emergency", on 15 meters. WA3ESV listened for a few minutes and when HC2JF put out a general emergency call, he answered him. HC2JF was trying to get word to a hospital in Houston, Texas, to inquire about the reservations for a woman who was to come to the states for open heart surgery. Confirmation of the reservations had not been received, and since telephone contact could not be made, amateur radio was tried. A message was originated to WA3ESV who relayed it to K3PIE/3, who took it to 3RN where it was given to a W5, with QNB by WA2WBK. Twenty-four hours later, WA3CCC relayed the reply to WA3ESV who met HC2JF on 15 meters. Everything was set at the hospital and the arrival of the patient was expected. Unfortunately, the trip had to be postponed because the patient suffered a heart attack and couldn't be moved. After sufficient time for recovery, the trip was made.—WA3BSV.

On Mar. 6, CE3OX was requested by CE3IW to make contact with U.S. amateurs to try to locate some plasma for a 7-year-old boy suffering from hemophilia. The boy was hemorrhaging from the mouth as a result of an abscess, which resulted from an attack of an extremely rare virus. An operation might be required to permit the boy to breathe and any operation on a hemophilia patient is very dangerous. The ordinary plasma for treatment of such cases was available, but since such large dosages were being given the danger of shock was increased. A concentrated form of plasma was required. CE3OX first made contact with W6HLV who called the San Diego Red Cross. Unfortunately, they were unable to help. A blood bank

was called, but a doctor's order was required before the plasma could be shipped. W6VNM joined the operation and at that point the three moved from 15 to 20 meters. Other amateurs also were standing by, helping keep the frequency clear. An effort was made to contact a Miami station, without success, until W8SWF came on frequency, and through him K4U00 was contacted. All other amateurs stood by while CE3OX and K4U00 made contact. K4U00 then called one of the local hospitals where he spoke with the head of the hospital's blood bank. Information from CE3OI was relayed to the doctor, who contacted one of the representatives of a large pharmaceutical company. The plasma was provided and arrangements were made to have it flown to Chile.

CE3OX's contacts were overheard by W4CSE/mm aboard the U.S.S. Howard W. Gilmore, stationed off Puerto Rico. The request for plasma was relayed to MARS circuits where a search was conducted, the plasma located and shipped via navy jet. — CE3OI.

On Mar. 22, a severe blizzard moved completely across Nebraska. The storm started as rain which froze, creating treacherous driving conditions and heavy ice loads on telephone and power lines. High winds broke these lines, leaving large areas of the state without power and telephone service. In some areas, it took several days before service could be restored. At 1650 CST, W0HYD, SEC Nebr., called the Nebraska AREC net to active session where it remained until the last of the traffic was cleared, Mar. 25. At least 150 amateurs participated in this operation, providing communication for local police and fire officials as well as for the news media. — W0HYD, SEC Nebraska.

This same storm moved into Minnesota, again taking down power and telephone lines. K0FTB was the only out of town communication link for St. Charles, Minn. for a day and a half. Likewise, K0IGZ covered the Rusford area, K0PSH covered Kasson, WA0EPX covered Utica, and W0VRY covered Spring Valley. W0FKT was the only ham in Austin whose antenna was still up. Ironically, four days before the storm struck, a simulated "ice storm" drill was held by the net.

The Mankato Area Radio Club maintained contact between Waseca, Mankato, Winnebago, Amboy, Janesville and Minnesota Lakes and conducted liaison with other nets. K0HWJ provided Minnesota Lake's only contact with the outside world until snow broke came through a day and a half later. One plow broke a rear axle and K0HWJ was able to summon help. — W0TCK, K0ZRD, WA0EPX.

W6SUH was aboard a tanker, located off the western shore of Mexico. On March 28, he checked into the West Coast Amateur Radio Service Net, where WA6WHP was standing by. One of the crew members had fallen and was in need of medical assistance. Since conditions were such that the ship's radio was ineffective in making contact with the coast guard, W6SUH relayed the request for assistance. W7ZC was asked to relay the message while a doctor at the U.S. Public Health Service in Long Beach, California, was called. First aid information was relayed back to W6SUH. — W6TX.



During the flooding of the Salt River, on Dec. 31, the Phoenix Red Cross net control station was manned by (l. to r.) K7NVC, W7YWF and K7CEH. Communication links were established with the evacuation shelters and portable units in the disaster area. (Photo by W7PZ).

Fifty SEC reports were received for February, representing 21,027 AREC members. This is 9 more SEC reports than last year, but indicates a drop of 176 members. Keep them reports coming, men. Those Sections reporting were: Conn., E. Mass., R.I., N.Y.C.-L.I., N.N.J., W.N.Y., E. Pa., W. Pa., Del., Md.-D.C., Ala., E. Fla., Ga., Ky., N.C., Tenn., Va., La., Miss., N. Mex., Okla., S. Tex., E. Bay., Orange, San Die., S.F., S.V., Hawaii, Mont., Nev., Ore., Utah, Wash., Wyo., Mich., Ohio, W. Va., Ind., Colo., Kans., Minn., Mo., Nebr., S. Dak., Mar., Ont., Man., Sask., Alta., B.C.

RACES News

From 1800 to 2330 EST, on Jan. 23, RACES members in East Keansburg, Leonardo and other shore areas of New Jersey were kept busy by flooding in that area, caused by a severe snow storm. Mobile units were used to direct evacuees to emergency shelters. Because the snow storm had created a serious flood condition, and the possibility of high tides causing additional flooding, the e.d. communications crew evacuated from one area, leaving the communication center to serve as the only communication link with the area. The expected high tide didn't materialize, however, and the crew went back to work. Those amateurs known to have participated were: W2HXJ, WA2s KEM JKJ, WB2s COP QMP KXI BBZ EKL.

Ooops. . . .

We goofed again. The photo on page 60, May QST, of K5HLXR should refer to him as the EC for Harris, not Houston County, Texas.

The caption for the photo on page 45, April QST, should show WA4OWG operating W4BOW, and W4CWI's call was inadvertently shown as W4WCI.

Strays

Mcupltis Tennessee

W4WBK

925 North Trezevant 73, Franklin Cassen

AMATEUR RADIO JUNI ENERGY RADIO RELAY LEAGUE

Are you among the many who have built one or more of the several versions of Ted Crosby's "HBR" receivers? If so, you'll probably be interested in some additional modifications and adjustment procedures that will lead to even better results. They're summed up by W6TC in a four-page bulletin that you can get by sending a self-addressed, stamped envelope, No. 10 size, to Alex Stewart, WA4ZNI, 916 Croton Drive, Alexandria, Va.

A good idea from former Delta Vice Director Frank Cassen, W4WBK: a stamp across the face of his QSL card promotes membership in the League.

Board Meeting Highlights

Denniston Elected President

Articles of Association Modernized

A PRINCIPAL task of the Board of Directors of the American Radio Relay League at its annual meeting in Newington, Connecticut, May 6-7, 1966, was the selection of a new president. To fill the office the Board chose a man of extensive amateur experience with background in International Amateur Radio Union affairs as well as in ARRL organizational matters—Robert W. Denniston, WØNWX. The new President has been director from the Midwest Division for the past ten years, and is a member of the ARRL Executive Committee and also that for IARU Region II. A resident of Newton, Iowa, professionally he is president of Denniston and Partridge Company, an extensive chain of lumberyards.

The Board unanimously re-elected Wayland M. Groves, W5NW, as First Vice President. Two new Vice Presidents were named: Charles G. Compton, WØBUO, and Gilbert L. Crossley, W3YA, who continue to serve as Dakota and Atlantic Division Directors, respectively. Honorary vice presidencies were conferred on Alex Reid, VE2BE, and Francis E. Handy, W1BDL. Director Noel B. Eaton, VE3CJ, and Director Compton were re-elected, and Directors Crossley and Carl L. Smith, WØBWJ, were newly elected, to the Executive Committee.

The Articles of Association were extensively reviewed and brought up to date, largely based on a report, after extended study, by Counselors Robert M. Booth, Jr., W3PS, and Arthur K. Meen, VE3RX. Provision was made for absentee ballots in director elections, for a 30-day grace period in membership continuity, and for family associate members. Vice presidents, after the first, now acquire right of succession in order of their election. Defeated were proposals to require regional representation on the Executive Committee (the Board felt it wanted complete freedom of choice), run-off elections in director contests where no candidate has a clear majority (the process would take months and leave a division without a current choice), a new by-law to limit the President to two or three terms (again the Board wanted freedom to choose the best man without restriction) and a change in license classes to be held by director and vice-director candidates (the Board felt it undesirable to reduce the requirements).

The Board ordered studies on the feasibility of changing power limits for bands above 420 Mc., remote broad-band translators on 144 Mc. and above, and advanced transmission techniques including independent sideband, pulse-code modulation, pulse-width modulation, and digital communication. The technical achievements of Project Oscar, Inc., and the TRW Radio Club, which designed and built Oscar IV, were especially commended.

The Amateur Radio Public Service Corps was widened to include RACES in addition to AREC and the National Traffic System. A field appointment as Public Relations Manager in each section or division is to be studied. QSL Bureaus are to be given further assistance through regular visits by Hq. personnel or directors. The Board approved a membership campaign based largely on mutual cooperation through affiliated clubs, and ordered studies of life memberships, membership identification numbers, and special pins for long-term League members. It also established an annual "Founder's Week," based on Hiram Percy Maxim's birthdate of September 2, to promote more public recognition of amateur radio.

The Board presented retiring president Herbert Hoover, Jr., W6ZH, with a handsome scroll of appreciation for his service to ARRL, and followed it with a standing ovation.

Mr. Denniston having resigned his former post, Sumner H. Foster, WØGQ, becomes the new director from the Midwest Division.

Minutes of the meeting will appear in July *QST*.

QST

Happenings of the Month

LEAGUE REQUESTS TEN METER RTTY

The League has filed a petition with the Federal Communications Commission requesting a change in the rules so as to provide for F-1 radioteletype emission on the frequencies 28.0 to 28.5 Mc., thus bringing privileges in line with other h.f. bands. The text appears below:

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C., 20554

In the Matter of
Amendment of Section 97.61 (b) (9)
of the Rules and Regulations in the
Amateur Radio Service (28 Mc/s)

RM-000

PETITION FOR RULE MAKING

The American Radio Relay League, Incorporated, by its General Counsel, respectfully requests the Commission to amend Section 97.61 (b) (9) of its Rules and Regulations to read as follows:

(9) 28.0 to 29.7 Mc/s, type A1 emission; 28.0 to 28.5 Mc/s, type F1 emission; 28.5 to 29.7 Mc/s, type A3 emission and narrow band frequency or phase modulation for radiotelephony and, on frequencies 29.0 to 29.7 Mc/s, special emission for frequency modulation (radiotelephone transmissions and radio telegraph transmissions employing carrier shift or other frequency modulation techniques).

In support whereof, the following is submitted:

Types A1 and F1 emissions are permitted by Section 97.81 (b) of the Commission's Rules between 3,500 to 3,800 kc/s, 7,000 to 7,200 kc/s, 14,000 to 14,200 kc/s, and 21,000 to 21,250 kc/s, generally referred to as the c.w. bands. For reasons not apparent from orders and policy statements of the Commission, F1 emission is not authorized between 28.0 to 28.5 Mc/s, the c.w. portion of the 28 Mc/s band.

The usefulness of the 28 Mc/s band for long distance communication will increase during the next few years with the increase in sun spot activity. Considerable teleprinter operation using type F1 emission is expected. It seems desirable that such operation be permitted in the c.w. portion of the 28 Mc/s band as well as in the c.w. portion of the lower frequency bands.

Wherefore, the premises considered, the Commission is respectfully requested to issue a notice of proposed rule-making looking to amendment of Section 97.61 (b)(9) of the Rules as proposed herein.

Respectfully submitted,

**THE AMERICAN RADIO RELAY LEAGUE,
INCORPORATED.**

BY ROBERT M. BOOTH, JR.
Its General Counsel

April 8, 1966

CHANGE OF ADDRESS OR NAME

The Federal Communications Commission has relaxed our rules slightly, permitting notification of a change in license mailing address, or of name, by letter rather than formal application for modification. Effective May 20, letters may be sent to the FCC, Gettysburg, Pennsylvania, 17325, with such changes, the licensee retaining a copy until his next renewal or major license change.

If the address of the station is changed, however, or if there is any other significant modifi-

cation, the amateur should make formal application for modification on FCC Form 610. The net effect of the change is to save amateurs the filing fee for minor modifications. The text of the revised sections appears below:

§97.13 Renewal or modification of operator license.

(d) Application for renewal and/or modification of an amateur operator license shall be submitted on FCC Form 610 and shall be accompanied by the applicant's license. Application for renewal of unexpired licenses must be made during the license term and should be filed within 90 days but not later than 30 days prior to the end of the license term. In any case in which the licensee has, in accordance with the provisions of this chapter, made timely and sufficient application for renewal of an unexpired license, no license with reference to any activity of a continuing nature shall expire until such application shall have been finally determined.

(f) When the name of a licensee is changed or when mailing address is changed a formal application for modification of license is not required. However, the licensee shall notify the Commission promptly of these changes. The notice, which may be in letter form, shall contain the name and address of the licensee as they appear in the Commission's records, the new name and/or address, as the case may be, the radio station call sign and class of operator license. The notice shall be sent to Federal Communications Commission, Gettysburg, Pennsylvania, 17325, and a copy shall be kept by the licensee until a new license is issued.

9. Section 97.47 is amended by amending paragraph (a) and by adding paragraph (c) with a Note to read:

§97.47 Renewal and/or modification of amateur station license.

(a) Application for renewal and/or modification of any station license shall be submitted on FCC Form 610. In every case, the application shall be accompanied by the applicant's license. Applications for renewal of unexpired licenses must be made during the license term and should be filed within 90 days but not later than 30 days prior to the end of the license term. In any case in which the licensee has, in accordance with the provisions of this chapter, made timely and sufficient application for renewal of an unexpired license, no license with reference to any activity of a continuing nature shall expire until such application shall have been finally determined.

(c) When the name of a licensee is changed (without changes in the ownership, control, or corporate structure), or when mailing address is changed (without changing the authorized location of the amateur radio station) a formal application for modification of license is not required. However, the licensee shall notify the Commission promptly of these changes. The notice, which may be in letter form, shall contain the name and address of the licensee as they appear in the Commission's records, the new name and/or address, as the case may be, and the call sign and the class of operator license. The notice shall be sent to Federal Communications Commission, Gettysburg, Pennsylvania, 17325, and a copy shall be maintained with the license of each station until a new license is issued.

NOTE: For the rules governing operation of an amateur station away from the authorized location, see §97.95-§97.101.

IDENTIFY IN ENGLISH

The Federal Communications Commission's Field Engineering Bureau requests that amateurs in the fifty states cooperate with its monitoring stations by identifying the station being called, either "this is" or "from" and the station calling, all in English, at the beginning and end of each

transmission (with certain exceptions noted below). FCC feels that its rules imply identification in English; in any case, its monitoring personnel do not uniformly have knowledge of all the modern languages used by amateurs for QSOs. Accordingly, the monitors are issuing "advisory notices" to amateurs in the fifty states who neglect to identify in English when carrying on a QSO in a foreign language.

§ 97.87. *Transmission of call signs.*

(a) (1) The operator of an amateur station shall transmit the call sign of the station or stations (or may transmit the generally accepted identification of the network) being called or communicated with, or shall identify appropriately any other purpose of a transmission, followed by the authorized call sign of the station transmitting:

(i) at the beginning and end of each single transmission or;

(ii) at the beginning and end of a series of transmissions between stations having established communications, each transmission of which is less than three minutes duration (the identification at the end of such a series may be omitted when the duration of the entire series is less than three minutes), and;

(iii) at least once every ten minutes or as soon thereafter as possible during a series of transmissions between stations having established communications, and;

(iv) at least once every ten minutes during any single transmission of more than ten minutes duration.

(2) The required identification shall be transmitted on the frequency or frequencies being employed at the time, and in accordance with the type of emission authorized thereon, shall be by either telegraphy using the International Morse Code, or telephony, except that, when a method of communication other than telegraphy using the International Morse Code or telephony is being used or attempted, the required identification shall be transmitted by that method and only the call sign of the transmitting station need be transmitted either by telegraphy using the International Morse Code or by telephony.

(b) In addition to complying with the requirements of paragraph (a) of this section, an operator of an amateur station operated as a portable or mobile station using radiotelegraphy shall transmit immediately after the call sign of such station, the fraction-bar character (DN) followed by the number of the amateur call sign area in which

the portable or mobile amateur station is then being operated, as for example:

Example 1. — Portable or mobile amateur station operating in the third amateur call sign area calls a fixed amateur station: W1ABC W1ABC W1ABC DE W2DEF DN 3 W2DEF DN 3 W2DEF DN 3 AR.

Example 2. — Fixed amateur station answers the portable or mobile amateur station: W2DEF W2DEF W2DEF DE W1ABC K.

Example 3. — Portable or mobile amateur station calls a portable or mobile amateur station: W3GHI W3GHI W3GHI DE W4JKL DN 4 W4JKL DN 4 W4JKL DN 4 AR.

When telephony is used, the call sign of the station shall be preceded by the words "this is" or the word "from" instead of the letters "de," followed by an announcement of the geographical location in which the portable or mobile station is being operated.

Example 4. — Portable or mobile amateur radio telephone station operating in the third call area calls a fixed amateur station: W1ABC W1ABC W1ABC "this is" or the word "from" W2DEF W2DEF W2DEF operating portable (or mobile) 3 miles north of Bethesda, Md., over.

(c) When telephony is used, the transmission of call signs prescribed by paragraphs (a) and (b) of this section may be made by the person transmitting by voice in lieu of a duly licensed operator provided the licensed operator maintains the control required by § 97.79.

(d) When using telephony, phonetic aids to identify the call sign of the station may be employed.

(e) In addition to complying with the requirements of paragraph (a) of this section, an operator of an amateur station operated as a mobile station aboard a vessel on the high seas, or aboard an aircraft en route on an international flight, shall, when the vessel or aircraft is outside the 10 call sign areas prescribed by the Commission in § 97.51 (b), comply with the following calling procedure.

(1) Mobile operations aboard a vessel.

(i) When using telegraphy the amateur operator shall transmit immediately after the call sign of the station the fraction bar DN followed by the designator MM to indicate that the station is being operated as a mobile station aboard a vessel. In addition, the name of the vessel and its approximate geographical location shall be transmitted at the end of each transmission immediately prior to signing off. If the vessel does not have a name, the number of the vessel shall be transmitted in lieu of the name of the vessel.

(ii) When using telephony the call sign of the station shall be preceded by the words "this is," or the word "from" followed by the words "maritime mobile," to indicate that the station is being operated as a mobile station aboard a vessel. In addition the name of the vessel and its approximate geographical location shall be transmitted at the end of each transmission immediately prior to signing off. If the vessel does not have a name, the number of the vessel shall be transmitted in lieu of the name of the vessel.

(2) Mobile operations aboard aircraft.

(i) When using telegraphy the amateur operator shall transmit immediately after the call sign of the station the fraction bar DN followed by the designator AM to indicate that the station is being operated as a mobile station aboard an aircraft. In addition, the number of the aircraft and its approximate geographical location shall be transmitted at the end of each transmission immediately prior to signing off.

(ii) When using telephony the call sign of the station shall be preceded by the words "this is," or the word "from" followed by the words "aeronautical mobile," to indicate that the station is being operated as a mobile station aboard an aircraft. In addition, the number of the aircraft and its approximate geographical location shall be transmitted at the end of each transmission immediately prior to signing off.



Amateur Radio Week in Illinois is August 8-14 this year, ending with the 32nd Annual Hamfesters Radio Club hamfest. A special feature this year is an Amateur Radio Operator of Illinois award, for amateur radio public service; nominations are due at the Hamfesters Radio Club, 6000 S. Tripp Avenue, Chicago not later than July 1. In the photo WA9EOC, WA9IWU and W9HPG, ARRL Central Division Director, admire Governor Otto Kerner's proclamation.

KENTUCKY CALL PLATES DEFEATED

We are sorry to report that, after being passed by both Houses of the Kentucky legislature, a bill for amateur call letter license plates has been vetoed by the Governor on the advice of the Revenue Department. Kentucky thus remains one of the two states which do not grant the call letter plates, the other being New Jersey.

QST



Hints and Kinks

For the Experimenter



INEXPENSIVE TOWER SUPPORT

WITH warm weather not too far off, many hams will be thinking about putting up towers or refurbishing existing installations. Fig. 1 shows a very simple but rugged way to secure a small tower to a house or garage without the use of guy wires or heavy concrete base. The total cost of such an installation shouldn't exceed \$3.00 for the turnbuckle, L-brackets and small hardware. The screw eye going into the stud should be at least four inches long and should be opened up and the turnbuckle inserted before mounting. This will permit closing the eye in a vise. After installing the tower support, run a locking wire through the turnbuckle eyes and slot to keep the turnbuckle from working loose. — *Chas. A. Hudson, W9SCD*

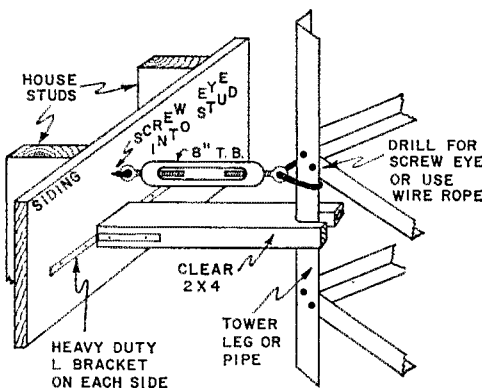


Fig. 1—Details of W9SCD's inexpensive tower support.

HX-20 AND HR-20 DIAL POINTERS

BOTH the Heathkit HX-20 and HR-20 have very wide slide-rule dial pointers, making it difficult to read the dial scale with any degree of accuracy. Using a printed-circuit soldering aid, slide the pointer along the cord to the edge of the panel and bend it 90 degrees, so that the edge of the pointer will be facing forward instead of the wide part. The "new" pointer will be about a third as wide as before and readily visible, as both the edge and wide part are painted white. In case the edge hasn't been coated, a small bottle of white refrigerator touch-up paint will do nicely. After making the modification, run the pointer across the dial to see that it doesn't rub, and check the calibration. — *Ross F. Fox, W3PZX*

KEEPING THE LOG BOOK FLAT

TO keep my log book from becoming curled up and dog-eared, I cut off the bottom corners of an envelope and slip them over the top few pages of the log book. — *Walter A. Hotz, K6LG*

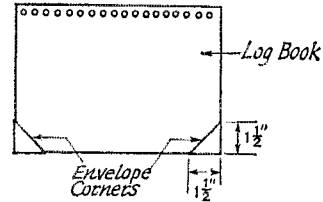


Fig. 2—Envelope corners protecting a log book from becoming dog-eared.

CODE-SPEED NOMOGRAPH

IT'S easy to determine one's code speed at a moment's glance by using the nomograph shown below. Just place a ruler over the nomograph, with the left end of the ruler over the number of seconds required to transmit or copy the selected passage and the right end of the ruler over the number of characters in the text. The code speed is read directly from the intersection of the ruler and the middle scale. — *Lemuel D. Wright, WB2UYF*

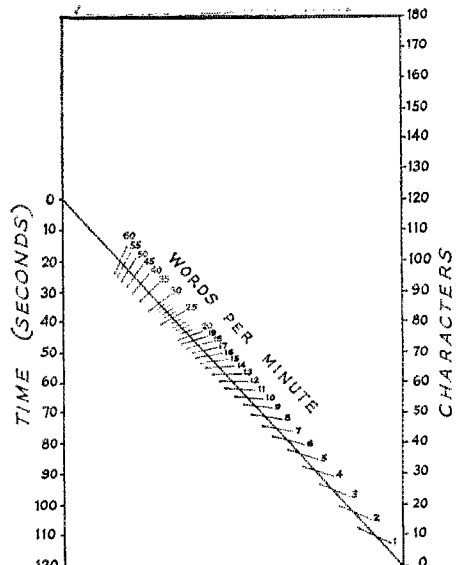


Fig. 3—Nomograph for determining code speed.

DUAL-VOLTAGE POWER SUPPLY HAS INCREASED EFFICIENCY

CONVENTIONAL dual-voltage power-supply circuits require either a precisely tapped transformer with a separate rectifier and filter for each voltage output, or dropping resistors, which waste power and result in poor regulation. A simple circuit employing a full-wave rectifier connected to two passive branches from which the d.c. voltages are taken is shown in Fig. 4.

The primary winding of the power transformer is connected to an a.c. source, and the secondary winding is connected to the full-wave rectifier consisting of diodes D_1 and D_2 . The unfiltered output from the full-wave rectifier is fed in parallel to a conventional choke-input filter branch and a diode-capacitor branch. The diode, D_3 , in this branch conducts on the peaks of the full-wave rectifier current and charges capacitor C_1 to the peak voltage across one half of the secondary winding of the power transformer. The voltage at terminal B will be approximately 40 per cent greater than at terminal A with normal component values. Both outputs should have low ripple and good voltage regulation. For maximum voltage output at terminal B, a high-conductance diode should be used in this branch. The required peak inverse-voltage rating of diode D_3 is only one-half the peak voltage across the full secondary winding of the transformer. — *NASA Tech Brief 66-10002*

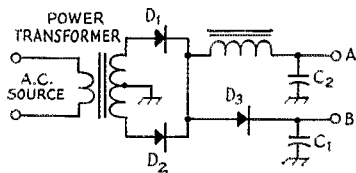


Fig. 4—Circuit of dual-voltage power supply.

TEN-MINUTE TIMER

A ten-minute timer for s.s.b. operators can be constructed quite easily from an old GE or Telechron electric clock. The time-set knob on the rear of the clock makes one revolution every ten minutes. I soldered a small angle bracket to the knob and bolted a short length of insulation to the bracket, as shown in Fig. 5. The insulation acts as the wiper arm for contacts that are mounted near the top of the back of the clock. These contacts are wired in series with a 7-watt 110-volt bulb and the a.c. line. Although I use a light to remind me of the ten-minute interval, a buzzer or some other audio indicator could be used. I tried a microswitch for the contacts, but found that the switch worked too hard for the clock to power, so instead I used two pieces of light springy metal and some insulation from the junk box.

I position the face of the clock toward the wall, not being concerned about time other than ten-minute intervals, and find the timer easy to set at

the beginning of each QSO. Once started, the timer lights the bulb every ten minutes and we all stay within the FCC regulations. — *Verlin Karli, WØRIS*

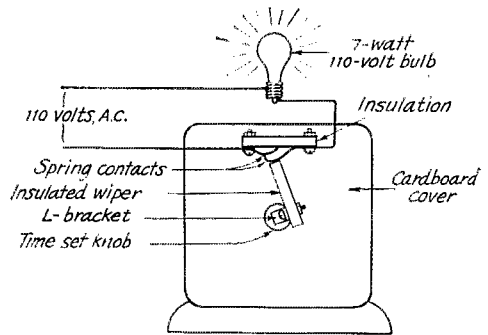


Fig. 5—WØRIS's ten minute timer built on the back of an old electric clock. The system is made possible because the time set knob makes one revolution every ten minutes.

BOOM DRILLING AIDS

IN the construction of Yagi antennas where round booms are used, the problem frequently occurs of properly drilling the booms for attachment of the elements in the same plane. In order that all holes in the boom are drilled in line, I have employed the two simple drilling aids illustrated below. Fig. 6A shows the leveling aid that is clamped onto the boom and held level during the drilling of the attachment holes. The wooden jig in Fig. 6B is clamped to a drill press and the leveled boom drilled as it passes through the guide slot. — *George A. Barry, Jr., W5UQR*

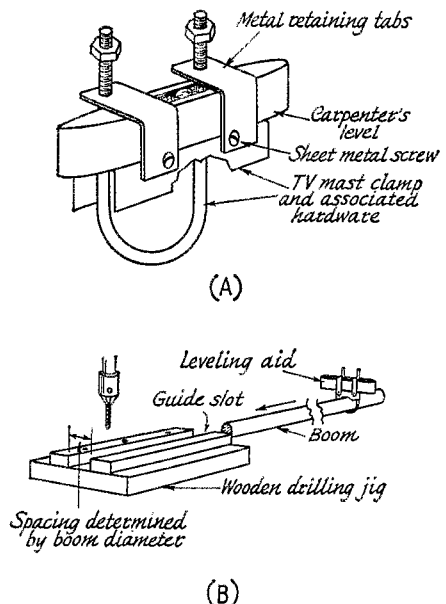


Fig. 6—W5UQR's boom drilling aids.

I.A.R.U. News

INTERNATIONAL AMATEUR RADIO UNION

9G1 AMATEURS QRT

The secretary of the Ghana Amateur Radio Society advises with regret that, effective March 5, all Ghana amateurs were instructed to relinquish their licenses and cease all amateur transmissions. It is sincerely hoped that circumstances will change soon, permitting renewed 9G1 activity.

POLISH FAIR OPERATION

The Polish authorities have granted permission for operation by SM5HF at the Poznan International Fair, June 12-26, using the call sign SM5HF/SP3. A special QSL card will be sent to each station contacted. SM5HF/SP3, set up in cooperation with the Polski Związek Krotkofulowcow, the Polish amateur society, will operate on upper sideband only; preferred frequencies will be 3.793 and 14.220 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, Signal Squadron, RAF, Khormaksar, B.F.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

Austral/Antarctic French Lands: via Malagasy Republic

Australia: WIA, 23 Landale St., Box Hill, E. 11, Victoria

Austria: Oe. V.S.V., Box 999, Vienna 1/9

Azores: via Portugal

Bahama Islands: Bahama Amateur Radio Society, Box 913, Nassau

Bahrain: (All MP4) Ian Cable, MP4BBW, P.O. Box 425, Awali

Barbados: Amateur Radio Society of Barbados, Highgate Signal Station, Flagstaff Road, 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

Bulgaria: Box 830, Sofia

Burma: B.A.R.T.S., P.O. Box 800, Rangoon

Burundi: via Congo (9Q5) QSL Bureau

Canal Zone: Ralph Harvey, KZ5RV, Box 407, Balboa

Cape Verde Island: Radio Club de Cabo Verde, C.R.I.A.A., Praia, Sao Tiago

Caroline Islands: Father Jack Walsh, Xavier High School, Truk

Cayman Island: via Jamaica

Ceylon: 487WP, 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. 3748, Elisabethville

Cook Island: ZKI QSL Bureau, % Radio Station Rarotonga, Rarotonga

Costa Rica: Radio Club of Costa Rica, Box 2412, 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, OZ6IIS, Ingstrup

Dominican Republic: R.C.D., P.O. Box 1157, Santo Domingo

Ecuador: Guayaquil Radio Club, P.O. Box 5757, Guayaquil

El Salvador: Club de Radio Aficionados de El Salvador, QSL Bureau, P.O. Box 517, San Salvador

Ethiopia: Kagnev Station Amateur Radio Club, ET3USA, APO, New York, N. Y. 09843

Faeroes Islands: P.O. Box 184, Torshavn, or via Denmark

Fiji Islands: P.O. Box 184, Suva

Finland: S.R.A.L., Box 10306, Helsinki 10

Formosa: (BV1US calls only) Taiwan American Radio Club, USARSCAT, Box 8, APO, San Francisco, Calif. 96263

All other BV stations: QSL Bureau, C.R.A., Box 2007, Keelung, Taiwan, Rep. of China.

France: R.E.F., Boite Postale 26, Versailles 78

France: (F7 only) F7 QSL Bureau, % Base MARS station APO, New York, N. Y. 09083

French Oceania: Radio Club Oceanien, P.O. Box 374, Papeete, Tahiti

Germany: (DL4 & DL5 only) MARS Radio Station, Hqtrs. 12th Signal Group, APO, New York, N. Y. 09046

Germany: (Other than above) D.A.R.C., Box 99, 8 Munich 27

Ghana: G.A.R.S. QSL Bureau, P.O. Box 3773, Accra

Gibraltar: RAF Amateur Radio Club, New Camp, RAF Gilbert and Elliot c. Charles W. Adams, VRI A % P. and T. Dept., Betio, Tarawa

Great Britain (and British Empire): R.S.G.B. QSL Bureau, G2MI, Bromley, Kent.

Greece: George Zarakis, P.O. Box 564, Athens

Greece (SV6s only): Signal Officer, Hqtrs. JUSMAGG, APO, New York, N. Y. 09223

Greenland: via Denmark

Greenland (KG1, OX4 and OX5 calls only): KG1A-KG1E (OX5) to MARS Director, OX5BX, APO, New York, N. Y. 09023. KG1F-KG1Z (OX4) to MARS Director, OX4FR, APO, New York, N. Y. 09121

Guam: M.A.R.C., Box 445, Agaña, USPO 96910

Guantanamo Bay: Guantanamo Amateur Radio Club, Box 74, FPO, New York, N. Y. 19593

Guatemala: C.R.A.G. P.O. Box 115, Guatemala City

Haiti: Radio Club d'Haiti, Box 943, Port-au-Prince

Honduras: Jacobo Zelaya Jr., HRIJZ, Bo. Buenos Aires, 13 Calle 505, Tegucigalpa, D. C.

Hong Kong: Hong Kong Amateur Radio Transmitting Society, P.O. Box 511

Hungary: H.S.R.L., P.O. Box 214, Budapest 5

Iceland: Islenzkir Radio Amatorar, Box 1058, Reykjavik

DX OPERATING NOTES

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

United States Reciprocal Operating Agreements currently exist *only* with: Australia, Belgium, Bolivia, Canada, Colombia, Costa Rica, Dominican Republic, Ecuador, Luxembourg, **Paraguay**, Peru, Portugal, Sierra Leone and United Kingdom. Several other foreign countries grant FCC licensees amateur radio operating privileges on a courtesy basis; write headquarters for details concerning a particular place.

Third-Party Restrictions

Messages and other communications — and then only if not important enough to justify use of the regular international communications facilities — may be handled by U. S. radio amateurs on behalf of third parties *only* with amateurs in the following countries: Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Greenland (XP calls only), Haiti, Honduras, Israel, Liberia, Mexico, Nicaragua, Panama, Paraguay, Peru and Venezuela. Permissible prefixes are: CE CM CO CP EL HC HH HI HK HP HR OA PY TI VE VO XE XP YN YS YV ZP and 4X. CANADIAN radio amateurs may handle these relatively unimportant third-party messages with amateurs in Bolivia, Chile, Costa Rica, El Salvador, Honduras, Mexico, Peru, U. S. and Venezuela. Permissible prefixes are: CE CP HR HK OA TI W XE YS and YV.

DX Restrictions

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

Cambodia, Indonesia (including West New Guinea), Thailand and Viet Nam¹ forbid radio communication between their amateur stations and amateur stations in other countries. U. S. amateurs should not work HS XU 3W8 or 8F. CANADIAN amateurs may not communicate with Cambodia, Indonesia, Laos, Thailand, Viet Nam and Jordan. Prefixes to be avoided are HS JY XU XW8 3W8 and 8F.

¹ KIYPE/XV5 has permission for international communications from U.S. and Vietnamese administrations and is authorized to handle third-party messages with U.S. amateurs.

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, 24 Wicklow St., Dublin 2
Israel: I.A.R.C., P.O. Box 4099, Tel-Aviv
Italy: A.R.I., Viale Vittorio Veneto 12, Milano 401
Jamaica: Mr. Lloyd Alberga, Jamaica Amateur Radio Association, 76 Arnold Rd., Kingston 5
Japan: (JA only): J.A.R.L., Box 377, Tokyo Central
Japan: (KA only): F.E.A.R.L. -M-, APO, San Francisco, Calif. 96525
Johston Island: KJ6BZ, 5% MARS Stn., Oct. 1, 1957 Comm. Op., APO, San Francisco, Cal. 96305
Kenya: RSEA QSL Bureau, Box 30077, Nairobi
Korea: Korea Amateur Radio League, Central Box 162, Seoul
Korea: (HL9) HL QSL Bureau, Signal Section, USFK/EUSA, APO, San Francisco, Calif. 96301
Kuwait: Alhaj Nasir H. Khan, 9K2AN, P.O. Box 736, Kuwait, Persian Gulf
Laos: Houmphanh Saignasith, XW8AL, P.O.B. No. 46, Vientiane
Lebanon: R.A.L. QSL Bureau, P.O. Box 1217, Beirut
Liberia: Liberian Radio Amateur Ass'n., Post Box 1477, Monrovia
Libya: 5A QSL Service, Box 372, Tripoli
Liechtenstein: via Switzerland
Luxembourg: R. Schott, 35 rue Batty Weber, rech sur/-Alzette
Macao: via Hong Kong
Madeira Island: via Portugal
Malagasy Republic (Madagascar): P.O. Box 587, Tananarive
Malawi: 7Q7RM, P.O. Box 472, Blantyre
Malaya: QSL Manager, M.A.R.T.S., Box 777, Kuala Lumpur
Maldives: via Aden
Malta: R. F. Galea, 9111E, "Casa Galea," Railway Road, Birkirkara
Mariana Islands: see Guam
Marshall Islands: KX6 QSL Bureau, via KX6BU, Box 444, FPO, 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, Box 14, FPO, San Francisco, Calif. 96643
Monaco: Pierre Anderhalt, 3A2CN, 49 rue Grimakli
Mongolia: JT1KAA, Box 639, Ulan Bator
Morocco: A.A.E.M., P.O. Box 2060, Casablanca
Mozambique: L.R.E.M. QSL Bureau, P.O. Box 812, Laurencio Marques
Netherlands: V.E.R.O.N., Postbox 400, Rotterdam
Netherlands Antilles: 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: QSL Bureau, P.O. Box 1044, Samaru, Zaria
Northern Ireland: via Great Britain
Northern Rhodesia: See Zambia
Norway: N.E.R.L., P.O. Box 898, Oslo Sentrum, Oslo 1
Nyasaland: See Malawi
Okinaua: O.A.R.C., APO, San Francisco, Calif. 96331
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 1
Papua: VK9 QSL Officer, P.O. Box 204, Port Moresby (or via Australia)
Paraguay: R.C.P., P.O. Box 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
Rhodesia: R.S.S.R., P.O. Box 2377, Salisbury
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 96920
Saudi Arabia: HZ1AB, 7244th ABRON-COMM., APO, New York, N. Y. 09616
Scotland: via Great Britain

(Continued on page 152)



Correspondence From Members -

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

W6ZH

☐ Dear President Hoover:

The membership of the Potomac Valley Radio Club of the Greater Washington, D.C. area wishes to express its regret over your decision not to be a candidate for re-election to the office of President of the American Radio Relay League, and, at the same time, to offer a sincere expression of appreciation for your four years of dedication to amateur radio during your term of office. The achievements realized during this period, with the benefit of your leadership, have been significant and we believe that a substantial beginning has been made toward improvement of the Amateur Radio Service and enhancement of the amateur image. We would have preferred to have you continue to direct this vital effort, but can understand your desire to attend to other demands of your business and private life . . . — *Carl Anderson, K3JYZ, President, PVRC, Silver Spring, Maryland.*

☐ . . . I know that I am speaking on behalf of all my colleagues in the RSGB when I say that your absence will be felt, not only in the U.S., but also wherever amateur radio is known . . . — *R. F. Stevens, G2BVN, President, Radio Society of Great Britain.*

☐ . . . It was with very real regret that I read the news and your decision to resign. I think I speak for the vast body of amateurs in saying that you brought order out of chaos in the amateur world. Your untiring efforts must bring forth good fruit. Certainly they demand the respect and support of all good men.

It has been indeed a great honour to have worked with you and to have shared your confidence in many important matters, and it is my earnest hope that I can look forward to your continuing friendship in the future . . . Every amateur in the radio world is indebted to you for your notable contribution in the highest office open to an amateur. — *Henry L. Wilson, EI2W, Dublin, Ireland.*

☐ . . . I feel I should express my most sincere thanks to you for your great contribution to amateur radio. The contributions of you and your late father have helped shape the destiny of amateur radio throughout the entire world for all time. Amateur radio owes you both a debt of gratitude that will never be repaid. Please accept my warmest and most heartfelt thanks as a token payment on this debt.

I can only speak for myself, Mr. Hoover. I know there are many that feel as I do. Please accept our plaudits for a good job well done. — *Dan Umberger, W8ZCQ, Columbus, Ohio.*

☐ . . . I am extremely sorry to know of your decision. I have always admired your handling of people, your judgement and sagacity. The American Radio Relay League and the International Amateur

Radio Union will feel your loss very severely . . . — *Anthony Pita M., XE1CCP, President, Union Interamericana de Radio Aficionados (Region II IARU).*

☐ The Foundation for Amateur Radio wishes to express its sincere regret at your decision to retire as President of the ARRL in May. As President, you have, by your devotion to the task, increased the stature of ARRL in the eyes of the government, military forces and radio amateurs throughout the world. It is recognized that this was accomplished at considerable personal sacrifice. The Foundation and its officers have had the pleasure of working with you, and we trust that our association will continue in the future. We wish you continued success and good health. — *Cleo N. Busbey, K3LYJ, Secretary, Foundation for Amateur Radio, Washington, D.C.*

☐ . . . Though I very well understand the reasons behind your wish to be relieved of the heavy burden of the world's most important amateur office, I must express how deeply we all shall feel the loss of your good guidance and work for the common interests of all amateurs . . . — *Per Anders Kinnman, SM5ZD, Vice-Chairman, Region I IARU.*

☐ . . . I know that everyone who has any interest in ARRL will deeply miss your steady hand, so available during the last four years, on the controls . . . I can assure you that each and every one of us will greatly miss the steady influence and far-seeing guidance that you have provided during your tenure of office . . . — *Morton B. Kahn, K4KR, Boca Raton, Florida.*

WHY FEWER NEWCOMERS

☐ You invite comment about the dwindling number of new amateurs. It seems to me you may be confusing the means with the end. First, let us ask ourselves if, in fact, an ill wind doesn't sometimes blow some good? What is our motive for wanting an ever-increasing number of amateurs? Is not ARRL a League of existing amateurs and not a promotion scheme? Would not fewer, but better quality amateurs be to our advantage in the long run? And finally, would not a policy, both on an individual and League basis, of attraction based on merit and service, rather than one of promotion, be wise?

The "causes" you give are all plausible — but you notice they shake out exactly the undesirables. The ones who settle for CB wouldn't make good hams anyway, and the ones who are scared of a \$4 fee aren't too seriously interested in the game. We also have to consider long-range trends as well as localized swings in any phenomena of natural growth. A cumulation of post-war trends has seemingly come into focus; the result may well be a more realistic growth rate.

You are so right: Amateur radio does not offer

the glamour or incentive of old. What boy will be fascinated to work across the country when he can direct dial the same place? When he can pick up the paper and read of radio control in the vicinity of Mars, it doesn't seem so much to send a signal across the Pacific. And a CB set in every laundry truck has spoiled local fun.

Our modern sets are so well-engineered that few of us can afford to build our own any more. It isn't only ham radio: motoring, flying and boating have all been so commercialized and standardized that there is little thrill any more. Even our QSOs are standardized. I tell someone I just worked a station in Japan. "Oh? What did he say?" I mumble something about my signals getting through good and his name is Tohru and he sends best regards. The casual visitor will think to himself, "This nut spends a thousand dollars and sits up all night just to find out some guy's name is Tohru in Japan . . . not much of a hobby, is it!"

Remember when motorists used to get together, and spin great stories of their autoing feats — how many miles to the gallon, how to best pull Liberty Hill or dead man's curve? The trip itself was fun, and the vehicle an object of intense interest. Nowadays, a car is just a standardized bit of transportation. Some of us may notice the manufacturer, but if it runs, that is about all we ask, and even fewer of us know what is under the hood any more. Ham radio is going the same way. I buy a set to give me a certain number of watts into an antenna. Sure, I study the book, but still am not too sure of all those trick circuits. Neither is anyone else.

I am a commercial operator, yet cringe whenever anyone asks me my occupation, so low has it sunk in public esteem. I generally tell people I steal money from churches in order to live. If you think I am exaggerating, take a listen to the sloppy way coast stations handle marine traffic on any band. Then you will see why amateur radio is still fascinating to me: It's the only place where any good operators are left. Leave us worry about quality, and not be alarmed about quantity. It will stabilize at a more realistic point that will be better all around. — *Ben Lane, W7FNE, Seattle, Washington.*

THE INVISIBLE TOWER

¶ Congratulations to W8HXC on a wonderfully disguised and cleverly written April Fool's article . . . — *Roy Durso, K4DJN, Merritt Island, Florida.*

¶ This letter will serve as your official notice that I will immediately be commencing legal proceedings . . . Relying on your having checked the article for technical feasibility and correctness, I decided to apply this solution to my own problems: a small yard, unfriendly neighbors and an annoyed XYL. After many phone calls, enquiries and discussions with all of the local paint companies (whose chemists read the article with great interest) I was finally successful in obtaining a batch of paint.

Following your advice to "act safely," I obtained the loan of a good ladder and started. It was only reasonable to start at the top and therefore I first painted the beam, rotator, coax and upper part of the tower. As I was moving down, some paint accidentally spilled on some of the lower rungs. The covering power of the paint was so good that I couldn't see the rungs. Naturally, the inevitable happened and I fell 35 feet to the ground and all of the paint splashed on me.

After the initial pain of my broken leg and arm

subsided, I called QRRR, SOS and MAYDAY. The XYL came out but she couldn't find me. The paint had covered me completely and I was invisible. She and my children looked for me for six hours, but finally gave up — they thought I was playing hide and seek. Finally she listened to what happened and believed that I was hurt. We couldn't think of a solution, although my children thought I was more talented than Batman.

An ambulance was called to take me to the hospital, but when it came, the attendants couldn't find me. When the XYL tried to explain what happened, they took her away for a mental examination. She prevailed upon the attending doctor (also a ham) to investigate. He spoke to me and he called in several specialists. After consultations with the chemists from the paint companies, the Regional Radio Inspector of the Department of Transport and a professor of chemistry at the university, a plan was formulated.

Their decision was to spray my whole yard with a different paint so that I could be found. The color chosen was bright green. This was done and I was finally taken to the hospital and treated.

Fortunately, I am now well on the road to recovery but I still have a complexion problem. Evidently the tower paint that fell on me has a wave length that is in perfect resonance with my skin, and this obviously had the effect of causing perfect resistance on the capacitance of my original pigmentation. Alas, for the rest of my days my skin will be bright green.

Therefore, be advised that my claim is for special, general and punitive damages. The claim is based on the breach of warranty that all articles in *QST* are thoroughly researched, and on the ancient legal maxim "De Minimus Non Curat Lex" — the law does not concern itself with trivialities. — *Jack M. Chapman, Q.C., VE4AE, Winnipeg, Manitoba.*

¶ . . . I think it is a good argument, but if it worked, think of all the invisible people there would be. I shall never go to Mr. Turner for psychological information. — *David M. Weintraub, WB2KSC, Huntington Station, New York.*

¶ . . . The paint should sell readily if put up in pressurized spray cans. A set should include a second can of black or similar color to pin stripe the tower against bird collisions, and to spray the nozzle on the first can. Otherwise there is danger an incautious operator might not see the nozzle pointing at himself, which might cause partial or entire disappearance of the painting operator. Unless restored, starvation would result.

On second thought, such a gift would be appropriate for some DX hogs. — *Betty Deck, W1GJVF, Palo Alto, California.*

¶ . . . After securing the necessary ingredients at the local paint store, I proceeded homeward to mix up a batch. Unfortunately, the following day the XYL, who had watched the mixing operation with some pleasure, concluded that the paint was to be applied to the exterior of the house . . . which has been in need of paint for some time.

Upon returning home the following day, hungry, tired and in need of some rest after a hard day at the water cooler, I found, instead of my home, merely a vacant lot where I used to live. Is there some way to neutralize this paint? — *R. R. Sines, K6OCU, Mountain View, California.*

(We suggest you write W8HXC, if you can find him! — EDITOR)

QST

Class B Audio Revolutionizes Amateur Phone Transmission

In this era of single sideband, with amplitude modulation on the road to joining Lo, the Poor Indian, the Class B plate modulator is venerable enough to be an authentic antique. Introduced almost thirty-five years ago, it caught on instantly in the amateur world—more rapidly, probably, than any other technical innovation one could name. And more than any other development, it made phone practical and popular—practical, by simplifying the adjustment of a phone transmitter; popular, because it made it possible to develop as much carrier power on phone as on c.w., from a given final stage. Until that time, adjusting a phone transmitter had been tricky and the useful power output was low; witness the description of a "modern" phone transmitter by Ross Hull in last month's classic.

November 1931 QST carried the first published information on Class B audio—the article by the inventor, Loy E. Barton, which is reproduced here. QST's technical editors followed it up by an article in the December issue showing how to apply it—including how to design and build the modulation transformer, none then being available! Space permits showing only the initial pages of that article; besides, who'd be interested in winding a modulation transformer today?

transformer. The bias must be fixed and the source should have low resistance. The use of mercury hot cathode rectifiers together with a liberally designed plate power transformer and a special reactor will maintain a practically constant plate voltage supply.

APPLICATION TO AMATEUR PHONE TRANSMITTERS
The method of calculating the audio power required for plate modulation in a class C r.f. power amplifier system has been given and also the

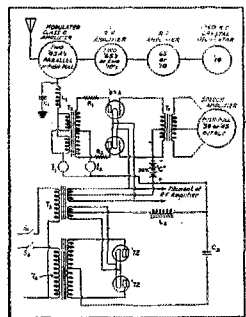


FIG. 6—SCHEMATIC ARRANGEMENT OF THE CLASS B AUDIO AMPLIFIER ADAPTED TO MODULATE A 200-WATT PHONE TRANSMITTER
L₁—Radio-frequency choke.
L₂—Radio-frequency filter reactor.
T₁—Radio-frequency transformer, 500:1 r.f. or 50:1.
R₁ and R₂—Plate current limiters, 1500 ohms.
R₃ and R₄—40-ohm surge suppressor resistors.
R₅—Filament current limiter primary resistors.
T₂—Special modulator transformer, double secondary.
T₃—Filament transformer for rectifier and transmitter tubes.
T₄—Plate supply transformer.

method of calculating the effective resistance into which the audio power is supplied. With this information and a method to determine the output power of the modulation system, a phone transmitter may be designed with the minimum cost of equipment for any particular power output.

A sample modulation system for a 200-watt 100% modulation system is shown in Fig. 6. The voltage-regulating method described in October QST would be applicable. See "Class B—Improving the Voltage Regulation of the Power System," QST, Oct., 1931.—Editor.

in the class C r.f. amplifier with 2000 volts supplied to the plate through the transformer secondary. The current to these tubes should be limited to 200 ma. or 400 ma. peak signals. Class C amplifier. This is the same power permitted to the class C tubes operating at 1000 volts to the plate. The 2000-volt tubes require a plate supply separate or different from that shown in Fig. 6. If the 2000-volt supply is separate, the Type 72 rectifier tubes may be replaced with Type 65 tubes. The 65 tubes also may be used for the system as shown if the total output of the rectifier does not exceed about 400 ma. peak signals.

The class B audio amplifier may be adapted to low-power transmitters for modulation by using 841 tubes. The output of two 841 tubes as class B amplifiers will supply enough power to completely modulate an input of about 40 watts to the class C output amplifier. The low power equipment also will require audio transformers—especially designed for the power requirements.

Any change in plate voltage and current to the r.f. output tubes, or change in plate voltage on the class B tubes, from the values recommended should first be studied to make sure that the modulators and class C tubes will not be

overloaded. Under normal operation, when transmitting speech, the modulator tubes will probably not show any color on the plate. If the transmitter is being whining into the microphone to supply a continuous note, the modulator plates will become red if the full output is obtained.

The above system of modulation of a class C output amplifier is perhaps the cheapest and simplest transmitter to build for a given r.f. power output with 100 percent modulation. Another feature which should appeal to the amateur is that when speaking into the microphone he can see things "happening"; that is, the modulator current jumps and if the antenna meter is not too sluggish it will also show signs of life. These variations in the antenna meter operator that he is modulating to a high percentage and that his signal range is the maximum for the particular power output.

Complete constructional details of a low-power phone transmitter using class B modulation will be presented in QST in a forthcoming issue. It won't be a low-power transmitter, either. It will deliver a 40-watt carrier completely modulated even though it contains no tube larger than a Type 10.—Editor.

The plate supply circuit is the usual type of full-wave rectifier circuit that L₂ is a special filter reactor designed to improve regulation. The filament transformer is separate from the plate transformer so that the hot-cathode mercury tubes can be heated before the plate supply switch is thrown. The filaments of all tubes may be left on during silent intervals, thereby requiring a minimum time to start.

The secondary of T₁ is arranged for either series connection of the two secondary windings or parallel connection as shown. The series connection permits the use of Type '52 or '60 tubes

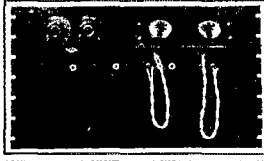
QST

High-Power Performance From the Small 'Phone Transmitter

A Class B Modulator for Sets Using Type '10 Tubes

By James J. Lamb, Technical Editor, and George Grammer, Assistant Technical Editor.

ACTUAL application of a Class B push-pull audio-frequency power amplifier to the business of modulation in a low-power amateur 'phone transmitter, promised in last month's QST, has justified fully the expectations issued by Loy E. Barton's article introducing the system to amateur radio in our November issue. In that article it was shown how a pair of Type '03-A tubes in push-pull as Class B modulators could duplicate the performance of ten 845's as Class A modulators, providing sufficient audio power to modulate 100% some 400-watt plate input to a Class C r.f. amplifier using a pair of 50-watt or 75-watt tube tubes—and do it with much better efficiency and economy than the Class A modulator. With this amplifier the plate circuit efficiency, this would mean carrier output of approximately 200 watts—real high power for the amateur bands where carrier powers of 30 watts and less are the general rule. Because of this and also because experience has taught us that it is a good idea first to acquire familiarity with new equipment in a low-power version, the Class B unit described in this article has been built and is being offered for sale as intended to be used as the audio end of a 'phone transmitter which need employ no tube larger than a Type '10 and a plate supply no greater than 500. Despite the smallness of the tubes and the low plate voltage, the transmitter using this Class B unit is capable of delivering a 30- or 40-watt carrier with 100% modulation, as attested by actual measurements of its performance. Here is a striking case illustrating that this old game of amateur radio "do move". The application of Class B modulation gives this little



THIS COMPACT UNIT MORE THAN DOUBLES THE POWER OUTPUT OF THE PHONE SET WINDING. WITH A PUSH-PULL TYPE '10 CLASS B MODULATED TUBES, WHEN IT BEING USED TO CLASS A MODULATORS COMMONLY USED.

transmitter practically the same output rating as the new historic QST 'phone transmitter that marked the beginning of the 100% modulation era back in April, 1929. In contrast to the little set illustrated and described here, that transmitter wound up with a pair of Type '52's as linear Class B r.f. amplifiers, required plate supply of 800 and 2000 volts, and represented an outlay of about eight hundred dollars. Its rated carrier output was only 37.5 watts with 100% modulation. At that time, modulation of the '52's operated as a Class C amplifier to obtain maximum power from this stage would have called for a Class A modulator using a pair of Type 49's (200 watt audio output) and a 3000-volt plate supply! Today the same could be done by a pair of much smaller Type '03-A tubes as Class B modulators operating at a plate voltage of but 1000. Enough said.

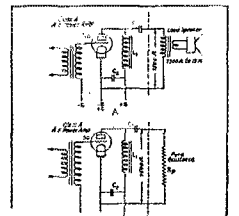
Duplication of the Class B unit in both construction and performance should not be difficult to one having a sound understanding of the major modulation principles, provided the design features and operating precautions to be described in detail are observed closely. A brief summary of these essentials will clarify what is to follow.

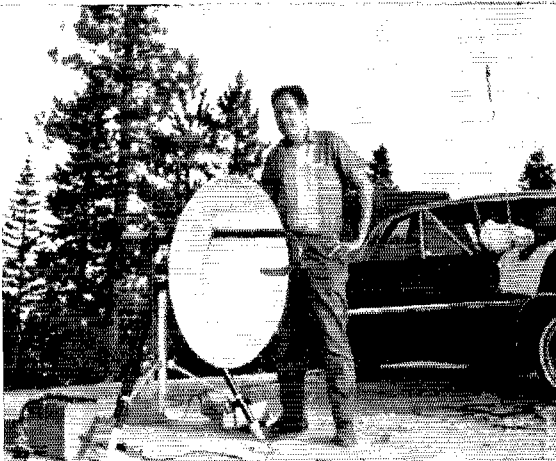
FUNDAMENTALS TO BE OBSERVED

First, the modulating system must effect an increase in antenna power. Although it is customary to think of modulation in terms of current amplitudes, voltage swing and the like, it is essentially the variation in transmitter power output that gives us modulation. As Mr. Barton shows in the article referred to previously, the

increase in antenna power required for 100% modulation is 50% of the unmodulated carrier power when the modulating signal is sinusoidal. This should not be confused with the so-called "instantaneous peak power." Needless to say, this additional power must be supplied from some source, something cannot be obtained from the amplifier. And this source within the modulation system be called "Heising," "grid," "error-grid," or something else. Where the modulation system operates directly to vary the power input to the modulator, r.f. amplifier plate circuit, as in the Heising system, it is necessary to supply audio-frequency power equal to 50% of the steady (d.c.) plate input to the modulated amplifier. Modulation systems of the type that use an audio-frequency voltage to vary the r.f. amplifier grid bias or screen-grid voltage, or in which the r.f. amplifier is supplied with modulated filament current, are not subject to this rule. Less audio-frequency power may be required for complete modulation, as compared with the systems in which the plate input power is modulated, but the requirement of 50% increase in antenna power must be met just the same. These modulation systems, in effect, operate to modulate the plate circuit of the amplifier.

modulation and sound as it was in "A." Progressing to "C", the audio amplifier (now designated a modulator) has as its plate load the plate circuit of a Class C r.f. amplifier. The value of the load resistance being made proper by adjusting the steady input to the r.f. stage to 40 ma. at 300 volts—4000, dividing out by 100, is of course the same 7200 ohms. This particular audio





Glen Tomlin, WA6KKK, with his 5800-Mc. equipment atop Sentinel Dome, Yosemite National Park, ready for the 117-mile work with WB6JZY/6.

Breaking the 5650-Mc. Record

BY J. E. TROLLMAN,* WB6JZY

SATURDAY, September 25, 1965, was a dull gray morning in the Bay Area, but it was to be a rather special day for a few amateurs. The group at WA6LET was busily working 432-Mc. moonbounce using the Stanford 150-foot dish (see November, 1965, *QST*, p. 101) and later on that afternoon if we were lucky, a distance record on the 5650-Mc. band that had stood since 1957 would be broken.

Glenn Tomlin, WA6KKK, was on his way to Sentinel Dome, an 8200-foot peak in Yosemite National Park. In the parking lot at the end of the road near the 7900-foot level he was to set up his 5800-Mc. equipment and two-meter rig. The schedule was for 2 P.M. I was to call him on 145.6 Mc. as soon as I arrived at the top of 4370-foot Mount Hamilton, east of San Jose. We were to proceed with the microwave contact from there.

Line-of-sight distance between these two locations is 117 miles, representing slightly more than 153 db. of free-space attenuation. Our combined antenna gains of 64 db. (32 db. over isotropic per 3-foot dish) left us with roughly 89 db. of total attenuation. At two meters this represents the attenuation one would see between two half-wave dipoles five miles apart. With the output powers we were running and receiver sensitivities involved, this *theoretically* gave us close to a 25-db. margin. Hopes were high, since two previous tests had shown actual signal levels to be very close to calculated values. The only other apparent unknown was the possibility of a temperature inversion across the San Joaquin valley. Fortunately for us, the wind had been blowing steadily out of the Northwest for several days. This helped prevent inversion layers from forming, so we weren't too concerned.

I finally left at 11:30 A.M., after numerous rechecks of the equipment check-list. On the

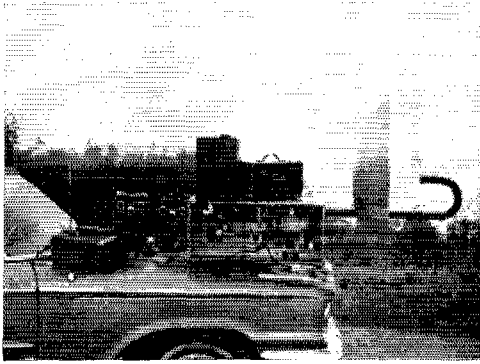
* Ex-W0UBA, 1920 Hackett Ave., Mountain View, Calif.

way to Mount Hamilton I picked up W6OSA with his portable tape recorder and WA6BQO and his 5800-Mc. system he wanted to try. We arrived on top of Mount Hamilton around 1:30 P.M. It was sunny and clear at the 4300-foot level but haze and smoke from forest fires north of us obscured the peaks on the coast range we had planned to use for landmarks. About that time I also remembered an item I had left off the check-list: the transit for measuring antenna azimuth headings. To further complicate matters, there were very few places along the road with room enough for use to set up the equipment. The one spot we did find did not have a clear view to the East.

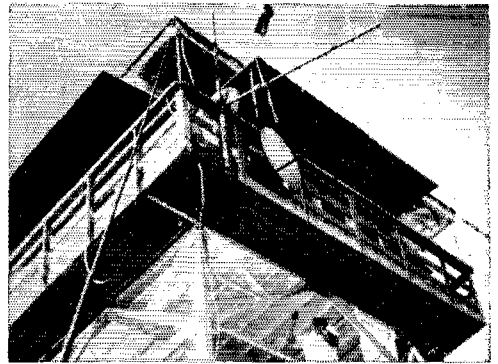
Down the road, about a quarter mile to the east of the Mount Hamilton observatory, is a fire lookout tower on Copernicus peak. We knew that it would not only have a clear shot to the east but would also have a siting transit for spotting fires. Will went up and asked the lookout if we could set up on the tower. He was happy to have visitors and quite interested in our project, so up we went.

The tower was about 250 feet above the highest parking place so there was some puffing before we got the equipment to the top. We were late for our schedule, so the first piece of equipment to go up was the two-meter rig. A 7-element yagi, the same one used in my Oscar III operations, was tied to the flagpole and pointed roughly in the direction of Yosemite.

The Sidewinder receiver cracked as Will soldered the Twin-Lead to the balun. A tremendous carrier was parked on 145.6 Mc., our scheduled frequency. When Glenn's voice started modulating it, we breathed somewhat easier. Glenn reported everything working and the microwave rig was warming up. Another four or five trips up the hill later, Les, Will, and I had the rest of the equipment on the tower. With the klystrons warming up, a careful siting



Equipment used by WB6JZY/6, Copernicus Peak in breaking the 5650-Mc. record. This is definitely not a mobile setup; the gear was carried up to the fire lookout tower shown in the other photo.



Copernicus Peak fire tower, near Mount Hamilton Observatory, with the 2-meter and 5700-Mc. antennas of WB6JZY/6 in place.

was made in the direction of 071 degrees with the fire spotting transit. Looking through the small hole in the center of the dish, I lined up the feed horn so that its center appeared on the horizon directly above the landmark sited in the transit. A stack of old *QST*'s under the back end of the system served as elevation control for the antenna since it was bolted firmly to the enclosure containing the waveguide plumbing.

"Are you all set, Glenn?" I asked over the two-meter link. "Yes, anytime," he said. "OK, I'll transmit to you first, my i.f. strip isn't connected yet," I returned. I then flipped on the transmitter klystron with 1-ke. modulation and adjusted the repeller voltage for proper cathode current. About ten seconds later Glenn came back on two meters and said, "OK, I hear you, you're very loud but let me peak things up here."

Glenn peaked his dish for maximum signal strength. He then re-transmitted the 1-ke. note back to me on two meters and I peaked my antenna. Surprisingly, neither of us was much more than two degrees off in azimuth or elevation. Everyone was all smiles; we had the path, no inversion; now all we had to do was make it a two-way and exchange signal reports. I quickly connected the B+ and the audio amplifier to the i.f. strip. A blast of noise out of the speaker assured us it was working. As the l.o. klystron popped into its proper mode, the receiver went dead. At first I thought something had quit but just then the noise started coming up, finally reaching its original level. It was only Glenn's 5920-Mc. signal quieting the f.m. i.f. strip completely. With the 3-Mc. bandwidth it didn't take long for one or both of our klystrons to drift out of the bandpass, however.

At 2217 GMT we made the contact official by exchanging 599 signal reports both ways. As near as we could tell by ear and memory, the signals were very close to the 25 db. over the noise that we had calculated. With the transmitters separated by the i.f. of 80 Mc., it was possible to operate full duplex, once the klystrons had stabilized. After completing the m.c.w.

contact and recording it on tape, we voice-modulated the klystrons by applying the audio voltage from an amplifier to the klystron repeller.

This worked very well except it was difficult to keep all klystrons on frequency. An a.f.c. loop would have helped considerably. As it was we were able to carry out a telephone-quality conversation for about fifteen minutes, interrupted only by occasional jumps in frequency caused by line voltage changes. At times the scolding of some hungry Yosemite jays was audible on Glenn's signal.

After this test was completed, we added 16 db. of path loss to the system by replacing my 3-foot dish with a small horn. The horn gain, 16 db. less than the dish, is equivalent to an increase in line-of-sight path length of approximately 780 miles. The f.m. phone was still readable but noisy. There would have been no problem at all with m.c.w., over the simulated 897-mile path.

Will, WA6BQO, then fixed up his transmitter on 5840. He was using a 1-watt klystron similar to Glenn's and a polplexer feed for his 3-foot dish. After a bit of tuning Glenn found his signal. It was somewhat weaker but it fully quieted Glenn's receiver.

It was a very interesting afternoon.

System Descriptions

While each system is basically nothing more than a modulated-oscillator transmitter and a superhet receiver, their operation is quite different in several ways. Glenn's system is a Varian K841A klystron mechanically retuned to 5920 Mc., acting as both transmitter and receiver local oscillator.

The klystron is mounted on one arm of a hybrid-T (waveguide directional coupler). A load is mounted on one output arm and the antenna on the other. On the fourth arm, a wavemeter and crystal detector/mixer are mounted. Energy from the klystron splits two ways, half into the load (wasted) and half into the antenna,

(Continued on page 148)

Hamfest Calendar

Alberta — The annual Central Alberta Radio League Picnic will be held at Pine Lake, June 18 and 19 this year. The CARL extends a warm welcome to all.

Alberta — The Waterton-Glacier International Hamfest will be held this year in Glacier National Park on June 23 and 24.

California — Don't forget the 10th Annual W6SD Hamfest which is jointly sponsored this year by the San Fernando Valley Radio Club and the LERC ARC. Exhibits, speakers, contests, refreshments and prizes. Winners of the grand prize and 2nd grand prize do not have to be present. For information, send SASE to Hamfest Committee, 2814 Empire Ave., Burbank, California 91504.

Illinois — The Western Illinois Radio Club is sponsoring a Hamfest at Eagles Alps in Quincy, Ill. on Sunday, June 19. Tickets are \$2.00 advance, \$2.50 at the gate. Tickets from Pat Hardin, 2040 Payson St., Quincy, Illinois 62301.

Indiana — The Tri-State College ARC is holding its Seventh Annual F.M. Picnic on Sunday, June 12. For information, write WA2YJX, Tri-State College ARC, Tri-State College, Angola, Indiana 46703.

Kentucky — The annual Mo-Ark-Ky Hamfest, sponsored by the Paducah ARC, will be held on Sunday, July 10 at Noble Park Community House in Paducah. This will be an all-day affair with a big noon meal available. No registration fee. Information from U. C. Morris, W4KCH, 3628 Gregory Ave., Paducah, Kentucky.

Missouri — The annual HBN picnic will be held June 19 at Warsaw. Pre-registration is \$1.00, \$1.25 at the picnic. Send pre-registration to WA0HWJ.


Nebraska — The Pine Ridge ARC will hold their annual Hamfest, which is a picnic for all amateurs in the tri-state area of Nebraska, Wyoming, and South Dakota, at Chadron State Park, Chadron, Nebraska, June 5.

Nebraska — The Tri City ARC picnic will be held June 19 at Scottsbluff.

New York — The Penn-York Hamfest will be held Saturday, June 18 at the Administration Building at Harris Hill, just off Route 17E, west of Elmira. Banquet and awards at 6:30 p.m. Advance registration is \$5.00, \$6.00 at the door. Tickets from W. P. Lightfoot, R.D. 1, Corning, New York 14830.

Pennsylvania — The Somerset County ARC will hold their 2nd Annual Somerset County Hamfest at beautiful Seven Springs Ski Resort at the main lodge on June 19. There will be no admission charge for the day. Swimming available. Seven Springs is just off the Pennsylvania Turnpike at the Douegal Exchange . . . follow the signs. For more information write Somerset County ARC, Box 17, Ursina, Pennsylvania.

Saskatchewan — The Annual Saskatchewan Hamfest will be held this year July 1, 2, and 3. The Hamfest will feature a field day, picnic, banquet and contests, including the famous Fur Lined Button Hole Trophy for the liars contest. Registration on July 1, S.A.R.L. and ARRL meetings and banquet on July 2, and field day and picnic on July 3. For further information contact the Hamfest coordinator, VE5JU, 2117 McPherson Ave., Regina, Saskatchewan.

West Virginia — The third annual picnic of the Tri-State ARA will be at Camden Park, U.S. 60 West, Huntington, West Virginia, 12 noon until 6:00 p.m. Sunday June 19. Single ticket \$1.00, Family \$2.00. Swap Shop, Surplus, and equipment displays. Contact W8VA, Tri-State ARA, 2937 Auburn Road, Huntington, West Virginia. 



June, 1941

. . . In the editorial section, K.B.W. enjoins us all to be more careful in obeying the regs, especially in regard to the business of identification. He's been in some light conversation with the FCC boys and they think we should give not only our own calls but also the call of the other station. Nothing said about ten-minute periods.

. . . Ah, at last! Jimmy McLaughlin, of considerable repute in receiver design, has an article on a single sideband receiver. It eliminates heterodynes and the other sideband than the one we want to listen to. Lots of hams didn't know that all necessary intelligence is carried by one sideband only, the other being superfluous. Not a construction article, since some parts are still unavailable, it tells what goes on. George Grammer, W1DF, in the editorial section tells more about it.

. . . U.S.A. Calling is a new section in *QST* engendered by the approaching national crisis. The many services all want engineering and operating talent.

. . . Vernon Chambers, W1JEQ has a nice article for the v.h.f. man — an inexpensive crystal-controlled ten watter for 56 Mc. Using 6A6 tubes, things start off with a xtal on 7 Mc., rapidly doubling down to 56.

. . . Hey, you 2-meter addicts, better read the article by James H. Green, Jr., W8MYW. He's got some real dope on loop antennas and really digs into this subject. Stacked loops and all.

. . . Fellow writes in to Technical Information department and wants to know if it is all right to build some described gear for his own use. A real careful ham.

. . . Says here that the 6 month average circulation of *QST* is 42,198 of which 621 copies were distributed for free. Wonder who got those? Authors and advertisers, of course.

. . . Byron Goodman, W1JPE (now W1DX), continues his classic studies of keying methods with another good article on tube keying. It seems that there's no single key-click filter capable of doing a good job for all transmitters, hence the development of a "little black box," which is described in the article.

. . . Stable e.c.o.s. are still in a state of development and G. W. Shuart, W2AMN, has some good ideas on improving these devices. He points out that mechanical stability is at least as important as circuit design. The pictures show real rugged construction.

. . . Eleventh A.R.R.L. Sweepstakes results are reported by Joe Moskey, W1JMY. W3BES is the national high scorer. This is the famous Frankford Radio Club of Philadelphia.

. . . K.B.W. has a column about what went on 25 years ago — that's 50 years ago to you who are reading this. Think we'll have a 50 Years Ago column here come next year. — *W1ANA*.

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.

SWITCH TO SAFETY!



QST for



CONDUCTED BY SAM HARRIS,* W1FZJ

432-Mc. Preamplifier, Part II

LAST month we ran a picture of a 432-Mc. transistor preamplifier. We had intended presenting a circuit, but because of a drawing error were unable to do so. Hopefully, it and interior pictures will be in this column. The circuit (see Fig. 3) makes use of the T1XM101 germanium transistor.¹ Specs say that the T1XM101 should give better noise figure at 432 Mc. than the best available silicon transistors. They do, in our experience. Not only that; an effort was required to keep the bandwidth down to 20 Mc. (ATV addicts take note.)

The exterior of the preamp was shown last month, complete with yardstick to give an idea of dimensions. The mounting box is made of brass sheet, primarily because it is easy to bend and solder. The amplifier works the same, in or out of the box, so any protective mounting should suffice.

An interior view and part of the brass box are shown in Fig. 1. The chassis and shield partitions are made from double-coated printed circuit board. The antenna end is at the left. In Fig. 2, the output end is at the left. The positions of the various taps and the approximate sizes of the coils can be seen from these pictures. Feedthrough capacitors are used as standoff bypasses in four places, as indicated under Fig. 3.

¹ The transistor in question is an experimental type by Texas Instruments, presently available in limited quantities and fairly expensive. Other germanium transistors of similar design, but having less rigid specs, are becoming available at very moderate cost. The T1XM05 is one type currently being used widely by amateurs in u.h.f. converter work.

It is also in limited production at this writing, but when obtainable is priced under one dollar.

—Editor

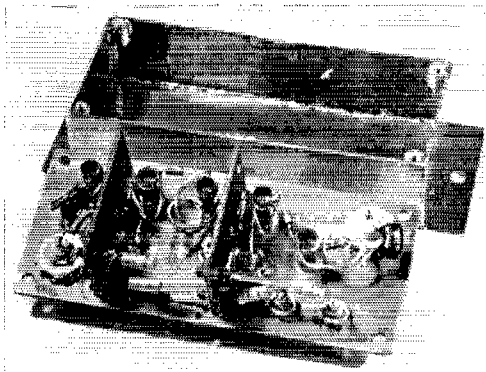


Fig. 1 — Interior of the 432-Mc. transistor preamplifier by K2KWL/KP4, with brass cover in the background.

The power supply should furnish both plus and minus 15 volts with respect to the chassis, as indicated. All coils are No. 16 wire, 3/8-inch diameter. They are resonated at the desired band center using a grid-dip meter. Overall tuning was done with a sweeping oscillator. Like anything else that works well, this preamplifier requires some time in adjustment. This includes setting the various coil taps for optimum performance. The tap positions given will serve as good starting points. Adjustments are made to achieve the desired bandpass, and do not affect the noise figure to any great degree. The input tap is very close to the top of the coil, as the input impedance of the first stage is approximately 50 ohms.

CT3AE Reports on OSCAR IV

To those who worked 50-Mc. DX during the last sunspot peak, the above call will be very familiar. CT3AE, Madeira Islands, meant "Africa" to many of us. Jose reports that after several years of inactivity he got going for OSCAR IV, and was receiving its signals daily during March. Like everyone else, he had little success in copying signals through the translator, hearing only parts of calls and things like DE. He was able to hear his own signal at times, running 500 watts on 144 Mc., and using a log periodic antenna. OSCAR IV signals have run 5 db. over the noise near apogee, and 20 to 35 db. near perigee. CT3AE will be on hand for any future OSCAR activity.

144 Mc. and Up

A couple of the boys from 6 land are in there pitching on 1296 Mc. K6UMV writes that he is spending his spare time on design of different type of feed to use on his six-foot dish on 1296, and also on development of different Yagi configurations. Don sez that 1215-Mc. activity seems to be picking up in the San Fernando Valley with the APX-6 being the major transceiver used. WB6IOM and W6UID are continuing their skeds on 1296 with Del (W6UID) now running 500 watts input using the 2C39 cavity design. The boys are hoping for a contact with someone in the San Diego area but can't seem to locate anyone there on 1296 Mc.

Pete, WB6IOM, has the following suggestion for measuring power at u.h.f. "Take a length of RG-58 cable that has a minimum loss of 10 db. at your operating frequency and immerse it in a few quarts of water, with the unterminated end just out of the water. The input to the cable looks like 50 ohms; load your transmitter into it and read the time required for a five degree change in temperature. The water temperature should be stabilized prior to measurements to about 2.5 degrees below room temperature. If this is done, insulation of the container is not critical. The transmitter may be keyed at a known duty cycle if your tubes don't take it continuously. Here are some figures to use if you

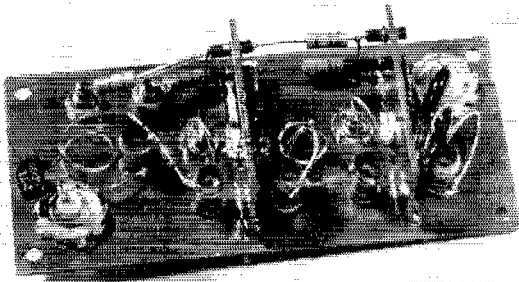


Fig. 2 — Closeup view of the transistor preamp, with the output end at the left.

have trouble converting thermal to electrical quantities: 5 quarts of water and 100 watts average power will result in a five-degree C. temperature change in 15.3 minutes. This method can be trusted to better than 10% accuracy. Stir the water frequently to have uniform temperature." Thanks Pete, I'm sure this will help out a number of the fellows.

Among the many building equipment for the 420-Mc. band is K2RDX in New Jersey who is working on a transistor-power amplifier for his 432-Mc. driver for 4X150A and 4CX250B amplifiers. Varactor-frequency multipliers will be used from 144 Mc. WB2TOM has completed a transistorized 420-Mc. transceiver similar to the one in the *VHF Manual* except for the transistors. K3QCQ built a coaxial filter for the front end of his 432-Mc. converter and was successful in eliminating interference from local TV and f.m. stations. At Jacksonville, Florida, W4MYB is working on a final for 432 Mc. with a 4CX250 in a cavity. Jesse plans to run about 500 watts c.w. and s.s.b. when completed. K4SUM (Virginia) has a 432-Mc. transmitter using a 4X150 tripler driven by a surplus 522. Joe sez that local stations include W4UBY, W3RE, W3AHQ, W4API and K4SUM, heard nightly between 9:00 to 9:30 p.m.

In Texas, W5LGW is now running 500 watts on 432 Mc. having completed a varactor-tripler mixer,

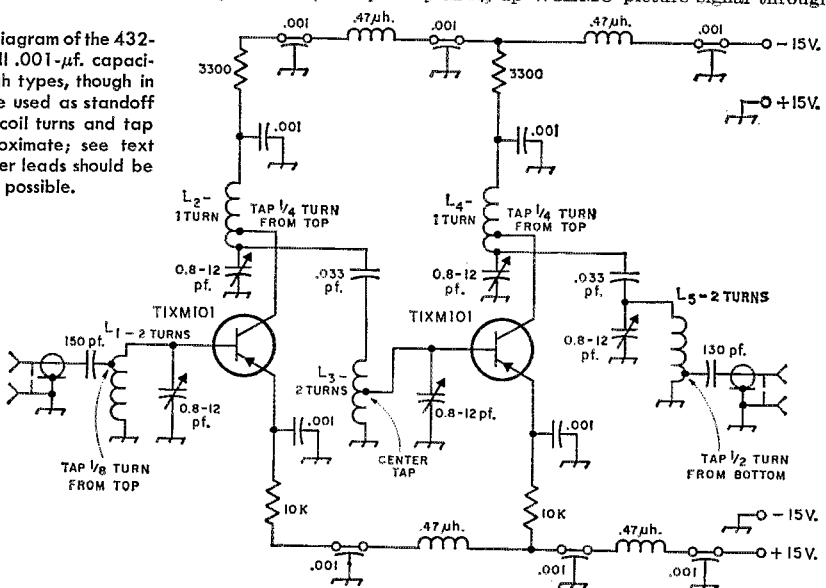
and is working on an all transistor converter and new antenna. Benny is also working on a transistorized portable for 432. Out in California, W6QJW is redesigning his antenna system for 432 Mc. changing from helix to cross-polarized arrays with plane reflector.

The following is from Grid, W4GJO: "It has been some three years since we've had the tremendous ducting from here to the Caribbean area. Don't know what change in weather patterns is responsible but it appears to be long range. For the six years prior to that, it appeared that this ducting was at least as reliable as the trans-Gulf variety so maybe it will return. In any event, if it does, we'll be on tap up here, so be looking for the Florida gang around 432.1 or so. We've had tremendous local tropo openings, with signals across Florida and up to Georgia coming in at local signal strength, but no trans-Gulf or Caribbean stuff yet." Thanks for reminding us Grid. We'll surely be watching for the gang on that frequency and hope that many more down this-a-way do the same.

From Margate, Florida, WA4KFW writes that WA4OFS, WA4FIL, WA4KFW, W8WM/4 all operate on s.s.b. on 432 Mc., and W4EMB and K4DZP are on a.m. (The foregoing stations on the southeast coast.) On the west coast the following stations are on 432-Mc. s.s.b.: WA4BYR, W4JGO, W4UWH K5AXH/4, K4QKR and K4YXZ. Ken tells us that nightly skeds are maintained over a distance of approximately 200 miles with signals normally at least 50 db. above the noise, but frequently much stronger due to tropo enhancement. WA4GHK is a c.w. contact for the boys, and on April 15, 1965, Ken, WA4KFW, made contact via c.w. with W5LUU in San Antonio, approximately 150 miles.

At Cleveland, Ohio on March 14, W8FAZ was hearing things on 432 Mc. Using an 11-element long yagi in the attic, 25 feet above ground in a highly residential and industrial section, Joe heard W8EMO in Parma, W8RMC in Toledo, W8JLQ in Toledo, W8HCC in Sandusky, W8RLT in Livonia, Michigan, and W3RUE in Pittsburgh, Pennsylvania. (Did you get that antenna on the roof yet, Joe, in spite of the neighbors?) K8OXZ reports picking up W8EMO picture signal through

Fig. 3 — Schematic diagram of the 432-Mc. preamplifier. All .001- μ f. capacitors are feedthrough types, though in four places they are used as standoff bypasses. Data on coil turns and tap positions are approximate; see text on adjustment. Emitter leads should be as short as possible.



a Channel Master u.h.f. Converter padded up to 432 Mc. and his regular TV set. W8DQU (Bedford, Ohio) is still working W8CSW (Powell, Ohio) nightly at 8:00 p.m. EST. (Sked maintained for over a year and a half.) It is a distance of about 120 miles with each station two and a half miles below line of sight. K9SGD writes that activity seems to be increasing on 432 Mc. and he is planning to get in on some of it. Joe has his converter and exciter ready to go and is now working on the final. He hopes to have a small dish in the not too distant future.

Activity on 220 Mc. seems to be low but in spite of that K1YON writes that contacts were down during March because it was difficult to break into ragchews that were in progress. However Ted did manage to work WB2CNK, K1POP and K2DZM (s.s.b.) and heard W1MEH, W2WOM and K2GHU. By the time you read this you should be able to start looking for that 220-Mc. contact in Rhode Island. Dick, K1ABR expects to be active on 220.015 c.w. and phone with 40 watts to start out. At Freeport, New York, W2SEU has completed a k.w. for c.w. and 500 watts phone for the 220-Mc. band. He's all ready to go except for the fact that a storm took down all antennas including 44 elements on 220.

After being without an auroral session for a long time, we found surprisingly few reports concerning the one which occurred during March. However, those who did report had a wonderful time during the session. At Portland, Maine, K1OYB worked W3BYF, W3MBN, W3PMG, W8WEN, K8UQA (new state) and VE3DHQ. He heard W9BRN, K4GL/8, W3LNA, K8EDU and many 2s plus a number of VE3s. "Fortunately," sez Marty, "I had just finished testing a new 4X150 two-meter rig, so I was all set with 150 watts. With Ohio I now have 16 states, 5 call areas and 1225 miles." Congratulations, Marty! Nice to see Maine listed in that box. During the same aurora (March 13) K1BTF brought his total states on 144 Mc. up to 12 when he worked K8UQA and W8WEN in Ohio. Barry also heard VE2s, VE3s, W9BRN, K4GL/8 and sez he listened to K1BKK in Barre, Vermont, working 'em left and right. (Oh! Vermont on 144 Mc.)

The WA2WEB group was also wide awake for aurora and heard about thirty stations in 1, 2, 3, 8, 9, VE2 and VE3 lands. Stations worked were K1BKK, W2PTI, VE3ETO, VE2BMQ, K8MPH, VE2TT, K8UQA, W9ADM/8, K4GL/8 and W9BRN. VE3ETO and VE2TT were on s.s.b. The transmitter at WA2WEB consists of a Clegg Zeus running 125 watts out to a 15-element yagi. Receiver was a nuvistor converter to a 75A4. Signals were running up to 40 db. over the noise.

K9SGD was another of the lucky (?) ones who caught the March 13 auroral session and Joe brought his total on 144 Mc. up to 37 states when he worked Maine, New Hampshire and Vermont. Joe sez it's funny to think that he's been keeping skeds with these three states for a couple of years and then gets all of them in one night. He is still open for skeds with anyone who needs Illinois.

At Hiawatha, Iowa, K0EMO missed the first portion of the aurora but did manage to work W8NSH in Lansing, Michigan, and W8WEN in Alliance, Ohio when he got home. Others in his area heard 2, 3, 8, 9, and VE3 lands. Gene tells us that new local activity on 144-Mc. s.s.b. includes K0UVU, K0RCZ, W8AMG/0 and W0BNG. In Iowa City W0DEN, K0CKX, W0GCQ and K0JVC are all on two-meter s.s.b.

From Jacksonville, Florida, W4MVB tells us that he and W4ZXI, just south of Miami, are holding nightly skeds on 144.016 at 0200 Z. Russ (W4ZXI) has a k.w. and two 8 over J-Beams. Jesse is running 125 watts and a 32-element collinear. Signals run from 15 db. above the noise into the noise on a typical night according to Jesse, and although they hear each other every night solid contact has been achieved only once. A linear is in the works at W4MVB and this may prove to be the answer for everynight contact. At Sarasota WA4FJO observed activity to northern Florida and southern Georgia on March 19 and 20, and on the 21st stations to the north and northeast were copied for a distance of approximately 150 miles. K4TUU at Arcadia, Florida is establishing a two-meter net to be devoted to ragchew and technical sessions.

F.m. activity in 5 land seems to be on the increase on 144 Mc. El Paso, Texas stations are too numerous to mention but we have a list of at least ten of 'em and also a number of stations in New Mexico.

From W6GDO: "Tropo QSOs with W7UAB in Portland, Oregon on 144.010 now being made on scheduled basis with several successful contacts already made. Seems to have a fade rate of two to three minutes with about 30 to 50 per cent loud enough for very slow speed c.w. QSO. This is a 480-mile path over extremely rugged terrain. As far as we know our contact of March 12 was the first non-meteor QSO from Portland into California on two meters. (As far as I know too!) I note that when the signal is below a certain point in signal to noise I can improve readability by switching out the 100 c.p.s. filter and using 2-kc. bandwidth and mental filtering. The signals are so weak at times that some who listen to my tapes ask where the signal is, while others copy 100 per cent." Congratulations, Jon and Tom, and continued good luck on future work.

We were delighted to receive word from W8HCC that the boys in the Toledo, Sandusky and Detroit areas are "hot on 1296 Mc. with W8RLT, K8AIY and W8UCT in Detroit, W8JLQ and W8RQI in Toledo, K8ZES in Gallion and W8HCC in Sandusky all active! W8JLQ is the man who is on the ball. He came up with 192 elements and many tips for 1296 Mc." Mel (W8HCC) has just completed a 192-element collinear also which is probably mounted by this time with the converter at the antenna. He has already worked Larry, W8RLT, a distance of about 80 miles. Mel goes on to tell us that "on 432 Mc. a number of transistor preamps are being built and TV is also on the go. W8JLQ, W8RQI, W8VCO (Toledo), W8RLT (Detroit), and W8HCC (Sandusky) plus several others are active. I am 50 miles from the nearest TV so don't get them very snow free 'til aural signals get about S9." Sounds like things are popping out your way Mel. Keep us informed.

Late aurora reports have been received from WN1FFY, who heard just one c.w. station; WB2-KLD, who heard VE3s, 1s, 8s, Virginia, North Carolina, Illinois, Minnesota and Michigan; W2IYR heard W8Y10, W2WCI, WA2WEB, K2LGJ and VE3CSO; WA3DJI heard New Hampshire, Massachusetts and Connecticut with others in his area reporting VE3s; K4GL/8 worked 14 stations in 8 states and sez "seemed like old times especially when nearly half of the stations had been worked in auroras of yesteryear." K8PBA heard several 0s and worked W9AAG in Illinois.

An aurora report for March 13 and 14 received

from K1MTJ sez that he and Marty, K1OYB worked almost exactly the same stations 'cause they have to take turns operating. "If we were both on at the same time we'd QRM each other." Thank goodness these two boys are friends! Otherwise, I'm afraid that a number of stations would lack Maine on 50 Mc. and 144 Mc. Joel and Marty deserve a great big hand for their constant and continuous efforts on the v.h.f. bands, and we're giving it to them for keeping Maine on our personal v.h.f. map. A look at the two-meter states worked box (next month), will show that both of the boys are now listed there with exactly the same totals (that is friendship!), sixteen states, five call areas, 1225 miles. Congratulations, fellas, and please, please "Keep with it!"

144 Mc. — Canada

From Norm Freidin, VE5DF: "A few of the fellows in the city of Moose Jaw, population about 32,000, decided that there should be more activity on the v.h.f. bands. Since the availability of used taxi equipment was nearby and cheap, we decided to start on two-meter f.m. using a frequency of 147.33 Mc. which is used in Vancouver and Winnipeg. Although the active number of hams in Moose Jaw is small, we have managed to get six or seven fellows going. We have only been on two meters for the last four months and hope to have more activity on two-meter f.m. in the near future. We would appreciate and welcome any calls on 147.33 Mc. by any travellers who may have two-meter f.m. equipment in their cars and are passing through Moose Jaw on the Trans-Canada Highway." Good to know that the boys up your way are active Norm. Keep with it!

VE3HW writes that he is gradually closing the gap with the f.m. gear; that further experiments are in progress with baluns and vertical collinear antennas; that Sunday morning skeeds with VE3-DXR continue with VE3BVC now joining in; and that the Metro Toronto two-meter net is gradually picking up. Dick also comments on the aurora of March 13 when he worked stations on 144 Mc. in 2, 8 and 9 lands.

The Toronto f.m. repeater is now in operation with an input of 146.460 Mc. and an output of 146.940 Mc. The call is VE3RPT and the boys are getting mobile to mobile coverage over most of Toronto and into the Niagara Peninsula. Links are being planned between the Toronto and Montreal repeaters via landline and between Toronto and Buffalo on 420 Mc. For information regarding the repeater and f.m. rigs, contact Jim McCullough, VE3CSO at 33 Florence Avenue, Willowdale, Ontario, Canada.

50 Mc.

After being alerted by XE1GE's letter (last month's column) regarding openings to the southern hemisphere, we now have a letter from LUTAT. During March and April Mike has worked the following stations on 50 Mc.: PY2PY, PY2BRA, XE1GE, XE1PY, KP4AJK, CE3CC CE3ET, CE3BM, CE3NH, CE3EU, CE3AF, CX9AJ and LU9MA. This is just a sample of what you may be hearing on 50 Mc. one of these days. Make a list and check 'em off as you work 'em. Mike says that he also operates on 144.010 every day running 100 watts to a 7-element beam.

For the first time since April, 1964, the path be-

tween the Philippine Islands and Japan opened for 50-Mc. work opened early in the evening of April 18. DU9PAR, Davao City, worked JA6EOH in Kumamoto, a hop of some 1800 miles, between 1645 and 1700 local time on the 24th he worked JA2s GWD, FIF and EA, all in the Tokyo area, about 2400 miles. DU9PAR was using a variation of the November, 1964, QST all-transistor rig, with about 0.3 watt input! JA6EOH was running 5 watts. Paul, a member of the Peace Corps, will be returning to Connecticut later this summer, where he may get to do some portable operating as WA1AOX. He has had some wonderful experiences with ham friends in PI.

WB2TPS sez that he has observed no skip but has caught a number of auroral sessions. However, he could not work anything and there was no one on c.w. during the aurora. Jim reports that his communication distance is about doubled with c.w. but his contacts are fewer than they should be, because of the low activity via that mode. On the other hand, WB2PYZ has noted an upswing in c.w. and RTTY on six meters. His c.w. CQs are now answered more often, and signals from the first and third call areas now pound into 2 land. During the aurora of March 13, W0IRO in Minnesota copied WSTFI on 50-Mc. RTTY using a RBM surplus receiver and a 6-element beam. Terry Shankland, WA8MVR writes us to warn everyone that he will be /4 in South Carolina for a week around June 15. Terry sez: "Last year the response was poor. With all the stations I heard saying that they need South Carolina I called CQ and other stations for hours before making a contact. I'm hoping that lots of people will call this year. I'll be there for a week and then move on to Virginia where conditions are great." O.k. Terry, we've warned 'em! Now it's up to you!

Aurora was the big event for the month of March and the reports came from all directions. From Maine, K1MTJ heard and worked 1, 2, 3, 8 and VE3 via aurora (March 13) and then moved to 144 Mc. where he hit the jackpot. K3QCQ noted a slight trace of aurora on s.s.b. signals on March 4 during a period of good ground wave to the northeast. From Pennsylvania K3MSG worked WA8LTA and WA8HAA (Michigan) during the auroral session, while K4KYL in Tennessee heard stations in 1, 2, 8 and 9. Pennsylvania and Minnesota were the states worked by K8VEX in Michigan, but Ivan also heard Ohio, Indiana and Illinois. WA9FIH reports many stations in Ohio, Michigan, Illinois, Indiana, Iowa, Minnesota, New York and Pennsylvania heard during the aurora of March 13, with fair to very good signals on c.w. A few s.s.b. stations were heard also. In Wisconsin W9FBC and WA9PBW noted the aurora but Maury heard no signals and Clive sez "no contacts made." WA9FJM at Milton, Wisconsin, sez the session was real good with many c.w. stations coming through, and W0BJV in South Dakota putting out an outstanding signal. A report from W0PFP in Iowa also took note of the aurora of the 13th but Jim was able to work only one station, WA9OUU, because of non-ham visitors. W0BMN reports s.s.b. activity from Minnesota and Illinois on March 13 but noted it was very hard to copy. A 50-Mc. skip report received from WA3DJI reports the band open to the north and west on March 23. Nova Scotia, Newfoundland and Ontario were heard to the north and Denver, Montana and California to the west.

QST

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

Whereas:

Say, how's this for a "happening"? . . . OM in kilts, toting bagpipes, hops down from transatlantic airliner, sniffs the New York air, opens plaid suitcase, extends telescoping 2S-Mc. vertical, plugs rig into wall socket, grabs mike and hollers across ocean: "GM8XX from GM8XX/W2. Hoot, woman, I'm *herre* *alrready*. Now hoot tis it *yourre* wantin' *frrom* Tiffany's?"

Farfetched? Not very. Not any longer.

Your QST DX log makes special note of the dawn of a brand new era in amateur radio communications. This time we don't mean the sun-spot cycle, ten meters, 160, an antitransceiver kick, the return of the Zepp, rediscovery of diversity reception, the cat's-whisker comeback or other swings of old pendulums. This one's truly new departure. We refer to the widespread implementation, at long last, of international reciprocal licensing arrangements.

This month's "How's" mailbox turns up a rash of unusual callsigns — G3MHV/W6, G5A5BY/DJ5DT, HC1EY/W6MBD, G5ABA/W9QQN and other reciprocity labelings not so obvious. Unlike DXpeditionary sideshow exceptions familiar in the past, this development splashes *kerplunk* in the DX mainstream. And just in time for the 1966 northern hemisphere vacation season!

Our old globe is far from "one world". It may never quite fill that definition. But as one solid contribution to the simple proposition of peace and good will among men, we amateurs can look upon this new DX dimension in ham radio with understandable institutional pride.

What:

You can shelve 160 and 80, maybe, but June should be bustin' out all over other DX bands. Spring's ten-meter hurry inspires feverish antenna activity. Getting enough drive to the final on 28 Mc.? Better soup it up by fall! Twenty meters, as usual, will dominate the summer DX scene. Meanwhile let's sample recent DX activity elsewhere up and down the dial. . . .

10 meters is becoming a real space-eater in these DX documentary proceedings. On 28-Mc. phone Ws 1BVP 7CWN 8YGR, Ks 10JQ 1ZJA 3SLP 7YDZ 8YSO, WAs 1CUN 2LOR 2VFA 4WIP 5CTD 7BOB, E. Johnson and W. Kilroy encounter CEs 3TV 3XG 6EZ* (28) at around 1500 GMT, 8AO 18, C05CN, CRs 61CG* (600) 18, 7FM 17, Cxs 1BY 18, 2CN 19, 2DT 18, 7AAS, EA8AFI (590) 20, ELs 2A* 2AK (385) 17, 2U 5B, FGXL 21, PSRT* (513) 20, G3OEJ 18, HC1s MX* TIT* 22, H4ARM* (640) 18, HKs 1EG 1W 3AVA 19, 4KL* (560) 19, 9A1* 17, KJ6DA (590) 22, KP4s BBN (475) 21-22, BY 21, BFF* 21, CKU* 21, CPP, Ks 4CA* (640) 22, 6BO (550) 22-23, KV4CK* 21, KX6s BQ (643) 22, BR (630) 23, KZ5VF, LUs 1DTL* 23, 3DCU 18, 3DDV 4EZ 17, 5DAO 5BT* (613) 15, 7AW* 22, 9AAK 16, OA1W (505) 23-0, PJs 2CR* 19, 3CJ 18-22, TGs 8CJ* (610) 23, SGZ* 9BM 19, 9EP* (680), T12ES 18, VK4YP (540) 0, VPs 1PV* 18, 2AA* 18, 2DAG* (265) 15, 2GAJ* 15, 2GLE* (310) 13, 2KD* 22, 2KJ* (600) 18, 2KR 18, 2MW (480), 2SI (611) 20, 2SI* 17, 6JC* 18, 8CW (600) 18, VS9CZ*, W4MGL/KP4* 21, XE1s JP KKV, YS1s LA* T1M* (570) 22, YVs 1AGM* (700), 11P 16, 1FH* 19, 4DA 5AGM* 22, 5BP* 22, 5CPA* 19, ZC4s KF KJ 11, ZD8s

AR* 22, HL (587) 14, ZEs 1AN* 1BR 10, 1JE* 12, 1JJ 2JA 2JE* (590) 12, ZSs 1BU 1KJ* (600) 17, 1SW, 40I* 10, 6AJQ (555) 18, 6BJW 10, 6BKU* 18, 6JK* (600) 17, 6NAL* (600) 17, 9C1*, 5A3CT* 11, 5H3JR* (600) 18, 5X5KL* 13, 6Y5s BS* 21, OF* (590) 23, 9J2s FK* (630) 16, VX* (562) 15, WR (615) 18, 9L1HX, 9Q5s FF* (602) 15 and HD (590) 17, the asterisks representing single-sideband senders.

10 c.w. finds Ws 1BVP 8YGR, Ks 1CDN 10JQ 3FKU 3SLP, WAs 1CUN 2LOR 2VFA 7BOA and 7BOB fraternizing with CRs 3AD 19-20, 4BB (60) 18, 6AI 18, 6EI 16, 7IZ 10, EL2D (27) 17, FG7XX (30) 17-18, G3NOM 18, H18XAL, HKs 1AGI 21-22, 3BAE 0AI (25) 20, HPIIE, KP4BJM, KV4CI, KZ2s BG FX (148) 19, JF (45) 17-18, LUs 1BB (65) 18-19, 1DAY (50) 18, 7BN, MP4BFK, OA4s KF 17, PF (47) 20, OH2DX 17-18, PYs 2BGL 2SO 5ASN, VKs 2GW (30) 0, 6RU 6SM, VPs 2KJ 5AR 6PJ 17, YN1AA (50) 20, YVs 1DP (83) 20, 4AC, ZB2AM (40) 17, ZC4G, ZDs 5M (70) 16, 7IP (25) 12, 8AR 16, ZL1DV (40) 0, ZSs 1AC 5V (20) 17, 6BMD 6FN 15, 5A3TX (70) 16-17, 5N2AAF, 5R8CQ (20) 17, 5Z4JX, 7G1A (43) 17, 7Q7RM 9-10, 9J2s DT 15, GJ (77) 19, 9L1TL, 9Q5s 1B (49) 20, LJ and 9V1LP (8) 17. This 28-Mc. catalog is north-south skip for the most part but the increasing east-west work is cheering. Will the coming season start the 10-meter north Atlantic path a-bubblin'?

15 c.w. supplants 40 now as runner-up to 14 Mc. Ws 1CNU 21CO 31NK 6BNK 7CWN 8BJX 8YGR 9CVZ, Ks 1CDN 1WXZ 1ZJA 3FKU 3FOP 3SLP 7QXG 8YSO, WAs 1CUN 1DBR 2LOR 4WIP 4YDR 5AER 6TZN 7BOA 7BOB 9LXF 9NSR 0KIR 0GQI, WB2PAZ and DL4NG check in with CEs 1AD (35) 16, 1BF 9AA (14), GM2s BL (60) 21, WS (47), CNSBU, C0s 2BO 21, 2HB 81E (70) 30, CP5EZ (6) 18, CRs 3AD (57) 17-18, 3KD 4AB 4BB 19, 6AI 6CN (82) 17, 6DX 6EI 6FA 6HG 6IH (58), 6JA 7IZ (10) 18, C7I1s 0LL, Cx1s JM 0P, DMs 2CDO 3HBM 3NEN 3ZH, EAs 6BD (70) 12-13, 8CR (55) 20, SER, R14N, EL2s D Y, EP3AM, ET3s FMA WH (35) 19-20, FB8WW (120) 12, FG7XX (60) 17, FL8MC, FSRT (25) 21, G5RV/OD5, HA5CQ, HB9JG, H18XAL (42) 18, HKs 3AVK (16) 3BAE (15), 3RQ (47), 9AI 13-21, HM5E, HPIIE 21, IS1VE 16-17, JAs 1ANP 1CA 1CYV 1KBT 1KTR 1LZP 1PTJ 1SEP 1SLS 1TAC 1TIL 2DSY 2FUA 2PCK/1 2WB 4DOP 6AXD 6CKW 8BAX (60) 23, 8CRK, J11AG (36) 13, KB6CY, KGs 4CX (40) 18, 6IG 21, KL7AZ (30) 23, KP4s BFF (70), CMP, KR6DB, KV4s CI CK (67), CX, KZ5s FJ 21, FX (28), JF (10), MI 21, SN (100), L9AHC (30) 18, LUs 1DAY 1DTL 3VSI (40), 5DJ 5DJ0 5O1 8DR 8EE (45), LX1LF (43) 19, LZ1s KAA KBAD, MP4s BEU BFK (50) 13, OA4s NVE (50) 22-23, PF (35) 14, UO (45) 22, OD5s EE EJ EL LX (36) 15, OX3UD (13) 18, OH2s BAM BFP, OZs 3FL 4RT (30) 16, 7UO 8E, PJs 1BTX 2CTF 2GDB 0, 4AKR (17) 4BO 5ASN (25) 21, 5QE 7BX 23-0, 7YS,



* 7862-B West Lawrence Ave., Chicago, Ill. 60656

PZ1BD (37), SLs 7AC 8AY/mm, SP5AFL, SUIIM (37) 13, SV0WAA (24) 15-17, TG9AC 20, TIEZJH, TN8AA (43) 16-17, UAs 1KBA 2KAP (20), 6AW 6BL 6KAP (34) 22, 6KAR (24) 12, 0DA 21, 0KFG 21, 0MIG, UI8LB (40) 13, UQ2FY (37) 14, VE8NO, VCs 2EO 2VN 7SM 9GN 9WE (46) 21, VO1AW, VPs 2AN (52), 2KR 21, 2MU 2VI (55) 21, 5AR 21, 6AQ 23, 6PJ (57), 7NQ (59) 20, 9FX 21, VQ8AW, VRs 2EK 6TC (61) 20, VS9s AD AAMD MP (45) 16, WA1EAV/VP9 (80) 23, WP4s COW CPD, XEs 1AX 1KKV 2TY 0AL (20) 19-20, YOs 2CD (100) 5, 3RO (80) 15, YU4AVJ, YVs 1AB 1DP 5CIP (40) 16, 6EE (20), ZB2s AM (110) 20-21, AP (10) 20-21, ZC4s GB TX, ZDs 7IP (60) 16-23, 8AR (40) 15-17, 8WZ (160), ZEs 2JO 3JO 8JV, ZLs 1AUM 2AFZ, ZP5EC (55), ZSs 4KC (30), 6JK 6OS, 4S7DA, 4U1TU, 4X4s CN MZ NY VJ YA, 5A3s TT TX (30), 5R8s AS (100), CQ, 5Z4IR, 6O6BW (30) 11, 6W8s DD1 DQ 6Y5s BB (65) 16, RA/PX/XG, 7G1A (50) 14, 7QZLC (40) 15, 7X2ED, 9G1FY (42) 16, 9H1s AF (70), AG, 9J2s BC IA (98), WR, 9K2s AD (47) 15, AN (35) 12, 9LITL (47) 16-17, 9Q5s CZ EH (90) 16, KS PA QR (45), 9Y4s LZ (17) 18 and VU (48) 16-20.

15 phone, though now peppered with short-skip commotion, excites W3s HNK 7CWN 8KUP 8YGR, Ks 1ZJA 3SLP 7YDZ, WAs 1BDR 2LOR 4WIP 4YDR 5AER 8NIGD 9IBT 0GQI, tuners Kilroy and Johnson with the accents of BV1USA* (320) 1, CEs 3OX* 1GT* (380), 6EW 8CG (415) 20-21, COs 2FA (270), 5CN 8RA* (350) 14, CPEK* (355), CRs 4BD (260) 15, 6AM 6AS 20, 6BX* 6CZ 20, 6DX* (340) 18, 6HG* (230) 18, 6HT* 19 7BF 7IZ 19, CTs 1BE* 19, 3AA (230) 11-12, EAs 6BF (248) 16, 8FZ, EP2AM* (390) 13, EL2s A O* (400) 18, ET3WH* (350) 15, FG7XL* (400) 15, FS7RT* (399) 15-22, FY7YJ* (395) 23, GD3TIU (240) 18, GI3s JIM* SSR* (435) 15-16,

601AU* (335) 19, 6Y5s BS* (400) YG WF 17, 707s BN* (370) 17, PS*, 9G1s FF 17, FL*, 9J2s BK* (405) 14, WR* 19, 9L1s JW* (430) 16-17, TW* (351), 9M2s LO* (400) 16, OV* (390) 13, 9Q5s DL* (324) 20, 1V 19-20, GC* KC* (384) 18, US* YL* (375) 16 and 9X5V7* (373) 19, the stars for s.s.b.ers.

15 Novice is all a-go-go once again with WNs 2R7X 2TEN 2UHZ 2UNV 4YZC 8QPF and 9QMT snapping up CE1EK, CRs 3AD 6HG, CT1s JD MP, two dozen DJ/DLs, DAMs 2BWO 2BYN 21, 4CZM, EA, 3NA 4CR 21-22, Fs 2GL 2JA 2NY 5CT 5GV 5TM 9CZ 9ZL 21 thirty-two assorted Gs, G3AXI, GMS 3MXN 3FCO 9TF, GW3IEAM, HA8MJ, HB9AU 22, Hs 10B CZS, IT, LAQ, KJ6DA 23-0, KH6IR, KL7CO, KP4BBN, KV4EU, LAs 10E 2MA/mm, 2FD 8J 8SJ 9AF 9AG, 9C 2LH 11 6DJX, LX1LE, OAs FL PE, OEs IHGW 15FW 2ASL 21, 3UP 5DA 21-22, 5NKL, OH3XR, OKs 1BAW 2PO 3DG, QNs 4LX 4RN 5FG 5GT 5IF 5IF, OZs 4H 5CP 6LL 8E, PAs NOL ZAV, PVs 1B0I 1NEW 2BHH 22, 5ASN, 7LAZ, SMs 3BZs 5AHQ 5CRC 5CFE 6CAW 6CED 7LAZ 7CR 8P3s BLG KCF, SV0WA, TG9WF, T2KR, UA6KAB, UO5AA 21, UP2KBC, VP6Q, XEs 1EO 2JS, YOs 2CD 2IS 3RO, ZB2s AAM, ZC4E, ZE1BO, ZL3IO, ZS4QC, 4X4s ML 18-19, NTC 18, 5H3JJ, 9H1R, 9J2GJ, 9Q5PA and 9Y4LZ. It's been years since we last had a Novice crack the ARRL DX Century Club. Who's next?

40 c.w. cools off as the weather warms up hereabouts but Ws 1BVP 3HNK 8YGR, Ks 1ZJA 3FKU, WAs 1DBR 4YDR 9IBT 9NSR 0GQI, WBs 2PAZ 6KVA and R. Johnson dig up COs 2BB (1), 2BO (10) 5, 2FC 2RL 3BU, CRs 6AI 7CI (6) 4-5, CT1s FR 0I, EAs 1GT (25) 3, 2CR 23, 6AM 8ER, E9AR, FG7D (11), G3BOQR, HA6NI, HIR8VD 23, HKS 3AVK 3AZJ 7BE, HM5CL, HP1IE (10) 12, ITIAGA, JAs 1BX 1IHE 1PVK 2FZM 2GUM 3AYL 3BAC 3CF 3AIV 4BJM 4CUU 5ADR 5AW 2 5BFK 6BWH 6EBY 7CVB 7CYC 7XF 8BZL 8CO 0ASO 0DR (10) all around sun-up, KGs 4CX (20), 6IG, KP4s BFF BJM TIN 3, KV4AA 23, LU1ZC (13) 8, OA6W, many OKs, OX3LP, P1LOC, Pys 1BLG (2) 5, 1CPC 1NEW 2BQI 7AEW (11) 3-6, 7APS 7DF 7GAW, SL8AY/mm (29), SPs 5ANL 5PSL 6ALD 6BJA, UAs 9TO 0KCK 0LJ 0PY 0KFG (14) 8-9, 0LH, UB5VF, UC2BA, UF6LA 3, UH8CI, UO2ML, umpteen VK/ZLs, VPs 1PV 2SM (15) 11 2VI (25), 5AR (10) 5BP 6YL 7DQ 3, VSs 6BJ 9MP (45) 23, WA4NPS/KP4 (40), WP4COW, WS6BW of Samoa, XEs 2CN 0AL (5) 5, YO6AW, a dozen YAs, YVs 4NS 7CT, ZD8AR (10) 3, ZS5QU (5) 5, 4X4QA, 5V8AB (10), 6Y5BB, 7G1A (45), 7X2AH, 9G1FY (5) 5, 9H1R (28), 9M6DH 10, 9U5s OU MX, 9V1LP (1) 11 and 9Y4VP (10) Up among the SWBC bunkmongers WNs 4YZC and 9PQY managed to extricate CO2FA (195) 2-4, KS6BA (173) 1, P3JCD (178) 3-4, PZ1CM (178) 2, WB6QE/VP9, WP4COZ (175) 11-2 and WS6BW. Need Albania? Radio Tirana rolls in S9-plus on 7090 kc. several evenings per week. Must have a lousy receiver, though — won't break.

40 phone is less frustrating than usual. W1BVP, K4KSY, OA1BL, Messrs. Kilroy and Johnson noting the presence of DJs 5VM 1, 6QT 1, EA4s DO 2, CZ 1, FT3AC (58) 21, Gs 30ML 7, 5TN 7, 8PO 7, GC8HT 7, G3CDE, HL9US, HPIJC, 1Is BAF CWX 7, JAs 2BAV 7KE, KR6DF, KP4s BFF BRG 1, BSV/mm 9, CKU 6, KSs CA (245) 4, 6BV (265) 6-7, KX6s BQ JI, LA1KY, LX1DO (95), OA4PO, OH2AM, OX3JV 1-6, SM62DL, TG9s AY EP, UD6BR (45) 21, U1B8F (35), VSs 2AHB 2AHT 3AC 3ATN 9DJ, VPs 1JKR 2KR 2VE 4, 5AR 6KL 7, 9CP 2, W5HWR/VP9 1-5, XEs 1XV 2BK 7, YN3BC 2, YV5BEP, ZB2AJ (40) 20, ZD8s AR 1-3, RD, ZL2s BCG 7, BE KL WS 9, ZSs 1PV and 6FN, all, so far as indicated, single-sideband specimens.

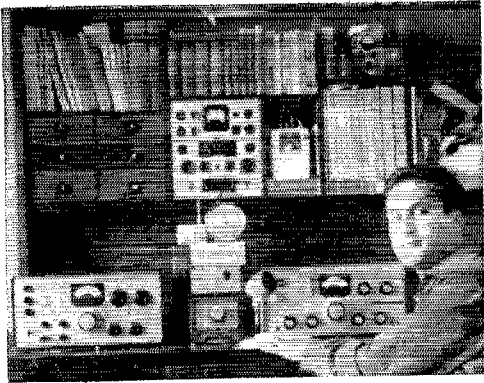
80 c.w. still has support from Ws 1ECH 1SWX 1YAH 1DVT 0RFJ, Ks 1ZJA 3SLP 6PJT 8YSO, WA5KUD, WB2SIA, DL4NG and s.w.l. Johnson in behalf of CM2BL, COs 2BO (5) 3-4, 6GQ, CP5EZ, GRs 4BB 7CI, DJs 2YC 7IK4, DLs 1RK 7AA, DAM2AB, EA5EN (4) 3, E1BJ, F8ZF, FG7XX, Iotsa Gs, GC2FMV, GDs 3TNS 5AAE/K9ALP (18) 0, 5SF 0UW, GW3ITZ, HGIJU, HB9JG, HIs 3PC 4ARI 8XAL (11) 1, Hks 3AJJ 4 BRQ 0AI, HL9US, HP1IE (7) 3, HZ3TYG, HIs FW LA 4 LAO (3) 3, JAs 1GK (5) 11, LCU, RICZH/KM, KL7PI, KM6CF (16) 8, KV4s CI DE, KW6EK (2) 12, KZ5s FX JF (7) 9, LAs 7H 7Y 8FG (12), LU1s DAY ZC, LZ2s KBA LGG, OD5CN, OH2AM, OK1AM, OX3LP 3, OY 47ML, OZs 1LO 4UN 3, 7CF, PA6PD (2) 3, Pys 1BTV 3, 0Y 47ML, OZs 1MO 2TW 3VF/mm 5CFE (20) 1, 5OC, TI2FW, YAs 1UW/KCF (20) 1, 2CD 2KAP 3, U1BAC (3) 2, UP2KNP 3-4, UJW3Cs, VPs 1PV (5) 2-4, 2DAG (4) 4, 2KR 2KY (5) 2, 2MU 2VI 7, 5AR (6) 4-7, VS9s APT JFT MP, W62BXZ/VP9, XEs 1KKV 0AL (17) 3, YNs 1AA 3KM, YO6AW YU, 2RAK 3CDE, YV1DPK (20) 4, ZBAP, ZC4TX (6) 4, ZDs 7EQ 7IP 8AR (3) 3-4, ZB7JP, ZLs 1AMO 4IE (8) 6, 4X4s NA YA, 5N2AAF, 6O6BW, 6Y5BB, 7G1A, 9G1FC, 9LITL, 9V1LP and 9Y4DA. WNs 25CU and 9PQY score upland for the Novice team with VR4ED (3734) 8 and YV5CLK (3720).

75 phone, due for estimation under its summer QRN blanket up our way, tapered off for K4KSY, WB6KVA and Mr. Kilroy with CN8s AW (3780) 20, MT



VK2GW ran a strong second to VK5ZP's high Australian c.w. entry in last year's ARRL DX showdown. Lyell used 3-element rotaries on 10, 15 and 20, a two-element spinner on 40, and a vertical on 80, fed by a homespun 100-watt 813 sender. (Photo via W1YYM)

GM3SUZ*, HCs 1AI* (400) 1RT* (380) 1SX* (376) 2AI* (400) 2JF 20, 8FN*, HIs 7NSB* (350) 8RBG* (400) 8XMT* (403) 14, 8XWZ* (370), HKS 1XT* 3RQ* (300), 5KW 7PU 0AI*, HP3MC, HRS 1MN* (330), 3AC 4DHS, HZ1AB* (400) 16, JAs 1RJO* (355) 23, 2CBZ* (375) 23, 3GZN 9JX*, K9VSK/KP4*, KA7AB* (383) 1, KGs 4AN* (400), 4CL* (400), 6APD* 6IG* (380) 1, KJ6DA*, KL7s FAO WAH YR 17, KP4s BL* CKU* CKW (282) 23, KS6BO* (393) 0, KV4s AB* (350), CX (395) 14, EQ2* (380), KX6s BQ* DC*, KZ5s AB* (375), JW* (400), LC* (400), SN, LUs 2CES* (410) 23, 3DRH* 22, 4ZV 20, 80C* (400), MP4s BFU* (390) 11-12, TBO* (374) 13-14, TBV* (390) 16-17, OAs 8T 8Q* (365), OD5s AT (220) 15, BZ* (445) 15, EE* (400) 12, EK* (380) 15, ET (220) 16, GF (213) 16, OE2EGL* (380), OK1MP* (385) 15, ONs 4NA* (340) 15, 8UA*, OX3JV* (382) 21, PA6GKO, PJs 2CR* 3CD* (378) 15, Pys 1BZY* 2BJO* 2PC* 2PV* (420), 4ZG, PZ1BA*, SL6BH*, SM5FK*, SP7HK, SvS 1AE* 1CX 1DW 0WU (385) 16 of Rhodes, TG8s CJF (310) 17, FA* (300), T1SML (400), TL8SW* (420) 22, TN8BK (220) 15-16, TR8AD 17, VKs 3AA* 22, 8KK* 9GN* (320), VPs 1LP 1TC 1WS* (360) 20, 2AC (300), 2AP* (383) 17, 2CAJ* (310) 13-14, 2KJ* (350) 21, 2MW* (253) 16, 2KY* (387) 15, 2KZ* 21, 3AA* (395) 10, 3IAG* 22, 5AR* 5RB* 18, 6AQ (280), 7ID* (392) 9, VR2EK* (386) 0, VS9AR, W7HH/YN6* (435), XE1OB*, XW8AZ* (370) 11, YA3PNC* (400) 15-16, YNs 1RA* 9JUL* (390), YSHUKE* 20, ZBZAO* 15, ZG4RM* (355) 15, ZDs 7RH 8LV* 8RJ* 8AR* (410) 14, 8CR* (390) 15, ZE2KL*, ZF1BP* (380), ZL1AW*, ZPs 5DH* 6BR* 23, 9AY* (358) 14-21, ZSs 1JH 6APA* 6NM 6YX* 9G (203) 17, 4U1SU* (370) 10, 5A3TX* (360), 1345H3JR*,



EA8EX cuts a wide DX swath on single-sideband with a cubical quad on 10, 15 and 20, a Vee on 40 and 75, and 260 p.e.p. watts. (Photo via DJ2YJ)

22, CO2s FA* 6, JA, Djs 2RR 6QT 7UG 5-6, 8EG 6, 8LPA, DLs 2GG 5-6, 7AA 6, EA4DO 6, F3FR 6, RS7RT, G3HXM 6, GD3FXN 21, GM5ABY/DJ5DT 21, GW3NWV, H18s JDA XAL 6, HK3RQ, HP1JC 7, IS1BAN 22, KL7s GYV (a.m.), FCW, KX6BQ, KZ5MV, 1As 5AJ/p 6YE 6XF/p, OA4PU, OY7ML 23, OZ5BW, SM7s CBJ/mm, CZ 6, TG9EP 5, T2AAC, UD6BR 21, VO1s DD 3, FX 6-7, VP3s 2DX 5, 5AR 7DT 8, 7NS 5, 9FE 6-7, 9WB, Ws 1FZJ/KP4 6, 5HWR/VP9, XF1s KKV VO, YS1AG, YV5s BBJ 6, BTS 6, CLK 7, EN, ZB2AJ 23, ZLs 2BCG 6-7, 3FTJ 7, 3JC (a.m.), 4IM 4LM, 4X4s BO 22, LX 22 and 5A2TR 20.

160 c.w. is treated in a wrap-up of top-band DX heard, worked, heard worked, heard called or heard of this past season by W1BB (via Steve's FB 160-meter bulletins), K1OYB and WA5KUD. CO2QR, DJ6ST DLs 1FF 9KRA, E19J, EP2s BK 1W RJ, countless Gs, G1s 30QR 6TK, GM3s QMR RXT TMK, GW3TSH, HB9CM, H8XAL, HP1IE, JA6AK, K1CZH/KM6, KH6s EL 1J, KL7JDO, KM6DJ, LZ1ARN, NSIA shipboard off England, OE1KU, a dozen or more OK/OLs, PA3s LOU PN, PL1STC, VE8ZZ, VKs 2AB 2EO 5KO, VO1s FB HN, Ws 1FZJ/KP4 5HWR/VP9, XE2OK, ZB2s AJ AM A1, ZD7s IP RH, ZL3RB, 5N2AAF, 6Y5s FH XG, 9L1HX and 9V1LP. By the way, W1BB will be traveling far and wide next fall and winter, so Steve requests no mail from his hundreds of 160-meter friends from September 10th through next January. Time your correspondence to reach him in early February, instead. (Watch out Mr. Mailman!)

If Jeeves survives another Field Day we'll be checking 14-Mc. DX doings next month with the help of "How's" reporters (c.w.) Ws 1AYK 1CNU 21CO 3HMK 7YRO 8PKU 8TRN 8YGR 9LCC, Ks 1CDN 1Z3A 2UPD 3SLP 7UHE, WAs 3AZI 4WIP 4YDR 5MIGD 9IBT 9NSR 9GQI, WB4ACP, DL4NG, tuners WN9PQY, R. Johnson; (phone) Ws 3HMK 8YGR, Ks 3SLP 7YDZ, WAs W1P YDR, KL7FEF/1, monitors WB2UFN, WN9BQ, Johnson and Kilroy, plus sleuths reporting later.

Where:

ASIA — ZC4CL writes W1WPO of your ARRL DXCC Desk: "Anyone who has not received his QSL from ZC4TX (5B4TX) for QSO during the last five years, excluding 1966 contacts, should now reapply to my address." Check the QTH rundown to follow. . . . W1RAN says all HZ31YQ/8Z4 QSLs were en route non-W/Ks by April. Ned expected to have completed U. S. mailings via bureau before this is read. . . . W1UWC still receives monthly logs from XV5AA and K1YPE/XV5. George appreciates those self-addressed stamped envelopes. . . . YK1AD just came through with a QSL for W4DVT's 1964 QSO. The new *Callbook* address paid off in ten days. . . . VS9ARV estimated completion of QSLing for the 3000-QSO VS9KRV Kamarin campaign around this time.

AFRICA — "I've been QSL manager for ZD5D since last July," affirms WB6CWD. . . . West Gulf DX Club *Bulletin* note: "ZD8RD logs through March 10th are now in possession of W0MFLY. Dick requires GMT and s.a.s.e. for each QSL." . . . W7WLL, QSL aide for W18MC and others, supplies food for thought concerning International Reply Coupons, a DX by-product circulating

YK1AA represents Syria almost single-handedly on twenty. Rasheed's current set-up is more sophisticated than the non-s.s.b. installation pictured on page 83, February 1964 QST. (Photo via OD5EE)

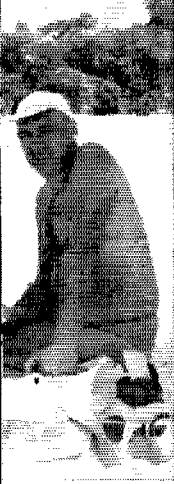
helter-skelter these days: "Our Post Office takes a dim view of exchanging stamps for IRCs when the Coupons are post-marked as issued in the U. S. A. In fact many a branch p.o. will not accept them. The regulations are not very clear on this subject, stating only that IRCs are exchangeable for postage representing that amount of first-class surface international mail, base rate. The problem is that the regulations also state that IRCs issued in the United States may be redeemed by the original purchaser for a discount of one cent on the purchase price. Should they be redeemed at 11 cents each when you lay down a flock of them dated all dates from points all over the country and assume you to be the original purchaser; or should the p.o. decide that since you are obviously not the original purchaser the Coupons are each redeemable only at 11 cents in stamps; or should they be refused *any* redemption since you are not the original purchaser and because regulations imply that they must be redeemed in a country other than that of issuance? If you could qualify as original purchaser should the IRCs be redeemed only if returned to the branch p.o. of issuance? Opinions on these questions vary among different local Oregon post offices. The postal regulations office in Portland has written to Washington for clarification. Meanwhile I urge that "How's DX?" help make foreign DXers aware that U.S.-issued International Reply Coupons should not be passed back to this country."

OCEANIA — Lack of post office facilities on Canton island causes QSL difficulties for transient KB6s, according to K6GILL. If, for example, your recent QSLs to ex-KB6EPN weren't forwarded you'll have to try another to his new KW6EM address. . . . "I'm QSL manager for K6SBH for contacts on and after April 6, 1966," notifies K6CYG, desiring the customary s.a.s.e., or s.a.e.-plus-IRC's courtesy. . . . "I QSL 100 per cent and handle my own cards," states KR6AM after five kiloQSOs in a year on Okie. . . . VP7DO/mm (VE7IR) recently dispatched a batch of QSLs via bureaus for late-'65 operation of the VK6 coast aboard oil exploration vessel *Sea Search*.

EUROPE — IW1CN operation by WB6CIY sometime this month will be confirmable through K6CYG on the usual s.a.s.e. or s.a.e. plus IRCs basis, GMT and GMD reference only. . . . "Because of missing logs, QSLing for SM1AS has not been up to date," discloses SM1CXE. "With the aid of Jan's notes I will try to be of assistance in confirming some of his contacts." SM1CXE insists on s.a.e. plus two IRCs per application, stressing that, except for this research, he is not SM1AS QSL manager. Indicate report received as well as sent. . . . K2MYR will do QSL chores for next month's Luxembourg flap by ONs 4NM and 5DI. "There will be 100-per-cent QSLing for all requests accompanied by s.a.s.e." . . . WGDXC has it that OT2BO logs for February-March, 1963, now rest in the able hands of W6NJJ, also that QSLs for DL7FT's March Balearics bash (EA6AR) may go to Frank's home address. . . . E1SBB's May QSOs can be confirmed through the visiting operator, DJ5WQ, according to DARC'S *Dx-MB* gazette.

SOUTH AMERICA — ARRL QSL Manager W4MF, S through W1ECH of Hq., forwards a long list of U. S. Fours who still haven't answered CX2AJ's Pluto-with-Donald Duck QSLs for 1964-'65 QSOs. C'mon, guys. . . . "I'm QSL manager for WB6LZF, operator aboard USNS *Elanin*, for contacts since March 22, 1966," notifies WA5ENK. "Ron uses his own call. . . mm, CE0Z1/mm or KC4AA/mm." S.a.s.e. or s.a.e. plus IRC, of course. . . . "Requests still come in for HK6ZU QSLs," notes W4BJ, alluding to FDXXC's 1962 DXpeditionary triumph. "I have about a hundred cards left, so remind the gang that I'm still QSL manager." . . .





FL8s AO MC and RA, left to right, keep French Somaliland workable on 14 and 21 Mc. W7s AEF WLL, Orange Co. Calif. DX Club and other benefactors have since added an SP-600, HT-37 and beam antennas to the FL8MC outfit shown here. (Photos via W7WLL)

K6GMA apprises, "Just received VP8HO logs for South Georgia QSOs, 1965 to March of this year. S.a.s.e.s. are a must." 9Y4LZ (G3LZZ) tells W1CNU he will take care of QSL matters when he arrives back in the U.K. this month In the Florida DX Club organ we see that FY7YL responds to pre-prepared QSLs bearing appropriate mint French Guiana postage.

HEREABOUTS — "Still have my Alaska logs," writes KL7FEF/1. "If anyone QSLd me and didn't get mine back, please try again via my Maine address. So far as I know I didn't miss anybody, but an average of 200 cards a month is pretty hard to keep up with." "I'm handling QSLs for recent operation by VE8AA as ZF1s AA and DG," confirms VE6TP. "Replies to those sending s.a.s.e. or IRCs will go direct, loose U. S. postage acceptable." WA2WGS's QSL managers for TI2ME begins with QSOs of April 10, 1966 Sorry — the real FP8CX (W6HS) wasn't active March 27th WA9CQI says KIIMP can help confirm VP2AC QSOs of late November, 1965, but QSLs for other contacts should go via WA4AYX. Also, VP6AQ wants his mail direct only "I'll be handling cards for W7HH/YN6-YN6BF," states VE3CKV, requiring s.a.s.e. or s.a.e. plus IRCs

We present your "QSLers of the Month": BV1USA, CO2JB, CTIAU, EA9IC, FL8MC, G3TBA, HC1MX, HK0AL, IT1GAL, JA5 ICYV 4BFT, K1YPE/-XV5, KM6BL, KS4CA, KV4EQ, KX6BQ, LA5 3II 9HC, OA4KF, SV0WAA, TG8CJ, TL8SW, VR9CJ, YP5 2DAG 2KR 2KY 8HJ, VQ9J, WA9KQU, XW8s AX AZ, YV5 1EN 5CFW, ZD8WZ, ZF1BP, 4U1TU, 5W1AD, 6Y5BB, 9L1s JW TL, 9U5DP, 9V1LP and 9Y4VU, plus QSL tenders EA7JQ, VE5 3ACD 3CJ 4OX, K9RNQ, Ws 2CTN 2YTH 4ECI 4UWC 6KTE 6RGG 7LWL 8ZCQ 9WIM and 9NGF, all nominated for quick QSL come-throughs by "How's?" correspondents Ws 1BVP 1VAH 3HNK 7VRO 8TRN 8YGR, K7YDZ, WAs 2LOR 3AZI 4WIP 4YDR 8PKG 9IBT 9IXF 9NSR 9GQL, WB6s KMV LEI, WN4YZC, P. Kilroy and J. Meirose. Any prompt pasteboard pushers for this list? Halpl

Tardy confirmations are sought by W8PKU, from YU0IARU; K1CDN, CR8AF, JT1s AG KAA; K1JU, VP1LL, 7Z0A '64, 9L1TL/G3USE; K1OJQ, VP1WH; K1ZJA, CE1AD, F9UC/FC, LA1H, ON5AZ/LX, VP2KJ; WA2UKA, FM7WB '64, OH2AH/OH0 '64; WA9NSR, XE1SS; WA9GOJ, KV4s AB CK CQ, HR1MN, OX3BB; and W82ABD, ZD8DW. Any nudge notions for the lads? W8PKU, K2MYR, WAs 3AZI 4WIP 4YDR and YL WBU2U offers assistance to overseas DX ops in need of Stateside QSL aid W8YGR testifies, "W0EFK read in your pages where I needed help with CR4 QSLs so he mailed me the 'gen'. Something familiar about his call sent me to my shoeboxes. Therein was his W0EFK QSL for a 1926 QSO! I made a copy of it and mailed it to Joe with my thanks." Now let's see what fresh specific suggestions flutter forth from the sack. Be mindful that they're necessarily neither official, accurate nor complete. G'luck!

CE0ZI/mm-KG4AAA/mm-WB6LZP/mm (via WA5ENK) CP1EK, J. Harwell, U. S. Embassy, La Paz, Bolivia CP0DJ, % 1520 College Av., Harrisonburg, Va., 22801 CR4BD, P.O. Box 67, Praia, Cape Verde Islands EA6AR (see preceding text) EA8FD, P.O. Box 215, S.C. Tenerife, Canary Islands EA9IC (to EA7JQ)

EI8BB, Longford, Fair Green, Ireland (see preceding text) EL2AO, P.O. Box 98, Monrovia, Liberia EL0B/mm (via HB9AAE) FG7TD (via W2CTN) G3MHV/W6 (to G3MHV or via RSGB) HC1EY/W0MBD (to W0MBD) HI8WXZ, E. Foster, Co. A, 782nd Maint. Bn., 82nd AB Divn., Ft. Bragg, N. C. HK3AVK (via K1DFC) HK0ZU (see preceding text) HV1CN (see preceding text) K4OSR/KB6 (to K4OSR) K9ZLE/mm, USS *Denebola* (to K9ZLE) ex-KB6EPN (to KW6EAM) KG4CX, Box 355, FPO, New York, N. Y., 09593 KL7FEF/1, G. Baker, 360 Foulois Dr., Loring AFB, Maine, 04750 KS4CA (via WA90VE) KS6BH (via K6CYG, see preceding text) KW6EM, G. Preece, Box 96, Wake Islands, 96930 KZ5AY (via K6CYG) KZ5s FX JF (via KZ5RV) LA8RR/mm (via LA2DD) LU1DTL, K. Bryan, APO 339, Box 34, New York, N. Y. LU2ZG (via LU2CN) MP4BFS, Box 138, Bahrain, Arabian Gulf MP4BFU, Box 425, Bahrain, Arabian Gulf OA1BL (via RCP) ONs 4NM/LX 5DI/LX (via K2MYR) ex-O09PD-9U5PD (to ON5PD) OX3AF, RCA BMEWS, APO, New York, N. Y. PJ3CJ, P.O. Box 282, Curacao, N. W. I. PY2PV, P.O. Box 300, Santos, Brazil PY7ACQ/p, % Brazil DX Club, P.O. Box 842, Recife, Pe., Brazil

SM1AS (see preceding text) SM4DZH/mm (via SM5AIO) SU1DL, B. Kinzel (DL6PE), Cairo-Helwan, High Institute of Technology, Box 24, Butz, Egypt TG9DQ, D. Chavajay, 20 Calle 1144, Zona 10, Guatemala City, Guatemala TI2ME (via WA2WGS; see preceding text) TI2PTS, % U. S. Embassy, San Jose, C. R. TU2BA, Box 172, Abidjan, Ivory Coast VK9CJ (via W2GQN) VK9DJ, G. Pooley, Era Sawmills, Private Bag, Port Moresby, Papua Territory VK0s AM KM (via WIA) VP2MW, P.O. Box 274, Plymouth, Montserrat, W. I. VP7DO/mm (see preceding text) VP7NQ (via K0BLT) VP8HD (via G3PEK) VP8HO (via K6GMA) VS6AZ (via K6GMA) W1BNH/mm, USS *Humboldt* (to W1BNH) W7HH/YN6 (via VE3CKW) WA4JIZ/mm, USS *Manley* (DD-940), % FPO, New York, N. Y. WA4UVR/mm, USS *Forestal* (CVA-59), % FPO, New York, N. Y. XE0AL (to K7AL) XW8BM (to K8DBP) YN1CJD, Box 327, Managua, Nicaragua YN1CML, Box 2557, Managua, Nicaragua YN6BF (via VE3CKW)

YS1THM, USAIG, % U. S. Embassy, San Salvador, El Salvador

- YV5BMN (via W7VRO)
- cx-ZB1BX (to G3KXF)
- ZC4CL, B. Clark, T. Trp., 259th Sig. Sqdn., ComCan, Episkopi, BFPO 53
- ZC4TX (via ZC4CL; see preceding text)
- ZD5D (via WB6CWD)
- ZF1s AA DG (via VE6TP)
- ZF1RD (to K8LSG)
- ZF1XX (via VE2BK)
- ZL2ACP (to VP7DO/mmm)
- 1M4A (via W4ECD)
- 5X5IU, R. Roberts, 1 Berlin 42, Tempelhoferdamm 88, Germany
- 707LC (via RSSR of Rhodesia)
- 9M6AP (via G3TXE)
- 9M6NQ, Box 339, Jesselton, Sabah
- 9Q5DM (via W9IZP)
- 9Q5PA, J. P. Alexander, P.O. Box 1, Conroe, Texas, 77301
- 9X5VF (via ON5PD)

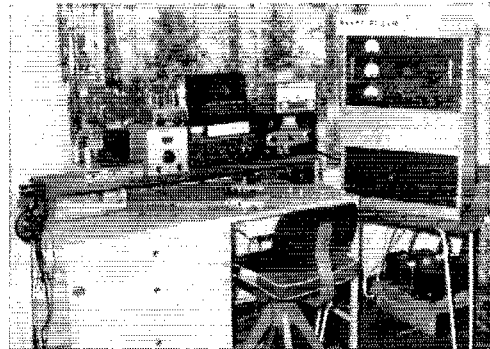
For this catalog hats off to Ws 1BVP 1CNU 1VAH 1WPO 1YYM 3HMK 4DVT 7RGL 7UVR 7VRO 8YGR 9DUX 9RJK 9CVZ, Ks 1CDN 1ZJA 3SLP 6GHL, WAS 2LOR 2UKA 4WTP 1YDR 9IBT 9NFS 9NSE 9CQI, WB2s AD UHZ, WN9QY, 9Q5PA, P. Kilroy, DARC's DX-MB (DLs 1EP 3RK), DX Club of Puerto Rico DXer (KP4RK), Far East Auxiliary Radio League News (KA2LL), Faeroe Amateur Radio Society (N4A 0Y7ML), Florida DX Club DX Report (W4MVB), Japan DX Radio Club Bulletin (JA1DM), Long Island DX Association DX Bulletin (WB2HXD), Newark News Radio Club Bulletin (L. Waite, 39 Hannum St., Ballston Spa, N. Y.), North Eastern DX Association DX Bulletin (KIIMP), Northern California DX Club DXer (Box 608, Menlo Park, Calif.), Puerto Rico Amateur Radio Club Ground Wave (KP4DV), VERON's DXpress (PA6s FX LOU TO VDY WWP) and West Gulf DX Club Bulletin (W5IG), Pitch in, OM!

Whence:

EUROPE—Dwindling phone interest caused EDR (Denmark) to omit the voice section of this year's April-May OZ-CCA DX test. Of 219 entries in the 1965 affair there were only 21 radiotelephone logs submitted, none from W7K/VE/VO mike men, W8VSK, VO2NA, W4HOS and VE2IL ran 1-2-3-4 for our side. Other c.w. highs by country in the single-operator category: DL1JC, 1M3XSB, F8OP, G3EYN, HA3GA, HB9QA, HP1AC, KZ5EH, LA7H, OH1XX, OK2KGD, OZ1LO, PA0LV, PY2SO, SM3TW, SP8AJK, UA6FD, UB5TR, UC2WP, UG6AM, UH6FE, UH8BO, UJ8LB, UJ8AH, UJ7JE, UM8IV, UO5AA, UP2AW, UQ2GA, UR2FU, UW9WB, VS6FF, YO3RF and YU1NOH; phonewise, CT1LN, HLCE, OH3YI, OZ3OV and UB5BX. On the basis of ten best non-Scandinavian c.w. scores we have, in order, UR2FU, UB5TR, UJ7JE, F8OP, G3EYN, UA6FD, OK2KGD, YU1NOH, UJ8LB and W8VSK; the top ten Scandinavian biggies are OH1XX, OZ1LO, OH3ZN, SM3TW, OH4NV, OZ2NU, SM7AXP, OZ1AG, OH7OK and LA7H. C.w. multiop highs in sequence are UP2KCF, OK8KAG, UA2KAW, UA1KBA, UJ8KAA, UM8KAA, YU1BCD, UB5s KHQ KKM and UA1CR. These data courtesy OZ2NU, EDR test manager. — Ws 1AYK and 2LQF won and placed for Uncle Sam in the '65 WADAI Contest, East Germany's annual c.w.-only DX fling. VE8 1AE and 2IL tied for Canada. DMs 4KI 2ATI, and 4ZCM ran 1-2-3 on the home front, while UB5s KBA KAI and UA3KAQ turned in the best non-DM totals. This year's WADM thing is scheduled for the first full October week end, code only. After his intended operational stop at HVICN this month (watch frequencies popularized by W4RPD) WB6CYV may radiate from Monaco for a spell on 15, 20 and 40 meters. This via his Stateside liaison, KR6CYG. — Livepeer will be jumpin' in July as host to the World Cup Series and its annual Horticulture & Agriculture Show. G3PDC and friends invite traveling DXers to visit a special CB2LS installation at the scene — DL1NG gets back across the pond conveniently on 15 through 80 with 50 c.w. watts and an indoor wire — FZXS tells WIECH of ARRL that the French society, REF, 60 Blvd. de Bercy, Paris 12, France, has a list of French hams and s.w.l.s interested in acquiring electronics pen pals in our country. Tadeusz Slawski, Boleslawien 8L, ul. Bronislowa, Koszyl 16m5, Wroclaw, Poland, is another candidate. — Contacts with any three of CT1s CAI (GN IFF IE JS IG LL NN NQ NZ OZ PI) and other stations in Portugal's Ria de Aveiro counties this year may qualify you for the Ria de Aveiro Award. Check with REF for details. — Homebrewer IICAE, according to WB2AFS, goes so far as to wind his own transformers for phone/c.w. RTTY work on 80 through 10 meters. — K2MYR warns, "ONS 4NA/LX and 51P/LX will run c.w. on all DX bands, sideband on 15 and 20 meters, mainly at 0600-1200 GMT for about three weeks in late July." — Not many SAs in the Callbook, but SM1CXF offers QSOs almost daily, 14,005-ke. c.w. at 1500 GMT or so, Rol's also workable on s.s.b. —

ZB2AM tells old Canada hand W8YGR that the Royal Navy still dispenses a daily tot of rum, Jack recalls. "When I put out to sea in '24 my first mouthful burned, so I turned over my daily ration to a thirsty messmate, pure water-white Demerara." . . . Club pressclips from the Continent: DL4FT's Balearics baggage included a TR-3, RV-3 and 14-AVQ antenna for his EA6AR stopover. . . . W6KG and XYL WB6QEP drew the calls (35s ACH and ACI to kick off their European tour. . . . HB9s ABS ADP AFM ZT and ZU, signing the HB9 prefix, give the Liechtenstein tourist season a rousing spring send-off.

ASIA—Eighth Army Radio Club secretary WA3ERL announces, "There will be a Korea QSO Party from 2400, July 2nd, to 2400 the 4th. Present plans call for maximum participation by HL9s and it is hoped that HLs will also participate, all bands and modes. An appropriate award will be made to the station outside Korea submitting a log with the most HL9/HAM contacts during this period. Logs should be sent to 8th Army Radio Club, Electronics Craft Shop, 19th General Support Gp., APO, San Francisco, Calif., 96301." This activity should help you clinch Kimchi credentials mentioned here last month. . . . VS9ARV & Co.'s VS9KRV go of early March was a first-magnitude DXpeditionary success, as 5337 QSOers will agree. KR6CYG relays commentary from Ray: "We had a major setback March 7th when our beam was brought down by persistent gale (force 4 to 5) winds, the usual feature of Kamaran island weather. After securing the beam as best we could, the only method we could find to tie the boom to the 10-ft. mast safely was to lash the boom with rope. This deprived us of the ability to swing the beam around in choice of direction." VS9ARV and associates still hope to generate more DX excitement as VS9s HRV, Kuria Maria, and PRV. Perim Isle. . . . KR6MM expects to keep his SB-200-300/400 hook-up hoppin' on 15, 20 and 40 meters till August. A 2-element quad and 7-Mc. vertical helped Clyde



EL2AE files fine ARRL DX Test c.w. scores with this clean-cut Monrovia layout. Various exciters drive a Class C 4-400A feeding a 14-Mc. rotary, wire verticals for 21 and 28 Mc., dipoles for 3.5 and 7 Mc. EL2s AD AF and AM join in multioperator action. (Photo via W1YYM)

pass the 5000-QSO mark. . . . "Been trying 'to persuade H8ICW to get permission to sign K1AH/HIS for a while," remarks W1BVP. "Art's active on 14-Mc. c.w. about six days a month." Thailand's HS tag remains on the FCC-ITU Ban List, of course. . . . WB6SKA joins the KR6QW staff for a spell this month and wants to work a pile of 40-meter Novices. For schedules write Bill c/o U. S. NavSecGruAct, Okinawa, APO, San Francisco, Calif., 96331. . . . WA6SLU finds UD6BV learning English in preparation for his 14-Mc. s.s.b. debut a few months hence. . . . Asiagrams via the clubs press: 9K2s AM, 14,140 kc. AN and BY in the U. S. segment, are Kuwait duties in demand. . . . XW8BM was slated to leave Laos for Spain after much 20-c.w. action. . . . 487IV knocked off in April for six U.K. months. . . . VS6FF, bidding Hong Kong bye-bye after three lively DX years, credits VS6B's HKARTS club work for the present solid status of amateur radio there. C.w. hounds VS6s FC and FE are also returning to England.

AFRICA—Clubs courtesy periodicals from aforementioned clubs and groups: That mid-April EL outburst stemmed from Liberia's annual field day proceedings. . . . Ex-ZD8HL is reportedly in Pretoria with DXpeditionary aspirations. . . . CR7GF, said to be licensed for the Comoros, Europa Isle (Glorieuses, Juna de Nova, Tromelin and Aldabra, awaits solution of the logistical problems involved. . . . SU1DL (DL6PF), franchised in March, spends week ends on 20 c.w. . . . ZD9BE's Tristan da Cunha s.s.b. comes courtesy W2GHH of Hammarlund. . . . 5X5HU is one more east Africa regular (Continued on page 96)

YL news and views

CONDUCTED BY JEAN PEACOR,* KIIV

Motivating Force

Why did you study to become an amateur radio operator? What encouraged you to continue studying as a novice and go on for that next higher license, and the next? A survey of the inner drive behind every 'ham' in the world today would probably result in as many different reasons for each holding the particular license he does as there are hams. There's little doubt that everyone would like to hold the highest



Lisa, WA2QGX/AEC (in this case, Amateur Extra Class).

class of license — after all, who doesn't like to be the one to catch the biggest fish, or to get all As? But, what lights that fire?

How many YLs have gone right to the top and received their Amateur Extra Class licenses? Who can tell! But, those who have deserve and have earned the greatest admiration of radio amateurs everywhere. Mrs. Henrietta "Lisa" Sapp of East Orange, New Jersey is one such personage.

Lisa, WA2QGX, became a Novice in 1961 and is now an Amateur Extra Class licensee in 1966. What provided the necessary incentive? "It was just a case of wanting something very badly, and working until I received it."

Several years ago, Lisa purchased a short wave receiver for the purpose of assistance in the study of the Spanish language. She found it a great help in this regard, and in addition, it enabled her to receive news from all over the world. Never having heard of a transmitter, this operation represented short wave radio as far as Lisa was concerned. Then — she heard

* YL Editor, QST. Please send all news notes to K1LJV's home address: 139 Cooley St., Springfield, Mass.

someone speak of amateur radio; something she had never heard of before.

Curiosity may have killed the cat, but for Lisa it is an incentive to learn more about something unknown. She found the library was able to provide her with an amateur license guide and other books on the subject. Finding it most interesting, her studies began, and as soon as she had earned her Novice license, she began working toward her General Class which was hers eight months later.

The many good friends and interesting contacts Lisa made in the enjoyable period of radio operation which followed provided the necessary incentive for her to learn more. Her CP now at 20 w.p.m., and having read the Extra Class examination a few times — convinced her that it was well worth a try. Lisa's education had centered on the field of music, which left her a lot of ground to cover in the field of electronics before exam time. But, after two years of studying she recently attained her goal.

During these two years, there was little time for her to operate her station. Now, she has every intention to make up for lost time and WA2QGX is certain to become a familiar call.

Lisa's first words when asked "How did you do it?" — "I do not believe that there is much of interest in what I have done." Not much? Perhaps. But, suppose for a minute that every radio amateur were to follow Lisa's example!

How late does the library stay open?



Dr. Katherine L. Burlingham, W7PNF/5.

True Amateur Spirit

Let your license expire? No one likes to hear such news, especially when it's connected with one you know who has thoroughly enjoyed amateur radio. Yet, circumstances beyond control sometimes create such a predicament. Thanks to several interested YLs, they have not allowed this to happen to W7PNF, Dr. Katherine L. Burlingham (Kate).

In January of this year, Kate, now in Commerce, Texas, wrote a letter to W7NJS, Beth, mentioning the fact that she was letting her license lapse in June as she had no equipment and could not be on the air for renewal requirements. Beth rallied in the true amateur spirit and quickly wrote to K5YIB, Barbie, who in turn wasted no time in contacting W5LGY, Helen Douglas, the only YL in Commerce, Texas. Helen met and talked with Kate for the first time on February 28; Kate accepted Helen's offer to operate at her radio station in order to fulfill the on-the-air time requirements so that her license wouldn't lapse; and June will find Kate a happily renewed licensee.

W7PNF is an extraordinary YL and one of whom the entire amateur radio world can be very proud. Her start in the field stems from wanting to have a short wave re-



Cathy Seeds, W4BAV, became the bride of Bill Soehl, W2HJM, in the fall. All plans were made via 75 meters resulting in a real ham wedding as (l. to r.) W4DUI was best man, W2HJM the bridegroom, W4PUE performed the ceremony, W4BAV was the bride, and W4WPD was matron of honor. Both Cathy and Bill have retired and will be on the air $\frac{1}{4}$ from their new home in Sarasota, Fla.

ceiver repaired one day. Leon McQuary, a Portland, Oregon neighbor who came to fix it, was also a ham; one who was about to become a teacher. For, through Kate's urging, he ended up conducting radio classes not only for Kate, but for five other interested boys in her school which enabled her to become W7PNF in 1950 when she passed the Class B examination. In 1951, she passed the Class A exam.

Since 1951, Kate has kept right on passing exam after exam in many fields with the result that she now has an A.B. degree from Leland Stanford; Bachelor of Divinity from Pacific School of Religion, Berkeley, California; M. A. from Yale; and a Ph. D. in history from the University of Oregon. Despite the fact that Kate has been sightless since birth, all these things have been accomplished with the help of readers and recorded tapes, until now, she is an instructor in the history department of East Texas State University. That she is held in the highest regard was recently shown when the college newspaper included a feature article about her.

Because of Kate's studies and many moves, it's easy to see why she considered the possibility of lapsing her license, since she has been unable to set up her own station in Texas. Now, thanks to W5LGY, this will not be necessary. Kate's especially pleased as she plans to be married this summer in Portland, Oregon. As soon as they are settled, she hopes to be an active radio amateur once more.

Ten meters has always been Kate's favorite band. This band's openings of late make it a perfect time for her to once again become active.



Goldie Hoover, K9AXS, was recently presented Cert. Number 100 for WAS/YL by her OM, W9VEY, Secretary of the Montgomery County Radio Club.

YL Certificates

Since 1949, the year that Howie Bradley, W2QHII, became the first to earn WAS/YL, interest in all the YL certificates has steadily climbed. After the YLAP and YL/OM contests each year, many find that they now qualify for one of the YL certificates which are sponsored by YLRL (the Young Ladies' Radio League). Do you?

Worked all States YL—issued for a contact with a duly licensed YL in each of the 50 states, Hawaii and Alaska QSLs must be dated after August 21, 1959. The District of Columbia may be substituted for Maryland. As with other awards, the contacts must be made from a "single community." No time or band limitations. Send 50 QSLs and list alphabetical by states to Custodian, Grace V. Ryden, W9GME, 2054 N. Lincoln Ave., Chicago 14, Ill., showing date, call, band and emission. Include sufficient postage for return of QSLs by first class mail.

Worked all Continents YL—issued for a contact with a duly licensed YL on each of the six continents. All contacts must be made from within a 25-mile radius of original location. Send QSLs and list to Miriam Blackburn, W3UUG, Box 2, Ingomar, Pennsylvania 15127. YL Century Certificate—issued for contact with 100 different YLs. All contacts must be made within 25-mile radius of original



W4BCJP, Ruth Williamson of Ashley, Ohio (one of the Buckeye Belles) demonstrates her prowess in using a soldering iron. Ruth was recently the subject of a feature article in Marion, Ohio's Morning Star which highly praised her radio activities in connection with Navy Mars and for being editor of the monthly magazine *VF High Banders*.

location. Send list in alphabetical order by operator's last name, showing operator's full name, call letters and date of contact. Enclose postage for return of cards by first class mail. Endorsement given for each additional 50 YLs. Applications for stickers to be in same form as application for original certificate. This award is for working different YLs—same YL worked under different calls counts only once. Send applications and QSLs to Onie Woodward, W1ZEN, 14 Emmett St., Marlboro, Mass. 01752.

DX YL—available to YLs only. Work 25 duly licensed YLs outside your own country as defined in the ARRL DXCC countries list. All contacts must date after April 1, 1958. Send log extracts showing date, time, station, band, mode, RST report and own QTH, name, and call. QSLs not required. No charge but return postage appreciated. (Note: work 25 different DX YLs, not necessarily in different countries.) Custodian is Maxine Willis, W6UHA, 6502 Wynkoop St., Los Angeles, 45, Calif.

DXCC YL

The DXCC YL listing printed last October should certainly have included KL7DTB/6, Iris Colvin, who had endorsements for over 200 countries under that call. Since September, 1965, Iris and her OM, Lloyd, who have been on a worldwide DXpedition sponsored by the Yasmie Foundation, P. O. Box 2025, Castro Valley, Calif., have worked DXCC from several locations (confirmations yet to be checked) as they visited such places as many islands of the Trust Territory of the Pacific—Saipan, Yap, Truk, Majuro and Ebon. Their next DXpedition will find Iris also trying to work DXCC YL which she feels will be a most interesting but difficult thing to do.

YL Net News

Ladies of Two Land meet each Tuesday at 10 A.M. on approximately 3915 kes. N. J. YLs welcome all YLs to this net. QST

How's DX?

(Continued from page 98)

pulling out. . . . 6O1AU plans a September JY2AU sortie and possible earlier YI doings.

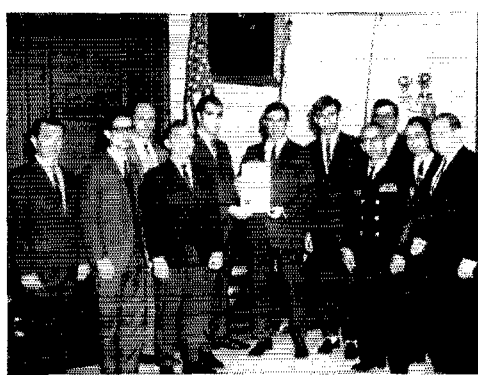
OCEANIA—“Worked about sixty countries, mostly 20 s.s.b., last September and October aboard *Sea Search* off Western Australia,” notes VF7DO/mm (VE7IR). “After a few months as ZL2ACP we’ll be off again, somewhere in southeast Asia. I’ll be land based next stop and hope to have a good DX call.” . . . Pacific patter via club newshawks: FW8RC of Wallis employs Collins gear obtained from star-crossed K7LNU and ZL2AWJ. Those islands still suffer from destruction wreaked by the mammoth storm that swallowed up Chuck and Ted last January. W9WNV, carrying on alone, signed IM4A from Minerva reef in mid-April. . . . VK4LT is mistaken for Willis island but there is no known ham activity there. . . . VK9AM, a Nauru resident, likes 21,230-ke. a.m. . . . WA4QKY/KG6I expects to depart Iwo next month. . . . VK9DJ, 14,210 ke. around 1300 GMT, is due for a four-year Papua stay. . . . 9M2YY wants to try some VSing soon. . . . VK9s KM, Mawson base, and AM, Wilkes, are said to be the Australian Antarctic amateurs-in-residence for '66.

SOUTH AMERICA—“I was privileged to be the first U. S. citizen to operate under the reciprocal license agreement in Ecuador,” writes W0MBD. “They made it very easy to get the license. All that was required was two copies of my FCC license and two copies of my passport photo, processing time only three weeks. Our first QSO involved the longest ‘ID’ I’ve ever heard on the air: KH6BCB/KS4 DE HC1EY/W0MBD!” . . . “I’m a novice in amateur radio, just started last August,” admits OA1BL. “Due to traveling I’m not as active as I would wish. I sign OA1BL/4 in Lima at present with an SB-line station and 40-meter dipole, phone only, almost nightly on 7050-7100 ke. After obtaining a higher grade of license I expect to have a rotary on 10, 15 and 20 meters.” . . . CX2AJ, retired vice-director of telecommunications, Uruguay defense ministry, looks back fondly on a 10,000-QSL DX career. . . . W7DU relays VP8IV’s strong protest against QSO butters-in. . . . CE0ZL/mm-KC4AAA/-mm-WB6LZP/mm, aboard USNS *Eltanin* way down south, runs a kw. and vertical on 7035, 14,060, 14,280 to 14,300, 21,050 and 21,440 ke. A shipboard quad is planned. . . . LCRA (Colombia) sponsors the Independence of Colombia DX Contest, an all-mode affair, on the 16th-17th of next month. Should help keep the 28- and 21-Mc. DX ball spinning through the summer slack season. More specifics

next QST PY7ACQ packed a v.f.o. transceiver, 30L-1 amplifier, dipoles and triband beam for his April Fernando de Noronha fun.

HEREABOUTS—“I’m currently operating from California under the new reciprocal licensing agreement,” reports G3MHV/W6. A Northern California DX Club meeting was an early must stop for Terry. . . . Connecticut Wireless Association’s recent PJ5ME swing produced 4.7 kiloQSOs and 87 ARRL DX Test multipliers for some 1.1 megapoints. Quick QSOs with PJ5ME encouraged high contest interest among weak-signal chaps otherwise hesitant to dig in. There goes another formerly rare country! . . . “Looking through my 1926 ‘27 c8GJ and n3JL Canadian logs I find four QSOs with W2CTN, then u2CTN,” discovers W8YGR. (Guess Jack’s *always* been reliable with those QSLs! . . . This year’s October W9-DXCC meeting, a gala DX event since 1953, coincides with the National Electronics Conference at Chicago’s McCormick Place with status as a “participating activity”. W9-DXCC acting chairman W9WYB, filling the shoes of absent G5ABA/W9QQN, plans a DXceptional program with the assistance of W9s DWQ FKC and JUV. Dick surmises, “Because we will be part of NEC we expect a large turnout of ‘visiting firemen’, both among DXCC holders and live DX. We solicit program suggestions from one and all.” . . . “Noticed your April ‘giant-killer’ notes,” writes W5LXG. “In 18 months I have 102 countries on 40 c.w. with a Navigator and ground-plane.” Steve’s vertical is gamma-matched on a 20-ft.-high base. He has 811As on stand-by if the party gets rough. . . . K1ZJA finds room in his attic for six DX antennas. . . . W8TRN volunteers our Gripe of the Month: “Stayed out of the DX Test this year because after operating for five minutes I decided it was a rat race with no purpose. Main reason for quitting was the amount of rules and procedures violations heard on the bands. I just don’t go for this new ‘DE DE’ business.” Neither does FCC, we might add. . . . WN4YZC concludes his Novice DX career with 76/24 countries worked/confirmed. . . . VE3CKW discloses that YN6BF is VE3BFA, also active aboard USS *Hope*, the mercy ship, as W7HH/YN6. . . . “Never thought I could get out with such a temporary set-up,” exclaims WB4CAP. “But after my first month on the air I find I’ve worked ten countries with 60 watts and an indoor 16-foot wire on 20 c.w. H8XAL, HKs 3BAE 0A1, KP4BJM, PJ5ME and XE1Z came back during the ARRL DX Contest.” Man, that’s getting your DX feet soaked fast. . . . W4BPD, hardly resting on laurels, regaled the New England DX Association meeting at Boston in April. . . . W51GJ embarks on his fifth year as editor of West Gulf DX Club’s renowned *Bulletin*. QST

Strays



Rhode Island's Amateur Radio Week is June 4 to 11. Gathered for the proclamation are K1RCL, W1IUP, K1AMG, K1HMO, W1YRC, Governor John H. Chafee, K1ZKM, K1VPK, WA1FQP, K1VZT and SCM K1AAY with K1UXS behind the camera. Amateurs can help celebrate the week by seeking the Recognition Award; for details see the box on page 120.



Operating News



F. E. HANDY, WIBDI, Communications Mgr.

LILLIAN M. SALTER, WIZJE, Administrative Aide

ROBERT L. WHITE, WIWPO, DXCC Awards

GERALD PINARD, Club Training Aids

GEORGE HART, WINJM, National Emergency Coordinator

ELLEN WHITE, WIYYM, Ass't. Communications Mgr.

PETER CHAMALIAN, WIBGD, Communications Asst.

W1AW Sked. Elsewhere in these columns we again show W1AW's summer schedule for bulletins, code practice and general operating contact. To accommodate the majority of RTTY equipped amateurs, we continue to use standard 850 cycle shift for the present on the RTTY bulletins which we send simultaneously in three bands. Note in the RTTY periods in which we look for calls around 3624 and 14095 kc. that we will, on request, use 170 cycles in place of 850 cycle shift. The summer sked includes a full hour Wednesdays 2000-2100 GMT, 14095 kc.-RTTY, for such work. Besides the twice nightly voice and c.w. transmission of Official Bulletins, OBS messages sent on 20-40-80 RTTY are repeated twice, as time permits, at 0300 GMT. There follows on the band indicated, a 0310-0330 Tues.-Fri.-GMT open period for RTTY contacts, optional shift. Please tell us of RTTY nets that standardize on 170 cycle shift. We understand that the

Florida net (FATT) only awaits word that a majority on the net have converters that will take the short shift, before making official such daily net operating criteria.

Public Service Work is listed as "number one" in the list of objectives in the ARRL Program. The League has made it a special goal in itself as attested by 30,000 amateurs registered in the Emergency Corps. Organizing and operational information is contained in the manual (on request) "Public Service Communications." The government, through the RACES program and the League in its provisions for an Amateur Radio Public Service Corps (AREC and NTS) have set up patterns or mechanisms to implement this "first goal" in the ARRL Program. All amateurs can help by signing up in these efforts in planned use of our amateur bands. The benefits in personal operating results will be found highly worthwhile.

THE ARRL PROGRAM

- for more effective performance in the public interest, convenience and necessity
- for more efficient use of amateur frequencies
- for increased amateur technical proficiency

1. A complete review and revision of the present written examinations for various classes of amateur license to conform more closely with modern techniques.
2. Reinstatement of an advanced grade of license, with appropriate frequency privileges, to provide an incentive for improved technical knowledge.
3. An expanded educational program in operating and technical fields through:
 - a. *QST* and other League publications.
 - b. Encouragement to affiliated clubs in planning worthwhile programs for regular meetings.
 - c. Enlargement of the club Training Aids project administered by Hq.
4. A more effective Official Observer system.
5. Combining the Amateur Radio Emergency Corps and the National Traffic System to constitute an Amateur Radio Public Service Corps for maximum effectiveness in the public interest.
6. Limiting the term of Conditional Class licenses and making them non-renewable except in cases of genuine hardship (*i.e.*, the handicapped).
7. An educational program in *QST* to better acquaint members with the League's history, accomplishments and goals.
8. Strict observance of the following operating principles:
 - a. To make proper choice of bands below 30 Mc. appropriate to the distance to be covered.
 - b. To achieve equipment flexibility so that an adequate choice of frequency bands and powers may be available.
 - c. To use minimum bandwidth, consistent with good engineering practice and compatible with the mode of transmission being employed.
 - d. To reduce the frequency shift, when using RTTY, to the minimum practical values consistent with reliable communication.
 - e. To expand the use of v.h.f. for local contacts wherever possible, with the ultimate aim of conducting all short-distance communication in this portion of the spectrum.
 - f. To use the minimum power necessary for each communication.

The National Calling and Emergency Frequencies, mentioned here last month, were used to advantage in the emergency alert following those tornadoes in Florida. Hank, W8CHT, mentions that use of the 3550 kc. NCEF, also monitored by W8RYP, was instrumental in finding W4MLE and QFEN, who were handling lots of useful traffic.

V.H.F. Netting Invites You. In these pages of *QST* in February we described the start-off of a v.h.f. net program. Emergency Coordinators and VHF-PAMs in increasing numbers are placing dependence on the v.h.f.'s. A disaster plan without any v.h.f. net and provisions for deploy-

ing mobiles as well as fixed stations is missing something. A working net of a dozen v.h.f. stations (not necessarily the same ones each night) can guarantee an area of local coverage and at the same time it creates new opportunities for fraternalism and constructive work.

In v.h.f. we hope there's good contact and understanding with ECs and PAMs, so net operators can be called to serve the community in useful emergency and traffic handling functions, in disasters and at other times. Where such nets are NOT existing or need to be expanded to have more points covered — or if they need to find members in the net *who also connect with*

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. All totals shown represent submissions received through March 31, 1966 and are shown alphabetically by call.

G3PKM... 317/333	4X4DK... 316/333	W2LV... 314/332	W6WWD... 312/328	W2GNO... 310/326
HB9J... 317/340	DL3LL... 315/330	W2NUT... 314/329	W8KML... 312/323	W2RDD... 310/323
W1BHF... 317/340	W2PL... 315/337	W2OKM... 314/331	W8NGO... 312/338	W3LMO... 310/322
W2AGW... 317/340	G4GP... 315/338	W4LRN... 314/325	W0QGI... 312/327	W4BJ... 310/321
W2BXA... 317/340	HB9MO... 315/331	W4OM... 314/335	DL7BA... 311/327	W5GJ... 310/327
W2JT... 317/340	K2BZT... 315/331	W4PLL... 314/328	G3RFB... 311/328	W5BKU... 310/327
W3CAU... 317/339	K6ENX... 315/331	W5KCL... 314/336	HB9TL... 311/326	W5POA... 310/327
W3GHD... 317/340	VE3GFG... 315/328	W5UX... 314/328	IT1TAI... 311/326	W6LDD... 310/330
W6GUO... 317/341	VK3KB... 315/337	W6GYV... 314/331	K2DCA... 311/327	W6TZZ... 310/330
W7GUV... 317/339	W1FH... 315/340	W7AG... 314/337	K41CK... 311/322	W9YSX... 310/326
W7PHO... 317/334	W2BOK... 315/331	W9NDA... 314/337	K4RPK... 311/319	W0QDF... 310/326
W8EWS... 317/340	W2LAX... 315/331	W0YFV... 314/337	K5BGB... 311/323	DL6GN... 310/325
W81BI... 317/335	W2SSC... 315/330	W0AIW... 314/336	K6EVR... 311/327	G3AAE... 309/328
W81IN... 317/341	W2PT... 315/323	W0BFB... 314/331	KV4AA... 311/334	W2OHH... 309/329
W8KIA... 317/340	W2WZ... 315/337	DJ2BW... 313/329	W2DEC... 311/326	W2TVR... 309/326
W8POO... 317/333	W2ZGB... 315/330	DL3RK... 313/329	W2FXN... 311/324	W2GLF... 309/322
W8UAS... 317/337	W3ECK... 315/331	PA0EX... 313/332	W2HO... 311/326	W6HOG... 309/321
W9RBI... 317/339	W3LMA... 315/336	VE7ZM... 313/333	W42ZS... 311/327	W6KZL... 309/324
CE3AG... 316/339	W4ML... 315/334	W1ME... 313/335	W3CCS... 311/329	W6RKP... 309/321
CX2CO... 316/336	W4OPM... 315/329	W2UVE... 313/330	W3NKM... 311/327	W6UOV... 309/322
LU6DJX... 316/339	W4TM... 315/336	W3JNN... 313/336	W4DOS... 311/317	W6WHM... 309/324
OE1ER... 316/337	W4VPD... 315/331	W3VGH... 313/327	W4LVV... 311/330	W0AJU... 309/322
PY2CK... 316/338	W5ABY... 315/331	W4CYB... 313/333	W4LYV... 311/330	W0PNO... 309/330
W1CLX... 316/338	W5AEP... 315/339	W6GPP... 313/333	WMMR... 311/330	ZL1HY... 309/322
W1GKK... 316/340	W5CKY... 315/333	W8DAW... 313/336	W5OK... 311/321	G1BIVJ... 308/322
W1JYH... 316/338	W5MMK... 315/335	W8IRN... 313/330	W6KEV... 311/332	K2UUV... 308/320
W2SUO... 316/332	W7ENW... 315/338	W81KH... 313/332	W6OSU... 311/322	W1CKA... 308/317
W2TQC... 316/334	W8BF... 315/335	W0NLY... 313/328	W6PUY... 311/331	W1FZ... 308/326
PY2CK... 316/338	W8ERW... 314/333	W0SLY... 313/330	W6PUD... 311/327	W2FXA... 308/326
W3KTL... 316/339	DJ1BZ... 314/331	G3AM... 312/335	W6RAN... 311/330	W2GUM... 308/329
W4AIT... 316/338	DL1IN... 314/329	G8KS... 312/329	W9GHL... 311/327	W2RJV... 308/323
W6AM... 316/340	K2LWR... 314/326	I1AMU... 312/330	W0BMO... 311/323	W3EPV... 308/330
W6YV... 316/335	K3UPG... 314/337	K4AM... 312/325	W0MLY... 311/326	W3JTC... 308/330
W7GBW... 316/339	K4LNM... 314/327	ON4DM... 312/330	W0NTA... 311/330	W4SSU... 308/315
W8BA... 316/338	W4HX... 314/333	W2CTO... 312/331	W0PCI... 311/325	W4ZAZ... 308/313
W8DMO... 316/337	W1HZ... 314/331	W2PCI... 312/328	5Z4AQ... 311/328	W5EGK... 308/327
W8MPW... 316/333	W1MV... 314/330	W2SAW... 312/328	K2QEA... 310/325	W5LGG... 308/327
W9HUZ... 316/335	W1ZW... 314/330	W2YTH... 312/329	K4TJL... 310/318	W5PSB... 308/320
W91NM... 316/338	W2YA... 314/332	W3RNO... 312/329	K6FO... 310/323	W4EY... 308/321
W0DU... 316/337	W2FZY... 314/326	W5RLG... 312/332	LU4DMG... 310/325	W6FOZ... 308/326
W0EJA... 316/338	W2HTI... 314/328	W6RZE... 312/331	W1BAN... 310/322	W7CNO... 308/318
W0QVZ... 316/336	W2LPE... 314/334	W6EPZ... 312/332	W2DOD... 310/327	W8KML... 308/325

Radiotelephone

W3RIS... 317/341	W4DOH... 315/336	W9JFF... 313/329	HB9TL... 310/325	W1ONK... 309/324
CX2CO... 316/336	W8BF... 315/335	W9RBI... 313/335	W2PT... 310/315	W2GLF... 309/322
PY2CK... 316/338	W8HW... 315/336	W0AIW... 313/333	W3RT... 310/328	W2OKM... 309/324
PY4TK... 316/332	W8POO... 315/331	ON4DM... 312/330	DL1IN... 309/324	W3GHD... 309/326
W2ZX... 316/334	4X4DK... 315/332	W1FH... 312/332	G2PL... 309/328	W4PDL... 309/318
W6YV... 316/335	5Z4ER... 314/335	DL3LY... 311/326	G8KS... 309/322	W9WHM... 309/324
W7PHO... 316/333	G3FKM... 313/326	I1AMU... 311/329	K4TJL... 309/317	K4AIM... 308/321
W8Z... 316/338	W3JNN... 313/333	W2HTI... 311/325	LU4DMG... 309/324	VK3AH... 308/319
W2BXA... 315/336	W6AM... 313/336	W8KML... 311/331	W1BAN... 310/322	W0YV... 308/324
W2JT... 315/328			T12HP... 309/330	W9SCD... 308/322

New Members

From February 16, through March 31, 1966 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.

I1CQD... 264	SL6BU... 124	W4FTB... 109	KP4MO... 105	PA0MTB... 102	K1FNU... 100
W4BDXA... 199	W5KZA... 121	W8LE... 109	OZ2CE... 104	UA9ML... 102	K2BKU... 100
KH6RBJ... 166	V8AJ... 121	J1DZY... 108	SA1BOE... 104	W4ZJM... 102	K6OZV... 100
K7JVF... 163	HB9AFA... 120	K7VAL... 108	W1GIV... 104	W6NRK... 102	OE1SQ... 100
W2HPV... 155	PY2RJH... 120	UA6MT... 108	W6RMI... 104	W47AR... 102	UA1TL... 100
W8GOU... 146	W8KC... 116	YU3PZ... 108	W49BT... 104	Z12BAH... 102	UW3BX... 100
OK1ABP... 141	W9NUQ... 114	W9GHL... 107	Z1NRY... 104	K1RZY... 101	W3BY... 100
W4LD... 141	G3POR... 113	W4BWM... 107	Z3AH... 104	K3QJE... 101	W4ARM... 100
ZD8RC... 141	K5VLO... 113	W4DUB... 107	K0GJX... 103	UA9EG... 101	W2BKTQ... 100
DL7CT... 140	OK1OO... 112	YU2RAK... 107	SM8AFH... 103	SP8SO... 101	W3KHW... 100
K1OZR... 138	W3JNV... 112	UB8QA... 106	UA9JS... 103	W1DYE... 101	W8BEP... 100
ON5AX... 135	W4HTR... 112	UW3CX... 106	W9JSM... 103	W2PDT... 101	W8BEK... 100
VE2ATU... 134	K4QD... 111	W49WD... 106	W0ZLN... 103	W49JUM... 101	W9CJY... 100
NW8AS... 129	W2EYJ... 110	W6CYV... 106	G3RDE... 102	3A2BT... 101	W9OCY... 100
DJ7MI... 124					W9SCD... 100

section-wide h.f. nets for liaison and outside-the-area messages, we request that SCMs, SECs and our other officials get busy. Contact some v.h.f. actives and h.f.-v.h.f. net liaison operators; get new appointments and arrangements going, all to the betterment of amateur radio. The Section-wide nets (h.f.) in NTS are vital to maintain our over-all communications, national and regional. In the same manner let us organize and make a part of all local emergency plans more v.h.f. nets. These can also receive certificates for net members from the SCM, when they contribute to Section objectives and the nets are part of traffic and disaster plans.

— P.E.H.

CLUB COUNCILS AND FEDERATIONS

Affiliated Council of ARCs, Mrs. Charlotte Ellis, K7SUR, Secy., 9610 S.E. Sixth St., Vancouver, Wash.
 Amateur Radio Council of Arizona, Gary Hamman, W7CAF, Secy., 1420 E. Missouri, Phoenix, Ariz.
 Chicago Area Radio Club Council, Karl Kopetzky, K9AQJ, Secy., 1052 Loyola Ave., Chicago, Ill. 60626.
 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 Mayer, W2OUQ, Secy., 25 Aldred Ave., Rockville Centre, L.I., N.Y.
 Hudson Amateur Radio Council, Fred J. Brunjes, K2DGI, 22 Ivy Drive, Jericho, L.I., N.Y. 11753.
 Indiana Radio Club Council, Inc., Ben Moore, W9DUD, Secy., 239 So. Jefferson St., Martinsville, Ind. 46151.
 Los Angeles Area Council of Amateur Radio Clubs,

DX CENTURY CLUB AWARDS

Radiotelephone

W8MPW . . . 309	OE7UD . . . 118	DL4PA . . . 110	OE1IU . . . 104	W5YKF . . . 102	W2PBZ . . . 100
F4QGMU . . . 241	W86AJ . . . 117	W34HTR . . . 110	W0NGF . . . 104	W7VSM . . . 102	W2WFF . . . 100
PY2PC . . . 218	W4AXL . . . 116	W2EYJ . . . 108	HB9AHA . . . 104	1MXY . . . 101	W44BRW . . . 100
KH6BJJ . . . 164	9M2GJ . . . 115	W36ADY . . . 108	K2ZFA . . . 103	K23SW . . . 101	W44TL . . . 100
WA5BYV . . . 149	W49NUQ . . . 113	DJ2MV . . . 105	W4WSE . . . 103	OZ2KT . . . 101	W460IT . . . 100
G13SLE . . . 132	G3POR . . . 112	1F31 . . . 105	W7REZ . . . 103	V82RB . . . 101	W7UZE . . . 100
C11IK . . . 129	W1FEF . . . 112	HB9TE . . . 104	K1QXO . . . 102	K18CQ . . . 100	W01JM . . . 100
XW8AS . . . 127	W0NWO . . . 111	11EAG . . . 104	VP9CP . . . 102	K2HWB . . . 100	

Endorsements

Endorsement listing through the 300 level are given in increments of 20, above the 300 level they are given in increments of 10. The totals shown do not necessarily represent the exact credits given but show only that the participant has reached the endorsement group indicated.

320	K8ONV	K9CJF	W2GKZ	K6EZH	WA5EFL	ZS2RM	W4ZXI	WA4DZU	W2LQP	VE3HL	K2MGM	
G2BOZ	K9EAB	LU5AQ	W2JAE	W2CZF	K8AJK		WA4FKJ	W4HKQ	W3AG	W1CSP	K3GUR	
G3DO	W2BBS	ON4NC	W2UJF	WB2CKS	K9QIE	200	WB0CIY	W6NUQ	W4CQI	WB2CZD	K3HTZ	
OH2NB	W2MJ	SM7QY	W2ZTV	W3DJZ	W5AI	HB9BJ	W7UZE	W8LZY	W4DVT	WB2FON	W4VSE	
W2CR	W2WVG	W2BMK	W4BFR	W5AI	220	K1GAX	W8MFW	W9QQG	W4RJI	W4HGG	K6SVQ	
W2GT	W4SSU	W2GKW	W4DLG	WA5EFL	HK3RQ	K2YMO	W90VF	W9SCZ	WA4HOM	WA4FDR	K6WDY	
W30P	W50GS	W2KTR	W5TIZ	W8YGR	JALADN	K41IF	W40KDI	W6PRW/5	WA4GCS	SM3CJD		
W6CHV	W6HYG	WA20JD	W6REH	W9HKL	K3MNV	K4WMB		W6LZI	W6ANB	VE3DDX		
W6ID	W6FN	W3PN	W7CSW	W0LBB	K4BVD	K4YYL	G2AAN	W7VMI	WA8GUA	VE3FKL		
W6IBD	W6LUS	W4EEE	W8KMD	YV5BOA	K6MAS	K5GOT	IT1AQ	DL3OH	W9NNC	VE7AGC		
W6NJU	W7DLR	W4RLS	W9PQA		OE8KI	K5QVH	JA8ADQ	JA1ACA	K1ZST	W9AUB	W1AGF	
W7CNM	W8PHZ	W5FFW	W9ZB	240	ON4QJ	K7BJE	K2HVN	K2ISF	K4MOJ	DJ1AK	140	
W8ONA	W9DWQ	W7EJD	W6QMD	F8EJ	OK1MP	OE1HGW	K2ISF	ON4ZY	K4BZU	HK3NQ	W0PFG	
	W9LW	W8EVZ	ZP5LS	HB9AAF	SP5ADZ	ON4ZY	K4JF	ON4ZY	K5LIL	K4BDE	DJ8BC	W81GM
	W9RCJ	W9TKD		K4FZ	W1AH	PN2BKO	K5LIL	PN2BKO	K6TYQ	OH2SB	120	WA2PLZ
DL3RK			260	K0HOR	W1WAI	SM5MC	K6TYQ	SM5MC	VO1BD	SP9DH	K1UDD	WA4END
DL9OH		300	DJ9GD	W1AUR	W1WQC	VO1BD	LA30F	VO1BD	W1BDF	UW8DR	K3FPO	DL1PN
OH5A	DL1JW	G6HH	DL6QW	W1BYJ	W2PXR	W1BDF	OE2BGL	OE2BGL	UW8DR	K4BOP	DL6AJ	WA9LZA
K4ASU	HB9EO	JA2JW	HK6B	W1BJJ	W3HDX	W2MOF	UA3FT	W1BDF	W1BDF	W6TZX	EL2S	W6QLZ
K6RW0	JA1BK	K6BDE	K11MP	W3ZQ	WA6HRS	WA2FQG	W2JSX	W1MRQ	K6TXZ	K1YPN	YC4TX	
K6VVA	K5ADQ	W1BFW	K9PPX	WA4FPX						K1ZND		

Radiotelephone

320	ZS6Q	K8ONV	K6ERV	ZS6BBP	220	200	W2GRY	K2KER	K2RAP	K4TFB	K5HWO
HB9J	W1PZ	W2GKZ	W2GKZ	DL7EN	G6RH	W2JAE	W1BYP	W2PDB	K4WMB	VE3DDX	
W2PTE	300	W2WVG	WB2F8W	K1IMP	11AA	W4PLL	W10HJ	W3PPV	K4YYL	W1MRQ	
	G6TA	W20DO	W3DJZ	K6ENX	K5GOT	W0LBB	W2JSX	W4GXB	K6RC	WA4GCS	
310	K9LUI	W4PFS	W45HP	DL1JW	K6MAS		W3PN	W5JWM	W1FDL	WA4HOM	
DL9OH	W1ZW	W4RLS	W5TIZ	W1BDF	W1WQC	180	W4AWF	W5LEF	W5LZZ	W6PYB	
UT3VJ	ZS6UR	W6BHY	W4DLG	W4AVY	W4AXE	DL1PM	W8WUO	W6WUQ	WA6FSB	W6PQT	
K8RTW		W6CHV	WA5EFL	W44XE	W4BFX	SM5ATN	W9NDE	YV5BS	WB6AJH	W8PVO	
W2WZ		W6NJU	W9LWQ	W6VUW	W6VUW	VE2ANK	JA2JW		ZL1ARY	W8LUI	
W3WGH	280	ICQD	W8ONA	W9LWQ	W9JY	W2ZSK	K2ISF	160	140	WA80J	
W4SKO	EA7ID	IKDB	W0LIL	W6QUU		W2CES		HTRA	K1ZSI	W6MGI	
W6RKP	K4AJ	K1JMV							K4WMB	11AKI	
	K6VVA									120	YV3KV

Gene M. Kistler, WA6OKZ, Secy.-Treas., 10218 — 10th Ave., Inglewood, Calif. 90303.

Manitoba Association of Amateur Radio Clubs, K. James Couprie, VE4CS, Secy., 487 Penninghame St., Winnipeg 14, Man., Canada.

Michigan Council of AR Clubs, Evelyn Penny, WA8HYL, Secy., 17422 Kinlock, Detroit, Mich.

Ohio Council of ARCs, James W. Benson, W8OUU, Secy., 2463 Kingspath Dr., Cincinnati, Ohio 45231.

Tennessee Council of ARCs, Mike Campbell, WA4HJK, Secy.-Treas., 2209 Mecca Drive, Nashville, Tenn.

Tulsa Council of Amateur Radio Clubs, Larry Russell, K5ZCJ, Secy., 11322 East 4th Place, Tulsa, Okla. 74128.

A.R.R.L. AFFILIATED CLUB HONOR ROLL

We're again proud to recognize those "100% clubs" in an Honor Listing of those affiliated clubs whose *entire membership* was shown in the '65 Club Annual Report as constituted of members of the American Radio Relay League. We're sending the Hundred Percenter's Certificate to each affiliate shown in this Honor Roll as *having every club member an ARRL member*.

One requirement of the Board of Directors for ARRL affiliation is that 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 1966 Honor Roll. This is expected to appear in December '66 QST. Our Honor Roll follows:

Aeronautical Center ARC, Inc., Oklahoma City, Oklahoma
The Amateur Communications Club of North Texas, Denton, Texas

AR Communications, Inc., Lansing, Mich.

Athens Amateur Radio Club, Athens, Georgia

Bays Mountain RC, Kingsport, Tenn.

Beacon Radio Amateurs, Philadelphia, Pennsylvania

Blue Ridge Radio Society, Inc., Greenville, South Carolina

Central Kansas Radio Club, Inc., Salina, Kansas

Conn. Wireless Assn., Connecticut

Decatur Amateur Radio Club, Inc., Decatur, Alabama

Dutchess County VHF Society, Poughkeepsie, New York

Enid Amateur Radio Club, Enid, Oklahoma

The Fort Venango Mike & Key Club, Seneca, Pennsylvania

Fountain City Radio Club, Knoxville, Tennessee

Hector Area Radio Club, Hector, Minnesota

Hoot Owl Club of Southwest La., Starks, La.

IRC ARC, Philadelphia, Pa.

Lake Success Radio Club, Great Neck, New York

Lamar Amateur Radio Club, Lamar, Colorado

Loudon County ARC, Lenoir City, Tennessee

Lower Columbia AR Assn., Inc., Longview, Wash.

Lumberton Amateur Radio Club, Lumberton, Mississippi

Mason County Radio Club, Inc., Ludington, Michigan

Massillon Amateur Radio Club, Massillon, Ohio

Maui ARC, Kailui, Maui, Hawaii

Mid-Island Radio Club, Freeport, Long Island, New York

Niagara Radio Club, Inc., Niagara Falls, New York

North Shore Radio Association, Inc., Lynn, Massachusetts

O.B.P. #1 Radio Club of St. Louis, Missouri

Pittsfield Radio Club, Windsor, Massachusetts

Potomac Valley Radio Club, Washington, D. C.

Radio Operators Association of New Bedford, Fairhaven, Massachusetts

Radions, Lancaster, New York

Rock Hill Amateur Radio Club, South Carolina

St. Louis Amateur Radio Club, Inc., St. Louis Co., Missouri

Sarasota Amateur Radio Association, Sarasota, Florida

Sheridan Amateur Radio League, Sheridan, Wyoming

Skagit Amateur Radio Club, Arlington, Washington

South Bay Amateur Radio Society, National City, Cal.

Submarine Base Medical Research Laboratory Amateur Radio Club, Groton, Connecticut

Town of Barnstable Radio Club, Hyannis, Massachusetts

Vanderburgh AR Emergency Service, Princeton, Indiana

Westlake Amateur Radio Assn., Lakewood, Ohio

Wichita Amateur Radio Club, Inc., Wichita, Kansas

ELECTION NOTICE

To all ARRL members in the Sections listed below:

You are hereby notified that an election for Section Com-

munications 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.

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.

RESULTS, FEBRUARY FREQUENCY MEASURING TEST

The February 10, 1966 FMT, open to all amateurs, brought entries from 320 participants who made a total of 1107 measurements. Of these 119 ARRL Official Observers submitted 362, and 201 Non-OOs made 745 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 credit as of equal merit all reports where computations show 4/10ths 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
W2AIQ W3BFF		W1MIUN W1PLJ	
W4CMP W4JU1		K1PMR K3BYY	
W5FMO W6GDO		W3PT W3PYW	
W9GFF	(0 to .4)	W4HER K4ITH	
W0VBK	..... .6	W5HTM W6NCP	
W1NTO	..... 1.0	W6SPB W6ZH K7UTF	
K0BRS	..... 1.1	W9BCY WA9GOP	
W4FFH	..... 2.1	K0HLC Robert Ireland	(0 to .4)
W8MTI	..... 2.8		
W3NNC	..... 2.9		
K8AOH	..... 2.9		
W6GQA	..... 3.4		

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.

You are urged to take the initiative and file nominating petitions immediately. This is your opportunity to put the man of your choice in office.

— F. E. Handy, Communications Manager

Section	Closing Date	SCM	Present Term Ends
Idaho	June 10, 1966	Raymond V. Evans	Apr. 10, 1965
Maritime	June 10, 1966	D. E. Weeks	June 11, 1966
Western		John F.	
Pennsylvania	June 10, 1966	Wojtkiewicz	Aug. 7, 1966
Western New York	June 10, 1966	Charles T. Hansen	Aug. 10, 1966
Santa Barbara	June 10, 1966	Cecil D. Hinson	Aug. 10, 1966
San Joaquin Valley	June 10, 1966	Ralph Saroyan	Aug. 20, 1966
Ontario	June 10, 1966	R. W. Roberts	Aug. 20, 1966
Iowa	June 10, 1966	Dennis Burke	Resigned
Alaska	July 11, 1966	K. E. Koestler	Apr. 10, 1964
Montana	July 11, 1966	Joseph A. D'Arcy	Sept. 9, 1966
Northern Texas	July 11, 1966	L. L. Harbin	Sept. 12, 1966
Santa Clara Valley	Aug. 17, 1966	Jeau A. Gmelin	Oct. 15, 1966
Nevada	Aug. 17, 1966	L. M. Norman	Oct. 22, 1966
New Hampshire	Aug. 17, 1966	Robert Mitchell	Oct. 26, 1966
San Francisco	Sept. 9, 1966	Hugh Cassidy	Nov. 19, 1966

ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed by members in the following Sections, completing their election in accordance with regular League policy, each term of office starting on the date given.

Canal Zone	Mrs. Lillian C. Smith, KZ5TF	Mar. 10, 1966
Connecticut	John J. McNassor, W1GVT	Apr. 11, 1966
Wyoming	Wayne M. Moore, W7CQL	June 9, 1966
Louisiana	J. Allen Swanson, Jr., W5PM	June 10, 1966
Quebec	Jim Ibcy, VE2OJ	June 11, 1966
Eastern Massachusetts	Frank L. Baker, Jr., W1ALP	June 15, 1966
South Carolina	Clark M. Hubbard, K4LNF	June 26, 1966

In the Southern New Jersey Section of the Atlantic Division, Mr. Edward G. Raser, W2ZI, and Mr. Stephen P. Branca, WA2BLV, were nominated. Mr. Raser received 259 votes and Mr. Branca received 168 votes. Mr. Raser's term of office began Mar. 4, 1966.

In the Ohio Section of the Great Lakes Division, Mr. Wilson E. Weckel, W8AL, and Mr. Richard A. Egbert, W8ETU, were nominated. Mr. Weckel received 851 votes and Mr. Egbert received 776 votes. Mr. Weckel's term of office began Mar. 28, 1966.

In the Tennessee Section of the Delta Division, Mr. William A. Scott, W4UVP, and Mr. Mark M. Bowelle, W4CXY, were nominated. Mr. Scott received 407 votes and Mr. Bowelle received 152 votes. Mr. Scott's term of office began Apr. 15, 1966.

A.R.R.L. ACTIVITIES CALENDAR

(Dates shown are per GMT)

- June 11-12: V.H.F. QSO Party
- June 14: CP Qualifying Run — W6OWP
- June 17: CP Qualifying Run — W1AW
- June 25-26: Field Day
- July 7: CP Qualifying Run — W6OWP
- July 9-11: CD Party (c.w.)
- July 13: CP Qualifying Run — W1AW
- July 16-18: CD Party (phone)
- Aug. 5: CP Qualifying Run — W6OWP
- Aug. 18: CP Qualifying Run — W1AW
- Sept. 8: Frequency Measuring Test
- Sept. 9: CP Qualifying Run — W6OWP
- Sept. 10-11: V.H.F. QSO Party

OTHER ACTIVITIES

The following lists date, name, sponsor, and page reference of QST issue in which more details appear.

- June 4-11: Rhode Island Amateur Radio Week (p. 120, this issue).
- June 11-13: New York State QSO Party, South Shore Amateur Wireless Assn. (p. 101, this issue).
- July 2-3: Alabama QSO Party, Huntsville Amateur Radio Club (p. 134, this issue).
- July 16-17: Independence of Colombia Contest, Liga Colombiana de Radio-Aficionados (next issue).
- July 17: Minnesota QSO Party (next issue).

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for Mar. Traffic:

Call	Orig.	Recd.	Ret.	Del.	Total
K6BPI	928	2944	2825	129	6826
K6MCA	134	1072	1041	31	2278
W3CUL/4	109	976	914	19	2018
K8EPT	221	742	569	233	1765
W7BA	4	659	604	53	1320
WA0DEM	104	534	457	2	1097
K8TEY	2	518	516	2	1038
W6ZJB	20	488	477	17	996
W3EML	24	507	408	4	943
WA9CCP	66	463	370	3	902
WB6BBO	37	436	386	22	881
WA4SCK	9	423	407	6	845
K8YVN	10	398	386	14	808
K9IVG	26	433	340	9	808
WB6JUH	22	390	350	40	802
W7DZX	16	388	320	9	733
W00HJ	17	356	350	6	729
W1PEX	57	346	304	20	727
K7TCY	17	317	281	36	651
WB6QXY	17	301	277	7	650
W7BLA	25	246	239	4	617
K8G8Y	42	282	276	1	601
W6RSY	98	200	227	34	559
WA5PII	7	274	265	8	554
W5ODV	154	193	13	190	550
WB4AIW	6	368	254	13	641
W6ZWL	1	274	258	258	535
W9JOZ	22	256	256	0	534
K9KZB	26	254	245	9	534
WB2NKN	30	250	240	10	530
K1ZND	14	264	248	3	529
K8LNF	1	259	255	4	519
W8VNO	15	245	254	0	514
WA4RQR (Feb.)	4	1329	1309	14	2656
WA9CNR (Feb.)	297	163	39	77	576

More-Than-One-Operator Stations

Call	Orig.	Recd.	Ret.	Del.	Total
W6YDK	4671	457	396	61	5585
W6IAH	969	1381	1031	350	3731
W4LEV	126	669	795	35	1625
W41BU	326	207	207	50	1219
K6WAH	153	316	313	3	785

BPL for 100 or more originations-plus deliveries

W4BPQ 208	W5HTY 125	W6WPF 104
WA4BMC 186	WA0JKT 119	WA1AF/4 103
W4SQND 174	WA4NEV 117	WB2QLF 103
K1GPH 167	K5MBK 117	WA1APY 102
W44YDT 157	WINJM 114	WA0GJT 102
W45CKL 154	K4FVY 114	K81OV 100
K7CR 131	K8SOH 112	K0ZZR 100
WA0KFI 128	W48KME 112	Lat. Report:
W7P1 127	K8KMQ 108	W9SUF (Feb.) 103
	WB2RBA 106	

BPL medallions (see Aug. 1951, p. 54) have been awarded to the following amateurs since last month's listing: WA1APY, K1OLAL, K3MYS, W4FP, W4RZL, WA4SCK, WA9LWJ, W0DEM.

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 more 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.

SUGGESTED OPERATING FREQUENCIES

RTTY 3620, 7040, 14,090, 21,090 kc.
WIDE-BAND F.M. 52.525 146.94 Mc.

CODE PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from W1AW will be made June 14 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 June 17 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 14 becomes 2130 EDT June 13.

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

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 by their fellow amateurs in recognition of their extra skills and courtesies:

W2DSC	W7SZM/KL7
WA4WWT	WN8SP0
K5DNE	WA9EZF
W5EHC	WA6IKK
W5GD	CH5UR
W5ODV	TG8FA
WA5CKL	VE7AIP
WA5FII	VK2AGH
WA6SCE	VK2QL
	VK2VN



Date Subject of Practice Text April QST.

June 3: *It Seems to Us*, p. 9

June 7: *Electrical Interference*, p. 11

June 13: *A Better C.W. Keying Monitor*, p. 23

June 23: *Amateur Radio — A National Resource*

Date Subject of Practice Text from *Understanding Amateur Radio*, First Edition

June 24: *The Diode Symbol*, p. 47

June 29: *Amplification by Transistors*, p. 47

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 -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.

IMPORTANT NOTICE

Changes of Address

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

SWITCH TO SAFETY!



on an expanded basis this season. These start at 2330 and 0130 GMT and are sent simultaneously on all c.w.-listed W1AW frequencies, with about 10 minutes practice given at each speed; 5, 7½, 10 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 W1AW* and to allow checking strict accuracy of your copy on certain tapes note the GMT dates and texts to be sent in the 1030—0220 GMT practice on those dates!

W1AW SCHEDULE JUNE, 1966

The ARRL Maxim Memorial Station welcomes visitors. Operating-visiting hours are Monday through Friday 1 p.m.—1 a.m. EDST, Saturday 7 p.m.—2:30 a.m. EDST and Sunday 3 p.m.—10:30 p.m. EDST. The station address is 225 Main Street, Newington, Conn., about 7 miles south of Hartford. A map showing local street detail will be sent upon request.

GMT*	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
0000	CW-OBS ¹	CW-OBS ¹	CW-OBS ¹	CW-OBS ¹	CW-OBS ¹	CW-OBS ¹
0020-0100 ⁴	3,555 ⁵	14.1	14.1	7.08 ⁶	14.1
0100	Phone-OBS ²	Phone-OBS ²	Phone-OBS ²	Phone-OBS ²	Phone-OBS ²	Phone-OBS ²
0105-0130 ⁴	145.6	3,945	145.6	50.7	1.82	21.41
0130	Code Practice Daily ¹ 15-35 w.p.m. TThSat., 5-25 w.p.m. MWFSun.					
0230-0300 ⁴	3,555	7.08	1,805	7.08	3,555
0300	RTTY-OBS ³	.....	RTTY-OBS ³	RTTY-OBS ³	RTTY-OBS ³	RTTY-OBS ³	RTTY-OBS ³
0310-0330 ⁴	3,625	14,095	3,625	14,095	3,625
0330	Phone-OBS ²	.....	Phone-OBS ²	Phone-OBS ²	Phone-OBS ²	Phone-OBS ²	Phone-OBS ²
0335-0400 ⁴	7,255	3,945	7,255	3,945	7,255
0400	CW-OBS ¹	.....	CW-OBS ¹	CW-OBS ¹	CW-OBS ¹	CW-OBS ¹	CW-OBS ¹
0420-0500 ⁴	3,555 ⁵	7.08	3,945	7.08 ⁶	3,555
1700-1800	21/28 ⁵	21/28 ⁵	21/28 ⁵	21/28 ⁵	21/28 ⁵	.....
1900-2000	14.28	7,255	14.28	7,255	14.28	.....
2000-2100	14.1	14.28	14,095	21/28 ⁵	7.08	.....
2200-2300	21/28 ⁵	21,075 ⁶	14.1	7,255	14.28	.....
2330	Code Practice Daily 10, 13 and 15 w.p.m.					

¹ CW, OBS (bulletins, 18 w.p.m.) and code practice on 1,805, 3,555, 7,08, 14.1, 21,075, 50.7 and 145.6 Mc.

² Phone OBS (bulletins) on 1,82, 3,945, 7,255, 14,28, 21,41, 50.7 and 145.6 Mc.

³ RTTY OBS (bulletins) on 3,625, 7,015 and 14,095 Mc, 170/850 cycle shift optional in RTTY general operation.

⁴ Starting time approximate. Operating period follows conclusion of bulletin or code practice.

⁵ Operation will be on one of the following frequencies: 21,075, 21.1, 21.41, 28.08 or 28.7 Mc.

⁶ W1AW will listen in the novice segments for novices on band indicated before looking for other contacts.

Station Staff: W1QIS W1WPR W1NPG. *All times/days in GMT, general operating frequencies are approximate.

SCM — ARC — ORS — CP — SEC — OBS — TCC — OO — NT-5 — W-AGS

Station Activities

OBS — A1OPR — EC — DXCC — CLUBS — RM — OPS — RCC

• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

DELAWARE—SCM, Roy A. Belair, W8IYE—SEC: K3NYG. RM: W3EEB. V.H.F. PAM: K3OBU.

Net	Freq.	Local Time	Days
DEPN	3905 kc.	1800	Sat.
DSMN	50.4 Mc.	2100	Tue.
Dover 6 & 2	50.4 Mc.	2000	Wed.
KCEB	3905 kc.	1300	Sun.

K3NYG has a twoer on 2 meters. K3YZF is on the 80-meter auto-start RTTY circuit. K3ZMI is working DX on 15 meters. The Kent County ARC has concluded classes for Novices and announces the following new teams: WN3s FKO, FFU, FFV, FFW, FFX and DZY. K3OPF is on special duty at Edwards AFB, Calif. W3-EB reports via radio. W8IYE is returning to Delaware after 3 months in South Carolina. Traffic: (Mar.) W3-EB 144, K3YZF 9, K3ZMI 8, K3NYG 4, W3HKS 2, W8IYE 1. (Feb.) W3EEB 157.

EASTERN PENNSYLVANIA—SCM, Allen R. Breiner, W3ZRQ SEC: W3ELI. RMs: W3EML, K3MVO, K3YVG. PAMs: W3BYH, W3SAO. Epa. C.W. Net had QNI of 419 and QTC of 318. The PTN had a QNI of 356 with a QTC of 158. The Epa. Emergency Phone & Hc. Net has changed frequency to 3917 kc. K3HLN is Montgomery County EC. W3KJJ and W3MPX are now ORSs. New OPSS include WA3ATQ, WA3CCC, K3WJ and K3TNL. K3OMF is attending Penn. State U. WN3-DMH has 28 states confirmed out of 36 worked and wonders where all the Delaware stations are! K3MNT is planning to attend Lafayette College. WA3CUI finds traffic work interesting. W2AFB and ex-FCC executive, its club station trustee for the "K" ARA. W3CKB spent the winter in Florida. K3ABC has a home-brew linear on the bands. RF Hill ARC had a Public Relations booth at the Quakertown Q-Mart. Milton ARC has 21 students in its instruction classes. W3CBH transmits ARRL Bulletins nightly on 3610 kc. at 1800 local time. K3SLP has QSOed a number of African stations on 10 meters. Lancaster Radio Transmitting Society officers are K3RZE, pres.; W3PEY, vice-pres.; W3OY, sec.; K3BLC, treas. New Gear Dept.: K3DSM an NCL-2000 and TA-33. K3RZE an 8B-300, K3WEU a FA-3340 and tower. WA3CFU a 126-ft. dipole. K3YVG a Collins 32S-2, K3FSV a TH-3 beam. Your editor added a new r.t. splitter in the 600-watt class which works both c.w. and s.s.b. The Lower Merion C.D. Net meets every Thurs. at 1930 local time on 147.21 Mc. All stations are welcomed to join the net. W3EEB, in Glenolden, has acquired an Extra Class license. The Epa Section has added another "first." A joint section net bulletin was printed and will continue on a quarterly basis. Local and area nets affiliated with NTS are welcome to send us items for entry. Copy deadline is June 8, Sept. 10 and Nov. 9. Traffic: W3EML 943, K3PIE 261, K3MVO 250, W3AFQ 246, K3FSV 128, K3YVG 119, W3-AIZ 111, W3ZRQ 95, W3RV 71, WA3BYH 68, K3TNL 56, W3FAF 54, W3JKX 50, WA3AFI 48, W3OY 46, K3-SLP 44, W3FGQ 40, K3KTH 40, W3ELI 38, WA3ATQ 33, W3KJJ 32, WA3CFU 30, W3AXA 26, W3VAP 26, K3-LPT 24, K3WEU 24, K3YQJ 24, W3MPX 20, W3CBH 19, K3MDG 18, K3ZAK 18, WA3CCC 15, K3KKO 15, K3-WAJ 12, WA3BBI 10, WA3DRG 10, K3RZE 10, W3KEK 8, W3BUR 6, K3HLN 6, W3ADE 5, W3BKF 4, W3BFF 2, WA3BJQ 2, WA3CUI 2, K3MNT 2, K3NZD 2, W3OML 1.

MARYLAND—DISTRICT OF COLUMBIA—SCM,

Bruce Boyd, W3QA—SEC: W3CVE. RMs: K3JYZ, W3-PRC, W3QCW, W3UE, W3ZNW. PAMs: W3JZY, K3-LFD.

Net	Freq.	Time	Days	Sess.	QTC	Ave
MDD	3643	0000Z	Daily	31	379	21.4
MDDS	3643	0130Z	Daily	29	37	1.2
MEPN	3820	2300Z	M-W-F-	20	15	.75
		1700Z	S-S			
MSTN	50150	0100Z	Daily			

Participation in the DX Contest lowered this month's traffic totals. Contrary to this trend, WA3CRA's traffic increased 10 times in spite of DX. W3MCG reported good DX but found 160 meters quiet. New appointments: K3ZSL as ORS, WIARR/3 as OO. New gear: At WA3CFK a home-brew I.r. switch, at K3QDD a home-brew RTTY converter, at K3LFD a compression preamplifier, at K3IPX/3 a Galaxy V. Still feeling the effects of the big snow in Feb. K3CJD's antenna is down and RM W3PRC lists RACES stations K3GZX, K3WIQ, WA3AKZ, W3LDD, W3HZZI, K3GUX and K3QMD all active with storm traffic. V.h.f.: WA3DFN was temporary NCS for MSTN. K3ZSX has trouble working into MSTN when beams are not on target. K3LLR is going back to v.h.f. with OES intentions. W3CBW is holding very successful RACES drills. K3EJF reports good band conditions and a visit to the fabulous mountain-top QTH of W3IZY, where Andy is too busy planting pine trees to do much operating. WN3EOP is interested in promoting state-wide 2-meter network coverage based on results with the Cumberland Valley Two-Meter Net. Section OOs: Reports from K3CYA, W3EIS and W3-MSR indicate a busy month checking amateur and "pirate" signals. W3TMY spent much of the last few months traveling in 6-Land. It is good to see W3ECP up and around again after another session in the hospital. It is time to think about Field Day. Don't forget the extra points for the message to the SCM. Traffic: (Mar.) W3TN 162, K3LIE 160, K3JYZ 151, K3ZIX 141, WA3BTA 118, WA3CFK 75, K3IPX/3 72, K3OAE 72, K3ZSL 59, K3LFD 51, WA3CRA 49, W3PRC 42, W3EOV 40, K3GZX 38, K3QDD 25, W3ZNV 24, K3UXY 19, W3UE 18, W3MCG 14, K3RZ 14, WA3CVM 13, W3PQ 10, W3ECP 9, K3VHS 9, WN3ROP 7, WA3DFN 6, K3-EJF 6, WA3CFK 4, W3QCW 4, K3NCM 1, K3ZSX 1, (Feb.) W3LRC 153, K3ZYP 58, W3WTV 1.

SOUTHERN NEW JERSEY—SCM, Edward G. Raser, W2ZI—RM: WA2BLV. PAM: W2ZI. N.J. Emergency Phone & Traffic Net reports 31 sessions. QNI 664, traffic 146; NJN C.W. Net 31 sessions, QNI 471, traffic 261. W2VX reports the NJRA will hold a gala banquet and hamfest Sept. 10 at the Ivy Stone Inn, Pensauken, N.J., to celebrate its 50th anniversary. C.d. exercise Operation Hurricane Alert, held in this state Mar. 25/26, was highly successful. The State Control Center was manned by W2VQR, WA2BDS, W2BZJ, W2ZI, WN2-UNT and W2ZCH. Mercer County Control was manned by W2HX, W2SVV, W2QKE and W2QLP. K4RAD/2 was high man in the Jan. C.D. Party, with W2ZVW top man on phone. Former YL NJN member K2DSL will quarry former DVRA member Dick Martin, in California this spring. The 8 UP Amateur Radio Club of Burlington is now affiliated with ARRL. W2ZVW is NCS for EAN Thurs. session, W2MRD is alternate NCS for 2RN Mon. K2MNV's son is K3YWH in the E. Pa. Net. WA2KVU checks in NJPN between his tours of duty with the Coast Guard. W2GTE is active with traffic. W2IU laments the good old days on 200 meters! WA2-IHN, in Princeton, wants OES appointment. K2BG is keeping skeks with S.S. Elaine, W2NAK/MM, in Madiera Is. W2GOK is OO Class I, recently endorsed. W2EIF also received OO endorsement. WA2DVU and K2SNK are new OPSS. Your monthly report should reach me not later than the 5th of the month. Traffic: (Mar.) WA2UPC 284, WA2BLV 74, W2ZI 45, WA2KIP 42, W2-ORS 40, W2YPZ 40, W2MRD 23, K2MBW 21, K2BG 14, W2BEI 8, W2EWR 4, K2JJC 4, (Feb.) K2MBW 19, K2JJC 13.

WESTERN NEW YORK—SCM, Charles T. Hansen, K2HUK—SEC: W2ZRC. PAM: W2PVI. RMs: W2RUF, W2EZE and W2PEB. NYS C.W. meets on 3670 kc. at 1900, ESS on 3590 kc. at 1800, NYSPTFN on 3925 kc. at 2200 GMT, NYS C.D. on 3510.5 kc. and 3993 kc. (s.s.b.) at 0900 Sun. and 3510 kc. at 1930 Wed. TCPN 2nd Call Area on 3970 kc. at 0045 and 2345 GMT, NYS County Net on 3510 kc. Sun. at 1000 and 3670 kc. at

1700 Sat. Please note that your SCMI's address has been changed to Warner Gulf Rd., Holland, N.Y. 14080. Holland is 30 miles south of Buffalo, 1 1/2 on a hilltop location with 30 acres. The Northern Chautauqua AIC elected K2SZF, pres.; W2PUL, vice-pres.; W2HJU, secy.; WB2HJV, dir. The code and theory classes conducted by K2SZF have resulted in licenses for WN2VSA, WN2VSG, WN2VTR, WN2VXX, WN2VYV, WN2VVZ and WN2VWV. Sorry to report that W2UMR has joined Silent Keys. K2LPT has been appointed EC for Cattaraugus County. Endorsements: WA2NDC as Lewis Co. EC; W2IDM as St. Lawrence Co. EC; W2MTA, K2SSX, K2KTM as ORS; WB2NA as OPS, WN2TUN and WN2UNK get CP-15, WN2TUN and WB2UHN are now General Class. The Chemung County AREA Assn. is affiliated with ARRL. Write ARRL for more information if your group is interested in affiliation. WB2MKD is conducting code classes for the CVARA in the Jr. High School in Norwich Thrus. WN2SYE is now General Class. The Chemung County AREC Assn. has published its first newsletter. The Penn-York Hamfest will be held Sat., June 18, at the Administration Building in Harris Hill off Rte. 17E west of Elmira. Contact WA2TPS, R.D. 1, Corning, N.Y., for details. W2CIL spoke on his trip around the world and his stay in Thailand at a recent ARATS meeting. WB2TAG, now General Class, has joined the traffic nets, Brighton HS ARC has four new Generals, WB2SNT, WB2SNT, WB2VRN and WB2RAZ. W2PVL reports that the policy committee of the NYSPT&E Net held a meeting in Utica in April. Please note that items for this column must reach my QTH by the 5th of the month. Traffic: W2SEI 267, W2GAL 246, WB2JF 187, W2FER 138, W2MTA 97, WB2HLV 72, K2JBX 60, K2QDT 52, W2RHH 46, K2MQN 23, K2EMH 31, W2RQF 24, K2LAIS 23, W2HYM 22, WB2TAG 14, W2FCG 10, K2BWK 9, K2DNN 8, WA2CLA 8, K2RYH 8, W2UYE 8, W2PVI 7, K2HOH 6, WA2UFI 6, WA2YB 5, WB2YB 5, WB2NZA 5, K2PBU 4, W2EMW 2, WB2SIA 1.

NEW YORK STATE QSO PARTY

June 11-13, 1966

The South Shore Amateur Wireless Association invites all amateurs to participate in the 1966 New York State QSO Party by contacting as many New York State amateurs as possible.

Rules: (1) *Contest Period:* 1800 GMT June 11 to 0200 GMT June 13. (2) *General Call:* On c.w. "CQ NY" or "de NY." On phone, "CQ New York State." (3) *Exchange:* QSO number, RS(T), ARRL section or New York county. (4) *Scoring:* One point per QSO. Out-of-state stations multiply by the number of New York State counties worked. N. Y. stations by the number of ARRL sections and countries. No power multiplier. A station may be worked once per band/mode. (5) *Suggested Frequencies:* 3560-70, 3900, 7060-7070, 7250, 14060-70, 14250, 21060-70, 21350, 28060-70, 29000 kc, and 50.4 and 144.5 Mc. Check 1815 kc at 0100 GMT both evenings. (6) *Awards:* Certificates will be sent to the high scorer in each section. N. Y. county and country, provided a minimum score of 50 points is attained. A special award will go to the top Novice scorer. (7) *Entry:* Logs must show GMT date/time, station worked, exchange sent and received, band, mode and total claimed score. They must be postmarked no later than June 30 and received no later than July 5. Send logs to the SSAWA, P. O. Box 465, Valley Stream, New York 11582.

WESTERN PENNSYLVANIA—SCM, John F. Wojtkiewicz, W3GJY—Asst. SCM: Robert E. Gawryla, W3NEM, SEC: K3KMO. PAMs: W3TOC, K3VPI (v.h.f.) RMs: W3KUN, W3MFB, K3SHH, W3UHN. Traffic nets: WPA, 3585 kc. 0000 GMT Mon, through Sun., KSSN, 3585 kc. 2330 GMT Mon. through Fri. The William G. Walker, W3NUG, awards committee has selected W3KNQ as winner of the award for 1965. W3TOC received honorable mention. K3ZMH has moved to Huntsville, Ala. K3PLQ is stationed at Fort Bragg, N.C., with the U.S. Army. WA3BEV joined the Coke Center RC. The Monroeville ARC membership elected K3FNW, pres.; WA3ADA, vice-pres.; WA3AYS, treas.; WA3AWU, secy., and welcomes W1CGY/3, K3SYJ, W3WGM, WA3DCH and WA3ESW to its area. The Two Rivers ARC will hold a hamfest at the Balkan Hotel grounds in

McKeesport July 17. K3NLL is stationed in Korea. New Gear Dept.: WA3AYS, Eico 753; WA3BWW, Heath Monitor Scope; WA3DCH, NCX-3; WA3ESW, WB-300 and 400; W3KPI, SB-400; W3GJY, HT-32A; K3KPU, Swan 350; K3RQV, Eico 777; W3NWB, Eico 753, WA3CZD won the top physics award at the Mon-Yough Chamber Science Fair with a laser device. K3PLU signs DL4QS in Berlin. K3AKR works on a computer program for Oscar tracking purposes. W3KWL reached the "300" rung in DXCC. WA3CXQ does a commendable job as TVI committee chairman in the Erie area. W3KNQ built a cathode modulator for his 6-meter transmitter. K3ZHH, K3QJJ, WA3CXF and WA3CWX installed a ham station at the Hickory High School in Sharon. WA3BGE and K3SAN operated during the DX Test as K3SAN/3. K3KAP now is on 2 and 6 meters with a Heath Seneca and five-element 6-meter beam. W3AGD operates on 2 with a modified tower. K3ZGI signs N0EOH on Navy/MARS circuits. K3YKY works 6 with an HE-45, as does WA3CLK, offspring of W3MED. WN3FPJ is a new Novice in Erie. New appointments: K3KMO as SEC; K3CXZ as Centre Co. EC, K3EXE as ORS. Endorsements: K3OTY as OPS, K3KAP as OES, K3GEO as OO, K3IIM as EC, W3AUD and W3TIV as OBSs. Traffic: (Mar.) W3NEM 329, W3KUN 238, K3SOH 195, W3LOS 87, WA3AKH 86, W3BLZ 56, W3GJY 42, K3ENE 41, K3PYS 23, WA3FPO 20, WA3AKB 18, W3AUD 12, W3YI 12, K3SMB 10, W3VA 10, K3EDO 8, WA3AWR 7, W3SAY 7, W3OEO 6, K3ZMH 4, W3ELZ 2, WA3BGE 1. (Feb.) K3KMO 24, K3SMB 11, K3EDO 8.

CENTRAL DIVISION

ILLINOIS—SCM, Edmond A. Metzger, W9PRN—Asst. SCM: George J. Nesbnd, W9LQF, SEC: W9RYU, RM: W9EVJ. PAMs: W9VWJ, WA9CCP and W9KLB (v.h.f.) Cook County EC: W9HPG. Net reports:

Net	Freq.	Times	Days	Tfr.
ILN	3760 kc.	1800 CST	Daily	215
ILL PON	3925 kc.	1700 CST	M-F	364
ILL PON	3545 kc.	1830 CST	M-W-F	12
ILL PON	50.28 Mc.	2000 CST	M&Thurs.	16
ILL PON	115.5 Mc.	2000 CST	M-W-T	89
No. Cent Phone Net	3915 kc.	0800 CST	M-Sat.	325
No. Cent Phone Net	3915 kc.	1300 CST	M-Sat.	271
IBN	3940 kc.	9000 CST	Sun.	No report

Governor Otto J. Kerner has proclaimed Aug. 8 through 14 as "Amateur Radio Week." In observance of this proclamation, Hamfesters (Chicago) Radio Club is initiating an annual "Amateur Radio Operator of Illinois" award. Nominations for this award should be sent to Hamfesters Radio Club, K9WMP has a new 40-ft. four-element antenna system in operation. The Palisades Amateur Radio Club, the Deerfield High School Amateur Radio Club and the Proviso West High School Radio Club have been approved by the League's Executive Committee as duly affiliated societies of the ARRL. W9PVD has completed building a new Eico transceiver. WA9KZY has been appointed act. mgr. of the Palisades Amateur Radio Club, replacing WA9KIG, who recently resigned. WA9GVW has increased his traffic with a new Globe LA-1 300w linear. New officers of RADIO (Radio Amateurs Downstate Illinois Organization) of Mt. Carmel are W9FJP/K9DEE, pres.; W9IRB, vice-pres.; WA9BXD, secy.-treas. New hams in that area include WN9RQW and WA9RRJ. W9LJN is active again with a new Tornado rig. The Ninth Regional Net had a traffic count of 573 for March, according to RM/9RN W9QLW. The Starved Rock Amateur Radio Club will hold its Annual Hamfest Sun., June 5, 1966, at 4H Fairgrounds at Ottawa, Ill. This promises to be one of the largest attended gatherings in SRRC history, according to W9QLZ. WA9AJF was incapacitated for a few days and is now back in the traffic system. WA9HSS is recovering from an appendectomy. WA9LGT has built a new SR-500 receiver. W9LNQ received his "British Commonwealth Radio Transmission" certificate. This column's sympathy is extended to the family and friends of W9DQN, of Brookfield, who died Mar. 18 after several months of illness. He will be missed greatly by the members of the 6-meter fraternity. K9QPJ is touring Europe. A new appointee is K9LDQ as EC of Sangamon County. W9PRN has been appointed communications chairman of the Disaster Board of the Sangamon County Chapter of the American Red Cross. Recipients of the BPL award include WA9CCP, K9KZB and WA9CNY. Traffic: (Mar.) WA9CCP 902, K9KZB 534, W9EVJ 210, W9DQO 160, WA9LDC 140, W9DUA 105, W9BET 103, K9CYZ 96, W9CCG 90, W9JXV 72, W9NKG 64, K9BTE 58, W9HOT 58, K9AVQ 52, K9WMP 48, WA9LGT 34, W9HPG 27, W9DFD 18, W9PRN 18, W9AISD 14, WA9POZ 13, WA9AJF 11, W9LJN 10, WA9GUM

8, K9HSK 7, W9MTO 6, K9RAS 5, W9LNQ 4, WA9FIH 2, WA9KLB 1. (Feb.) WA9CNV 370, W9JXV 35.

INDIANA—SCM, M. Roberta Kroulik, K9IVG—Asst. SCM: Ernest Nichols, W9YYX. SEC: K9WET.

Net	Freq.	Time	Mar.	Tfc.	Mgr.
IFN	3910	1330Z Daily.	2300Z M-F	232	K9IVG
ISN	3910	0000Z Daily.	2130Z M-S	487	K9CRS
QJN	3656	0000Z Daily		146	WA9BWW

K9GLL, PAM of Hoosier v.h.f. nets, reports Mar. traffic of 66. K9EYF, mgr. of PON, reports Mar. traffic of 146. WA9IZR, mgr. of RFN, reports Mar. traffic of 106. W9-QLW, RAI or 9LRN, reports Indiana was represented 100% in Mar. QIN Honor Roll: K9VHY 29, WA9FDQ 26, K9HYV 26, WA9IQV 25, W9QLW 23, W9RGE 21, W9-HRY 20, W9HRB 19, W9ZYK 18, K9WVJ 15. The 1RCC Hamfest will be held at Brown Co. State Park, Nashville, Ind., July 10, 1966. New officers of the Bloomington ARC are W9ARA, pres.; K9COT, vice-pres.; WA9-KTX, treas.; W9GXW, secy. Monroe Co., amateurs are installing gear in a new RACES communications trailer for civil defense. W9EGV is building the SB-200 and the SB-400. W9AAI and K9DWI are back on the air after a long absence. The new 35,000-kw. alternator at the Madison Co. Red Cross station is manned by Aladison Co. amateurs. Bloomington ARC has published a directory of Monroe Co. amateurs. W9DGA won the "SS" plaque for the high TARS cw entry. W9MBI is enjoying a new Swan 350 and W9WKN now is on RTTY. BPL certificates went to W9JZO and K9IVG. Amateur radio exists because of the service it renders. Traffic: (Mar.) K9IVG 808, W9JZO 534, W9MIA 287, WA9BWW 280, WA9IQV 210, W9RGE 191, W9QLW 190, W9HRB 145, W9ZYK 122, K9HYV 114, W9HRY 112, WA9IZR 99, K9FHQ 86, W9RTH 82, K9CRS 67, W9VYM 66, K9-HWQ 66, K9VHY 55, W9SNQ 54, K9ZLB 52, WA9NDN 35, WA9GJZ 30, WA9BGI 29, W9BUQ 25, WA9BWT 22, WA9LQG 22, W9YYX 22, K9BSL 21, W9CILY 21, WA9-FDQ 21, W9DGA 20, K9EYF 20, WA9LW 20, W9EJW 18, WA9CHY 17, K9GLL 17, W9CC 16, K9ILK 16, W9-FWH 15, K9YXS 14, W9PMT 12, W9DOK 11, W9DUD 11, K9KTL 11, W9DZC 8, WA9KAG 8, WA9CFW 7, W9-HDP 5, WA9BEG 5, WA9JHX 5, W9NOZ 5, WA9BNX 4, K9FUJ 4, W9GFS 4, WA9JWL 4, K9DHN 3, K9RGF 3. (Feb.) WA9CJR 50, WA9CFW 5.

WISCONSIN—SCM, Kenneth A. Ebneter, K9GSC—SEC: K9ZPP. PAMs: K9EJS, K9IMR, W9NRP. RAI: None.

Nets	Freq.	Time	Days	Sess.	QNI	QTC	Mgr.
BEN	3985 kc.	1200Z	Mon.-Sat.				W9NRP
BEN	3985 kc.	1700Z	Daily	31	561	259	K9EJS
WSBN	3985 kc.	2215Z	Daily	31		238	K9IMR
WIN	3660 kc.	2345Z	Daily	31	375	103	W9KQB
SWRN	50.4 Mc.	0200Z	Mon.-Sat.				W9CIU

Please note new frequency for the WIN. Net certificates were sent to K9CPE, W9LFS, WA9LWH, K9KBT, K9-NIZX, K9KQU, K9RCK, K9UDT, K9VSV, WA8AYG, WA9CCP, K9ASR and WA9LAW for the BEN; WA9-OFQ for the WSBN; W9HQT and WA9NPB for WIN. New appointees: WA9IZK as EC for Rock County, WA9NBU and WA9NPB as OPs, W9SUF as ORS and WA9GJU as OBS. Renewed appointment: W9ITW as EC. The Annual WNA Picnic will be held at Stevens Point July 10, at Iverson Park on Highway 10 at the east side of the city. Congrats to the Ozaukee Radio Club, Inc., on their affiliation with the ARRL. WA9-OMO is starting a 15-meter Novice net on 21.15 Mc. Sat. at 1600Z. W9SUF has a Model 19 operating on RTTY. W9MVG has a new T-4X, and R-4 on the air. K9GDF led the OOs with 56 notices in March. BPL certificates went to WA9GJU and W9SUF. Traffic: (Mar.) W9CXY 234, WA9GJH 156, WA9GJU 155, WA9MIO 150, WA9NPB 137, W9DYG 126, W9SUF 115, WA9IYW 102, K9IMR 93, K9EJS 85, W9KQB 79, WA9NBU 58, W9NRP 46, WA9-NFG 33, W9BLQ 30, WA9LJG 28, W9CBE 26, W9AYK 25, K9DJV 24, W9MVG 23, W9HWQ 17, WA9IVH 16, WA9NDY 15, WA9OFQ 12, K9PHI 11, K9GSC 11, K9-KQU 8, W9GGN 5, W9OTL 2. (Feb.) W9SUF 202, W9-NRP 47.

DAKOTA DIVISION

MINNESOTA—SCM, Herman R. Kopschke, Jr., W9TCK—SEC: WA9BZG. RMs: W9ISJ, WA9EPX. PAMs: K9QBI, W9JKT, W9HEN, WA9DWM, MSN meets daily on 3595 KHz. at 0030Z. MJN meets M-S on 3595 KHz. at 0100Z. Noon MSPN meets M-S on 3820 KHz. at 1805Z and Sun. at 1500Z. Evening MSPN meets daily on 3820 KHz. at 2300Z. MSTN meets M-F on 50.4 MHz. at 0430Z and Sat. at 0200Z. Minn. Co. Hunters Wx Net meets Sat. on 3820 KHz. at 1500Z. The Post Office

Net meets Sun. on 3812 KHz. at 1830Z. The S.S.B. Net has disbanded for the summer. During DST, nets meet at the same local time but one hour earlier by GMT. Appointments renewed: K9SXP as EC, W9TIV as OO and W9FIT as OBS. Many thanks to those of you who were active in the spring snow and flood emergencies. Ironically, Piconet held a simulated sleet storm emergency just three days before the storm hit Southern Minnesota. Mankato ARC elected WA9DFT, pres.; K9HWJ, vice-pres.; and WA9JTW, secy.-treas. W9-HUU is running a 4-400 in class C linear these days. WA9LVG has a new SR-100 receiver. OES W9PHD recruited five new stations on 2 in the Grand Forks area, just in time to be active in the floods there. K9-AJU is organizing an AREC group in Brown Co. They would like to see S.W. Minnesota organized into an area AREC net also. If interested, contact AJU. Three stations receive BPL certificates this month. WA9JKT, K9ZZR and WA9KJF. Traffic: (Mar.) WA9JKT 427, K9ZZR 207, WA9KQU 181, WA9KJF 141, WA9EPX 93, W9TCK 89, K9PZ 80, WA9LVG 72, WA9LOB 62, WA9ILX 53, WA9DFT 54, W9HEN 44, K9ZRD 40, K9QBI 35, K9BAD 32, WA9DFT 32, WA9LOH 23, WA9IIT 22, W9ATO 20, K9GZ 19, WA9KUD 17, K9-ICG 16, WA9LW 16, W9BUO 12, WA9LTK 12, W9-UMX 9, WA9EZO 8, W9FHO 8, K9ORK 8, W9KLG 7, K9SRK 7, WA9MIV 5, K9SKX 5, WA9FFU 4, WA9HRM 3, WA9IUI 3, WA9JPR 3, WA9EDN 2, W9FKC 1, W9OIO 1. (Feb.) WA9IKP 12, W9KLG 7.

NORTH DAKOTA—SCM, Harold L. Sheets, W9DM—SEC: WA9AYL. The month of March kept us all busy with emergency work with the terrific blizzard of Mar. 4 and 5th and the aftermath flood conditions in the Red River Valley. The Grand Forks AFB Radio Club held a QSO Party on 20 meters. W9GFE has added another transceiver to his collection, a Swan 350. K9ITP has returned to her homeland after a two-month vacation in sunny California. WA9KSB has been busy building a t.r. switch and electronic keyer. WA9JXT/O, the Forx Amateur Radio Club station, as well as WA9AYL, W9TUF, WA9BIT and a group of Novices, were busy with flood traffic. K9FUP has changed QTH to Portland, N.D. K9GGL dusted off an old d.s.s.b. rig and has been making himself heard on the RACES Net. Thanks to the Minot Radio Club for the first edition of their club paper. Officers are WA9-ELN, pres.; W9KGS, vice-pres.; WA9GTU, 2nd vice-pres.; -secy.-treas.; W9HJU, sgt. at arms; Duane Wells, act. mgr. W9PQW has been busy installing emergency equipment in Fargo and Grand Forks for use with the State Communications. The Goose River 160-Meter Net, which meets every Sun., had 103 check-ins, 14 messages and 4 informals. W9CD is NC. Traffic: WA9KSB 140, K9GGL 81, W9CGM 30, W9DM 15.

SOUTH DAKOTA—SCM, Seward P. Holt, K9TXW—SEC: W9SCT. WA9CJ operated portable 0 at the Sturgis Hobby show successfully originating a lot of traffic. New equipment includes WA9MXC's NCX-3 since Mar. 21. WA9CKH added a Swan 240. So. Dak. MARS members received 2 kw. generators recently. We are happy to hear of the return of W9CUC to Sioux Falls. W9ZWL and K9LKH provided the only communication link between Black Hawk and Rapid City during the recent blizzard. The S. Dak. WX Net averaged 24 daily QNI during March. WA9DEM reports 2316 QNI and 1720 QTC for March on the S. Dak. SSB net. Traffic: (Mar.) K9GSY 601, W9ZWL 535, K9VYY 88, W9SCT 77, WA9AOY 56, K9AIE 54, WA9LYO 50, WA9BZD 23, K9LKH 23, K9YGZ 23, W9RQS 12, W9JCE 9, K9KOY 8, K9YJF 7, K9BWJ 5, W9ZWL 4, K9TNN 3, WA9CKH 2, W9WRM 2, K9ZTV 1. (Feb.) WA9NZA 86.

DELTA DIVISION

ARKANSAS—SCM, Don W. Whitney, K5GKN—Congratulating to W5YM on scoring 53,664 points and coming in 31st in the ARRL club section. WA5AER reports good DX on 15 meters. K5KQD spent a couple of very pleasant hours in a solid QSO on 15 meters with Pago Pago. W5MJO, NCS for the Arkansas Post Office Net, reports the newly-organized Post Office Net is making substantial gains each month in attendance and traffic-handling. Mar. net reports:

Net	Freq.	Time	Day	Sess.	QTC	QNI	Time
RN	3815 kc.	0001Z	Daily	30	50	514	551 min.
AFN	3885 kc.	1200Z	Mon.-Sat.	27	25	1063	1866 min.
OZK	3790 kc.	0100Z	Daily	31	73	232	636 min.
APON	3825 kc.	2130Z	Mon.-Fri.	23	80	373	660 min.

Traffic: W5NND 215, W5MJO 139, K5TYW 41, W5YM 21, K5UEK 19, WA5GPO 15, K5GKN 7, K5ABE 6.

LOUISIANA—SCM, J. Allen Swanson, Jr., W5PM—
SEC: K5KQG. RM: W5CEZ, V.H.F. PAMs: W5UQR,
W5KHE. State nets:

LAN	Daily	2330 GMT	3516	WA5FND net mgr.
Delta	75 Sun.	1330	3900	WA5EVU net mgr.

K5KQG shortly will distribute a one-page sheet covering the what and where during an emergency. K5LMV has been appointed Beauregard Parish EC. W5SKW is going great guns in AREC-planning in the Lake Charles area. W5IQH has organized a 2-meter net in the Franklin area. ARRL was awarded a Certificate of Commendation in recognition of distinguished service during "Betsy" by the Lu. amateurs. The GNOARC held a very successful emergency test drill. W5UK was Master Control. WA5JVL operated mobile and handled much traffic. WA5DRP reports the Baton Rouge 2-Meter Net averages eight check-ins every Mon. BRRC officers are W5LHZ, pres.; W5IQM, vice-pres.; WA5MHS, rec. secy.; W5LPM, treas. WA5KAJ has a new SX-146. W5MBC is adding a new rig. WA5DES has changed his bulletin time to 0000 GMT daily Mon., Wed. and Fri. W5JYA is busy on LAN and MARS. K5OKR is one of our finest c.w. lady operators. W5CEZ is now retired. His youngest kiddo is now WN5PDN. WA5KLF is Neville High RC pres. W5GEP has completed a new quad. WA5FNB reports that LAN has been experiencing 21 QNTs per session. W5MXQ says the Jefferson RC has a 12KVA emergency plant wired and ready to go. I regret to report the passing of W5AEN. W5JFB still is trying to finish his 80-10 transceiver. W5EXI finished first in the La. QSO Party with W5KC second and W5GZR third. WA5NTT, WA5MHM, and WA5NDW are new Generals in Lafayette. The Lafayette RC provided the March program for BRRC and the BRRC provided the April program for LARC. W5MYZ is the new Jefferson Radio Club pres. The GNARC, it is rumored, will have its club quarters in the new International Trade Mart. The BRAC holds code classes every Thurs. night. Don't forget the Alexandria Hamfest July 16 and 17. W5BBV reports the Rapides Emergency Net meets Sun. on 3897 at 1400 GMT. K5EYP is new act. mgr. of the Chetmachi RC. The Ozone ARC of Slidell is setting up a complete roster of members who can handle traffic and check into formal nets. Traffic: W5GHP 279, W5MXQ 66, WA5FNB 58, WA5DES 32, W5MBC 40, K5OKR 37, W5EA 12, WA5JVL 11, W5JYA 10, WA5HGX 7, W5HHA 6, WA5EID 1.

MISSISSIPPI—SCM, S. H. Hairston, W5EMM—
SEC: W5JDF. My thanks to WA5BQP, K5HCI, K5UTE, WA5EBT, W5CQJ, W5NNZ, W5JZS, K5PPI, WA5FII, W5ODV, WA5CKL, K5KAF, WA5GEG, W5IAJ, W5OYH, W5EMM, W5HTV, K5GSY, W5JHS, WA5CAC, W5OHE, W5EVY and W5FXZ who did a fine job during the Jackson tornado disaster. W5ODV is temporarily in Tuscaloosa. Old Natchez ARC is making big plans for Field Day, says WA5CAM. The Meridian Club has reactivated with monthly meetings. K5UBR/5, Harrison County EC. Miss. Sideband Net NCSs are W5WMQ, WA5ETL, WA5GEG, WA5IXC, WA5GWW and W5VOO. WN5OFR has been called to the service. W5JDF now is in Columbia. K5EYS has a fine kw. signal in Mendenhall. WA5MGH has a new Apache and an HQ-170. W5AKCD is using 4-805s. WA5MGH, K5EYS, W5DYN and K5PJY, with a 6- and 2-meter net, are working hard with civil defense. W5CUU is really working DX with his 20-meter beam. New appointments: K5UBR/5 as ORS/EC; K5LUW as QRS. Traffic: WA5FTI 554, W5ODV 550, WA5CKL 307, W5HTV 249, K4UBR/5 113, WA5EBT 73, W5JDF 54, K5HCI 25, K5UTE 16, W5EMM 15, WA5CAM 13, W5BW 7, K5WUX 6, WA5FCP 4, WA5JAN 2.

TENNESSEE—SCM, William A. Scott, W4UVP—
PAMs: WA4GQM, WA4PFP, WA4EWW, RM: W4ALNF.

Net	Freq.	Days	Time	Sess.	QNI	QTC
TSSB	3980 kc.	T-Sun.	0030Z	27	1288	184
ETPN	3980 kc.	M-F	1140Z	23	449	31
TPN	3980 kc.	M-Sat.	1245Z	31	1111	338
		Sun.	1400Z			
TN	3635 kc.	Daily	0100Z			
			0230Z			

Many thanks for selecting me as your SCM. The Greater Memphis Council will operate a booth at the Mid-South Fair, Sept. 23-Oct. 2. W4RFR received a nice write-up on weather pictures received from ESSA 2. W4ZBQ also is receiving pictures. K4RIN/5 was married Feb. 5. WA4LPI now is GM5AAL with W4SQE as QSL Manager. WA4PCW is joining the exodus to 432 Mc. W4MXF is getting a Galaxy 5. Was greatly impressed by the job being done by the Frye RC with

the QSL Bureau. Bureau phone number is 615-267-4739. WA4UCI is on 6 with 2 to follow. RACES and AREC need volunteers in all areas of the state. Traffic: W4FX 441, WA0GG 298, W4PQP 240, WA4YDT 169, K4UWH 135, WA1AFP/4 120, K4XND 98, W4SQE 70, W8UVP 65, W4DIY 63, K4XND 63, W4WKB 57, WA4IBZ 54, WA4YNF 42, WA4BNL 27, WA4GQM 27, W4PFP 26, W4RUW 25, W4VTS 20, WA4EWW 19, W4RMJ 19, W4TJZ 19, WA4GLS 15, K4RIN/5 15, K4COT 14, WA4GOL 14, WA4CUQ/4 12, WA4NUJ 10, WA4UCI 10, W4TZB 9, W4TYV 8, WA4CGK 7, K4BTY 6, WA4IZB 6, K4UMW 6, W4VJ 5, WA4BXH 4, K4ZYL 4, WA4JY 3, WA4PNL 3, WA4PSU 3, WB4AJH 2, K4FZJ 2, WA4PCW 1.

GREAT LAKES DIVISION

KENTUCKY—SCM, Lawrence F. Jeffrey, WA4KFO—
SEC: K4URX. Appointments: K4CSH and WA4GMA as OPS. Endorsements: W4KJP as OPS, K4NYO as OBS, K4FPW as OBS and OES, W4ISF as OES and OPS.

Net	Freq.	Days	EST	Sess.	QNI	QTC	Mgr.
EMKPN	3960	M-F	0630	23	329	39	W4BEJ
MKPN	3960	Daily	0830	31	318	48	WA4KFO
KTN	3960	Daily	1900	31	735	325	K4YZU
KYN/KSN	3600	Daily	1900/1700	70	630	542	W4BAZ

WA4TJS is EC for Districts 16 and 17. W4JUI is too busy with commercial stations to do much hamming. W4ISF has a new Swan 350. WA4WWT is active on seven nets. W4CDA still is working on the shack and building a keyer. A photo received from W4KJP shows his old-time station. WA4OMH has been on training duty with the Navy Reserve. WA4VCN reports a new 10-meter net for the Louisville-Jefferson County area on 28.6 Mc. at 2030 EST week days. W4WNH resumed MS skeds with W4AWS. WA4VPA is ex-K8KXS in Prospect, Ky. K4E1 is in the hospital in Nashville and K4NYO is in the hospital in Lexington. W4BAZ is trying hard to finish the antenna installation at the new QTH. K4UCS is the call of the Owensboro Amateur Radio Club 2-meter repeater operating on 146.34/146.94 Mc. W4OYI reports skeds with MM stations. Traffic: (Mar.) WA4DYL 377, W4BAZ 361, WA4AWT 316, WA4TPB 262, WA4TTE 259, WA4AGH 204, W4EON 183, WA4KFO 171, W4OYI 170, K4YZU 155, WA4DX/4 138, W4ISF 101, W4CDA 85, WA8DKJ/4 79, W4AIN 73, W4AHJM 72, WA4GMA 59, WA4IBG 57, WA4ZIF 50, W4BNB 29, WA4VCN 26, W4UAZ 24, WA4UIH 22, W4RHZ 21, WA4BZS 13, WA4WQZ 13, K4HOE 11, K4YDU 9, W4KJP 6, WA4YDO 6, W4JUI 1. (Feb.) W4ISF 70.

MICHIGAN—SCM, Ralph P. Thetreau, W8FX—
SEC: K8GOU, RMs: W8ELW, K8QKY, W8EU, K8KAIQ. PAMs: W8CQU, K8LQA, K8JED, V.H.F. PAMs: W8CQV, W8YAN. Appointments: W8AIG, W8LHU, W8MIPD, W8PDF as ECs; W8BEZ, W8BQK, W8CQK, W8WQH, W8ZLK, as ORSs; W8ALG, W8TIC as OPSs; K8JUG as OBS; W8PT as OBS. Silent Keys: K8KJZ, W8OA (ex-8NZ), W8SDTV, W8QOQ, W8QOQ, ex-W8JZD of 1934, had been Berrien County EC, since 1957. New officers: Mich Council ARC—W8IWF, pres.; W8HYL, secy. Wolverine SB Net—K8VDA, pres.; K8GOU, vice-pres.; K8AYJ, secy.-treas. Huron Valley ARA—W8NPOU, vice-pres.; W8LPI, vice-pres.; W8CTB, secy.; W8OLD, treas.; W8CXG, trustee. W8PT returned to Michigan permanently. Milford ARC now has the club call W8YDK. K8AAMG, W8IGN and W8SEL are on RTTY on 145.8 Mc. W8CTB made General; W8SBO and W8N8PU are trying. W8S8KU left the hospital and K8JDM went in. W88YZ has a new Leader dog and now goes everywhere. W8KME has a new inverted "V." W8HGE enlisted in the Air Force and leaves Aug. 1. W8SWF runs the Morning Net on 14,256 at 1430. W8LRC was in Florida using mobile. The Wadsworth Hall ARC built its own keyer. W8DHP became the father of triplet girls. W8WNX built an HO-10 scope and Cantenna dummy load. W8LQS and W8FYF have new "Joy Stick" antennas. Don't believe that W8RTN was seen coming out of the back door of Shand's with a mike! W8FFF, W8FYF, W8LSW, W8ABQ, W8ROV and K8YHR all have changed their CB rigs to 29.480. W8MIE is going motorcycle mobile with the leather jacket set. W8ATB and W8QBO are down in Florida. K8ACQ found out you need a key to operate c.w. W8FOV leaves California for Michigan for a "vacation." K8KOO, on a Mexican vacation, donated mobile gear there to some Mexican ham. W8VGG and K8JEE are getting new linears, and W8PDN is going s.s.b. K8PKU has a new "camper" and says if you have TVI, it's easy to move. K8LNE made the RPL for the third time. Traffic: (Mar.) K8LNE 519, K8KMQ 469, K2SII/8 203, W8AKNE 154, W8RTN 104, W8SPIM 89, W8UFS 86, W8MQT 70, W8ABQK 61, W8ELW 58, W8EU

RECEIVER sensitivity is so frequently (and understandably) misunderstood — particularly the way in which it is measured — that you may enjoy an explanation of the meaning of signal-to-noise ratio and an outline of proper measuring techniques.

THE *Handbook* refers to sensitivity measurements as follows: “Sensitivity . . . the signal required to give a signal-plus-noise output some stated ratio (generally 10 db) above the noise output of the receiver.” That seems simple enough, but unfortunately — it’s too simple!

AM SENSITIVITY, for a 10 db signal-plus-noise to noise ratio, may be defined more precisely as “the signal in microvolts *at the input to a matching pad* at the receiver antenna terminals which, when 30% modulated, will result in a 10 db increase in audio output.” Note that modulation is applied to the carrier for measurement of audio output — the modulated carrier is *not* turned on and off, as is assumed by many.

FURTHER, note that the output from the signal generator is applied to a matching pad — not directly to the antenna terminals of the receiver. The pad is necessary to match the internal source impedance of the generator to the design antenna input impedance of the receiver, and results in a 6 db loss at the receiver terminals — which means that the actual voltage at the receiver is only *half* the voltage output of the generator! This technique obviously requires twice as many microvolts for a given S+N/N than if the pad is not taken into account. Generator output microvolts so obtained are called “soft” microvolts in the trade — as compared to “hard” microvolts right at the receiver input. “Soft” microvolts are used to determine sensitivity because they simulate the open-circuit voltage on an actual antenna matched to the receiver input. This technique is used for all of National’s published sensitivity specs.

BY THE WAY, don’t confuse the matching pad discussed above with the *terminating resistor* contained in the pod at the end of the coaxial cable from the generator — both are required . . . the matching pad to match the internal source impedance of the generator to the input impedance of the receiver, and the terminating resistor to eliminate the effect of the coax cable VSWR on the measurement. Without the use of a terminating resistor, a sensitivity measurement is a function of both frequency and length of cable from the generator, and is wildly inaccurate.

TO HARK BACK to the definition for a moment, why 30% modulated? Because average speech levels as transmitted are only 30% of peak, or 100% modulation. You have undoubtedly noted, in addition, that sensitivity specs given for CW reception are typically two to four times better than the AM numbers — because in a CW measurement, the carrier *is* turned on and off and the BFO is activated. The beat note thus produced is effectively “100% modulated”, thereby causing a 10 db change in audio output from the receiver with a much smaller signal from the generator.

MIKE FERBER, W1GKX



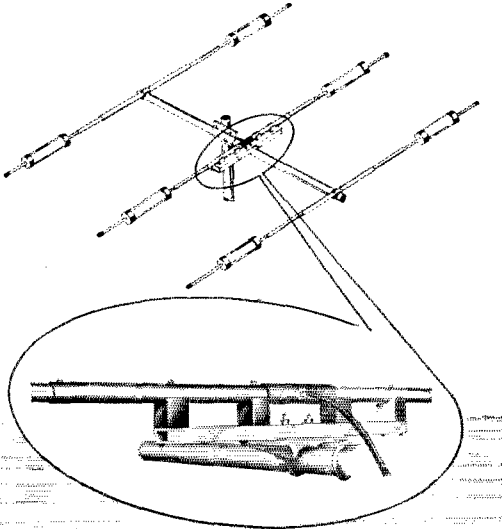
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52, K8ZJU 52, W8FX 51, W8ROJ 49, K8GOU 46, W8-
OGR 46, K8HLR 45, W8MCO 43, W8YAN 38, K8BYX
33, W8MGM 31, W8ELR 28, K8JED 29, W8CQB 21,
W8IWF 20, K8CBA 19, W8LRB 19, W8UC 18, W8-
HGE 16, W8CZJ 15, W8SWF 15, W8LRC 14, W8BEZ
12, W8WYL 12, W8ALXY 10, W8TBP 10, W8CQR 8,
K8YDA 7, W8MRM 6, K9RHU/8 6, K8QLL 5, W8DSE
4, K8AQ3 3, W8AAM 2, W8WNX 2, (Feb.) W8CQR 3.

OHIO—SCM, Wilson E. Weckel, W8AL—Asst. SCM; J. C. Erickson, W8DAE, SEC; W8HNP, RMs; W8BZX, W8DAE and K8LGB, PAMs; W8VZ, K8BAP and K8UBK. According to Parma RC's *P.R.C. Bulletin* the club heard K8BQY speak about implant transmitters in the human body. Toledo's *Ham Shark Gossip* tells us the Toledo Mobile RA held an auction. W8OTD is a new Technician, W8NSKA, W8NSOM and W88SQK are new Novices. Toledo RC held its Third Annual YL Dinner. Greater Cincinnati ARA's *Mike & Key* says W8FGX told about his experiences on DXpeditions to San Felix and San Ambrosio and had a photo of the clubs' 1948 president, who is now DJQBS. W8RXU reports Marietta ARC's officers are W8KWW, pres.; W8RXU, vice-pres.; W8FKD, secy.; W8PBA, treas.; W8VZ, trustee. W8PCH has a new SB-100, K8AXK has a new SB-200 and W8DUY graduates a BSEE from U. of Cincinnati. Youngstown Univ. ARC's officers are K8HGY, pres.; K8ZLN, secy.; W8BFQK, treas.; K8QIW, act. mgr. K8BSH moved to Conn. K8HGY has a new DX-Thunderbird beam and 60-ft. tower. W8AJJ has a new HW-22. W8AQQ has a new T-4X and R-4A. Kettering ARC's A-4 reports David Collins spoke on electronics correspondence schools and careers in electronics. W8NUL received the 25-w.p.m. Code Proficiency award and W8s NAZ, NUL and Q8F got their WA8 certificates. According to Honolulu ARC *News* W8EDG, ex-W8LYZ, spoke on the history of Morse codes and telegraphic communication. Canton ARC's *Feedline* tells us the club heard W8EFW give a lecture on antenna fundamentals—radiation characteristics—ground effects and horizontal and vertical patterns. W8NFW started a hitch in the Army. W8QAZ was in the hospital. Toledo's *Ham Shark Gossip* says K8UVE is in the hospital. K8SZE moved to Colo., K8VLL was promoted to RM3c in the Coast Guard. W8s SQZ, SUD, SUP, SWP and SWW are new Novices and W8QVI and W8RAZ are now General Class. K8LGB was in the hospital. Parma RC informs us the club held an auction. W8SML spoke on modern techniques in radio receivers and a new club called Amateur Radio Square Club was formed. Sandusky Valley ARC's officers are K8VCH, pres.; W8-OWQ, secy.-treas. W8THD is a new Novice. K8DTA has a new TR-4 transceiver. K8GVY is working RTTY. Westpark Radiops *Log* tells us W8AJH has a new tower and tri-hand beam and the club heard W8SML talk on sophisticated solid state receiver design and K8GVK on audio compression and its applications. Massillon ARC saw a demonstration on radioteletype equipment by W8LCA. Miamisburg Wireless Assn. toured WKPE's studios. Columbus ARA's *Carascope* states that W8-AXB has a new Eico s.s.b. transceiver. W8TFR is a new Novice. W8INO completed a new 2-meter linear, the club heard K8LW speak on "Insurance and the Ham" and gave diplomas to those completing the Novice code and theory classes with W8ETU as its instructor. Inter-City RC's *IRC News Bulletin* reports a Novice class has been started under W8QJF. W8EHA and W8FMK, W8MQX received his General Class license and W8RCI is in the hospital. Cuyahoga County TVI committee members are W8LJS chairmn, W8CBBJ assistant and K8ONA publicity chairmn.

	QNI	QTC	Ave.
Ohio SSBN	2055	932	16.6%
BN		277	9.

Traffic: (Mar.) W8RYP 411, W8DAE 265, W8DQD 215, W8GYY 208, W8CHT 207, W8CFJ 184, W8FSX 176, K8YSO 172, W8PMN 164, W8WEN 158, W8BUW 144, W8CXY 106, K8UBK 102, W8AUZ 89, W8FSM 70, W8IPO 66, W8JXM 63, K8BYR 56, W8QZK 50, W8-
MQE 45, W8KHR 43, W8GPO 42, W8BZX 39, W8LJG 34, W8ABND 32, K8UKY 28, K8DHJ 26, W8MIHO 23, W8MGA 22, W8CXM 17, W8FGD 17, W8OOU 17, K8EZJ 15, K8YDR 15, K8BNL 14, W8LZE 14, W8TV 13, W8-
FKD 12, W8TH 10, K8TVX 10, W8ETO 7, W8LAM 7, K8LRK 4, W8BTE 3, K8BXT 3, W8ETK 3, W8QES 3, W8POE 2, K8QOJ 2, (Feb.) W8MXO 12, (Jan.) W8-
LAG 42.

HUDSON DIVISION

EASTERN NEW YORK—SCM, George W. Tracy, W2EFU—SEC; W2KCC, RM; W2VYS, PAM; W2JIG. Section nets: NYS on 3670 kc, nightly at 2400 GMT; NYSPTEN on 3925 kc, nightly at 2300 GMT; ESS on

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- Kit HP-14, HA-14 Mobile Power Supply . . . \$89.95
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3590 kc. nightly at 2300 GMT. Appointment: W2SZ as OBS, Endorsements: WA2JWL and WB2FVD as OPs; WB2HZY as OES and ORS. Congrats to WB2NKN on his first BPL for March traffic. WB2NVJ is a new Asst. EC for Westchester Co. A new 50-ft. windmill tower is reported at W2SZ. March was "home brew" night at the Albany Club with many pieces of gear on display. Sorry to report as a Silent Key, K2KTH of Valatie. Ulster County reports a new RACES Net on 2 meters. WA2MDP was guest speaker on RTTY at the Westchester Club. Nuvisitons described by W2OKO, of RCA, was the feature at the Schenectady Club. The club celebrated its 36th anniversary in March. Join the New York State QSO Party June 11 at 1800 GMT to June 13 at 0200 GMT. Certificates will be awarded to the highest scoring section station. Send a copy of your log to SSAWA, P.O. Box 485, Valley Stream, N.Y. 11582. WIICP spoke on antenna design and performance at the New Rochelle Club. Hudson Division Director W2-TUK also was a guest speaker. Appointees: Check your certificates and if they are due send them to the SCM for renewal. Let's get up to date during the summer. Traffic: WB2NKN 530, WB2HZY 227, W2THE 158, K2-SJN 127, WA2VYS 93, WB2JVV 76, W2SSZ 50, W2URP 49, WA2JWL 37, W2ANV 33, WA2LJM 31, WB2QYZ 31, W2UC 27, W2ODC 23, WA2WGS 21, WB2FVD 18, K2AJA 15, WA2RTZ 12, W2BXP 11, WA2ZPD 9, K2HNW 5, WB2HYA 5.

NEW YORK CITY AND LONG ISLAND—SCM,
Blaine S. Johnson, K2IDB—Asst. SCM: Fred J. Brunjes, K2DGI. SEC: K2OVN. Section nets:

NLI	3630 kc.	1915 Nightly	WA2EXP-RM
VHF NET	145.8 Mc.	2000 TWTh	W2EW-PAM
VHF Net	146.25 Mc.	1900 FSSnM	W2EW-PAM
NYCLIPN	3932 kc.	1600 Daily	WB2DXM-PAM
NLS (Slo)	3630 kc.	1845 Nightly	WA2RUE-RM

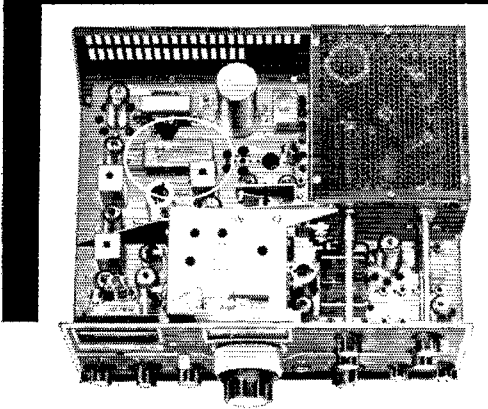
NYC-LI AREC Nets: See Dec. 1965 column for schedules. W2VL suffered a mild heart attack recently, but is recovering nicely. His son, K2VWZ, installed a new quad to help him while away his recuperating hours. WB2ASR came up a winner at the s.s.b. show during the IEEE show with an RV-4. Birthday greetings to WA2KSP, 72 years young and going strong. Jumpsuit Net members received certificates at a recent meeting from Jump Master W2BJL. W2BCB is trying to raise his ground-plane with fertilizer? WB2AWX has been appointed EC and Asst. Radio Officer of the 10-Meter Net, Brooklyn. WB2WZL is sporting a new SR-42. WA2-PJL is the new R.P.I. RC pres. W2AWK sports a new five-element beam on 20 meters. K2ORA is coming on s.s.b. with a new exciter. K2DGI now is on 2-meter i.m. WB2OCF is working on a parabolic for 432 Mc. K2DDK has some new wall paper, YLCC No. 717 and DXCC C.W. and has an s.s.b. exciter and 9TO keyer under construction. W2KTG, now K4DJN in Florida, sends regards to L.I. and the 28,720 gang. W2HAE has a new 136-ft. long wire up. WB2TBX is looking for interested fellows concerning high-power rigs for 6 meters! The Federation of Long Island Radio Clubs will hold its 2nd Annual Hamfest July 17 at the Hempstead Town Park at Pt. Lookout from 10 A.M. to 6 P.M. The Maritime College at Ft. Schuyler, Bronx, is in need of an electronics instructor with experience in all maritime related electronics. A 1st- or 2nd-class FCC Radiotelegraph license is required. Interested persons should contact Prof. G. J. DeSimone, Chairman, Dept. of Marine Trans., State Univ. of N.Y. Maritime College, Ft. Schuyler, Bronx N.Y. 10465, or call the prof. at TY 2-3000 or 863-7851 after 4:30 P.M. He also is looking for an Asst. Ships Radio Officer for a 10-week summer training cruise to Western and Northern Europe June 14 to Aug. 23, 1966. The Kings County 6-Meter AREC holds bunny hunts every month. For information write Bunny Hunt, c/o TVI, Box 3, Midwood Sta., Brooklyn, N.Y. 11230. WB2TRD reports a dipole antenna for 2 meters; 6 half waves long with #18-copper wire works very well! WA2RAT has completed a 2-meter s.s.b. heterodyne converter and 820B linear amplifier and reports it works exceedingly well. Well it's about time for the annual Field Day. This is the time when we compete with the cows and bugs for possession of the local farm or back lot. We go out full of enthusiasm with expectations of a great week end and return home after it is all over; tired and with broken equipment, swept downstream by a local cloudburst vowing we'll never do it again! But comes the following spring, and we're racing to go. See you during Field Day. Fred, K2DGI. Traffic: WA2-UWA 427, K2UBG 246, WB2RBA 197, WB2FAJ 150, WB2PYI 107, W2GKZ 88, WB2NGZ 66, WB2RFQ 65, WB2EUH 62, WB2AEK 58, WN2TCS 33, WA2LJS 32, W2DBH 28, W2EC 27, WB2QKJ 27, W2BCB 26, WB2-GKX 19, WB2SIZ 12, WA2QJU 11, K2UFT 10, WA2DTY 9, WB2EMJ 9, W2PF 8, W2GP 6, WB2BKS 5, WB2SFG 5, WB2UKQ 4, WB2MBQ 3, WB2AWX 1, WA2TKS 1, WB2WZL 1.

IF YOU'RE LOOKING FOR

SELECTIVITY

LOOK INTO THE
SWAN-350

AND ITS HIGH FREQUENCY
CRYSTAL LATTICE FILTER

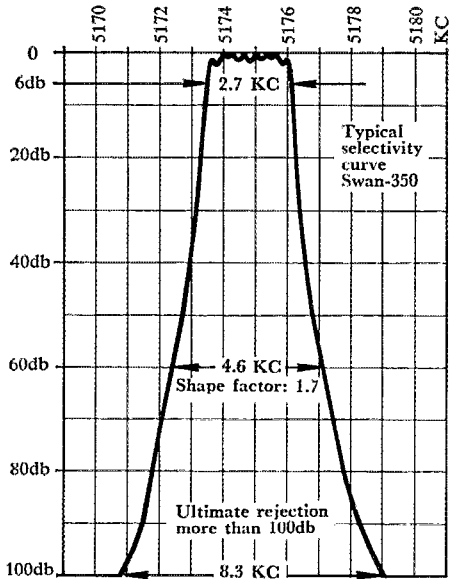


One of the reasons why the Swan-350 is the top selling transceiver today is its exceptional selectivity provided by a new crystal filter which we began installing in all production units a few months ago. This amazing little gem is made exclusively for Swan by C-F Networks. The selectivity it provides for voice communication is as good or better than the selectivity provided in any other sideband equipment, regardless of price.

There are 3 important factors about a filter which determine what the overall selectivity will be. One of these is its *bandwidth* at the 6 db points, and here we have carefully selected 2.7 KC in order to give you good channel separation, and still retain the smooth, natural audio for which Swan transceivers are so well known.

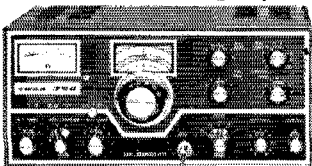
The next consideration is *shape factor*, or the ratio between bandwidths at 6 and 60 db. In this respect the Swan filter gives you a "shape factor" of 1.7 to 1. This is substantially better than the 2 to 1 ratio of the mechanical filter, or 3 to 1 of the average 9 mc crystal filter. Best shape factors are achieved right around 5 mc, and this is one of the main reasons for selecting 5175 KC for the Swan I.F. (This choice of I.F. also permits single conversion design which results in fewer images and spurious signals. The only thing better than single conversion is no conversion at all.)

The third important factor, but by no means the least, is the measure of *ultimate rejection*, or how far the skirts fall before flaring out. Take a look at the graph and you'll see that this is better than 100 db with the Swan filter! Ultimate rejection determines how well your receiver attenuates those strong adjacent channel



signals, especially the guy down the street with the big linear. In this respect, the Swan filter is superior to others being used in amateur sideband gear.

In Swan transceivers, the filter is also used when transmitting, of course, and in this mode the shape factor determines what your unwanted sideband suppression will be. We have been advertising 40 db, but this is a conservative figure, since it is really better than 50 db. Also, we've been advertising only 400 watts PEP input to the 350, but actually the average production unit peaks over 500 watts before flat-topping, which is why the 350 gets out so well, and sounds so good. Compare these features with any other sideband transceiver, and they all sell for more money! 73 Herb Johnson W6QKI



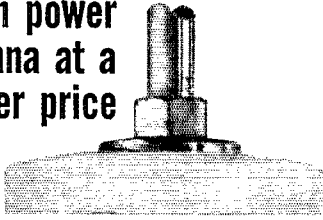
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Oceanside, California

BIG-K

high power
antenna at a
low power price



Now... BIG-K... an improved Top-sider mobile antenna with one kilowatt p.e.p. coils.*

Compare these new low prices for a KW rated mobile antenna!

Manufacturing costs have been lowered by quantity production, new techniques. Savings are passed along to the customer. BIG-K retains hinged column with fast release, positive lock-up—allows coil and top whip assembly to fold over. New... lower in price... better.

*(KW coils only—except for TW-160)



MMW-B
Fold-over mast and adjustable whip for KW coils. 93". (Bumper mount) 13.50

MMW-D
Fold-over mast and adjustable whip for KW coils. 77". (Deck mount.) 13.50

TW-160
300 watt, 160 meter coil 5.80

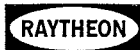
KW-80, 1 KW
75 meter coil 13.50

KW-40, 1 KW
40 meter coil 8.95

KW-20, 1 KW
20 meter coil 6.95

KW-15, 1 KW
15 meter coil 6.25

KW-10, 1 KW
10 meter coil 4.45



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NORTHERN NEW JERSEY—SCM, Edward F. Erickson, W2CVW—Asst. SCM; Louis J. Amoroso, W2LQP. SEC: K2ZFL N.J. public service networks:

NJN	3695 kc.	7 p.m.	Daily	WB2AEJ	RM
NJ Phone	3900 kc.	6 p.m.	Ex-Sun.	W2PEV	PAM
NJ Phone	3900 kc.	9 a.m.	Sun.	W2ZI	PAM
NJ Six	51150 kc.	11 p.m.	M W Sat.	K2VNL	PAM
NJ Two	146700 kc.	10 p.m.	Tu Sat.	K2VNL	PAM

A listing of AREC net schedules is available from SEC K2ZFL. New appointments: WB2KTO as OPS, WB2QAIP and K2SCD as OBS, W2QNL as QRS. A group of Asst. ECs and others have formed a traffic net which meets Mon. through Sat. at 8 p.m. local time on 30.360 kc. W2ZTH1/2 operates from Montclair State College. WB2KTO has received his WAS and has a new keyer. W2SRQ has been DXing on 10 phone. WA2CCF has a new Drake RA-14X in addition to his other equipment! WB2LXW, Paterson and vicinity EC, needs support in manning a 2-meter net with tie-in to 3900 kc. W2SSE received a Boy Scout Radio Merit Badge. WA2IWL, Rutgers U. AUC, plans to have a shack at the new Student Center by 1968. WB2QMA worked two new states while on spring vacation. Tim will handle traffic from the Lawrenceville School, WA2ZPY. WA2UDT has 48 countries on 40 meters. W2BVS is back on the air with a R&W 5100 and SX-101A. New Officers of the Livingston (N.J.) Amateur Radio Club are Gassus, pres.; W. Waekenhuth, vice-pres.; K. Murray, treas.; W2COT, secy. WB2MLXZ is engaged in self-study of ionospheric radio propagation. WB2PUL is NOEAK in Navy MARS. WB2JHQ has a new quad; WB2PIA has a new Galaxy III. K2RDX removed the traps from his varactor multiplier, resulting in more output. The Bergen ARA 6-Meter Net, Sun. at 9 p.m. local time on 50.4 Mc. with WB2GKB as NCS, had an average of 13 QNI during Mar. K2SCD is hooking up a directional coupler for s.w.r. measurement on 10 GHz. WB2QMP's DXCC is 13/11. WB2UCS observes the trend to high power and large arrays on v.h.f. WB2KLD theorizes that the recent appearance of that comet may have caused some openings on v.h.f. WB2MTU and Tom further theorize that all the objects now floating in space could possibly cause openings in the manner of meteor showers. Congratulations to WB2VUY on receiving his General Class license. WB2QZF is editor of the *IRAC Newsletter*. OO reports: Mar.—W2BVE-37, W2TPJ-21, K2AGZ-17, W2NIY-2, Feb.—K2AGZ-5, W2NIY-2. Traffic: (Mar.) WB2AEJ 277, WB2JWB 215, K2VNL 200, WB2QLF 169, WB2KSG 164, W2CVW 88, WB2OHK 80, WB2FIT 75, WA2GQZ 45, WB2VHG 37, K2ZI1 34, WB2UCS 27, WA2SRK 25, K2ITU 23, W2PEV 22, WB2IYO 16, WB2BCS 14, W2ZTH1/2 14, WB2KTO 13, WA2SRQ 12, K2EQP 9, W2ZTHM 6, WA2CCF 5, K2MFX 5, W2QNL 5, WA2TWS 5, WB2DXW 4, W2NIY 3, K2SLG 3, W2JDH 2, W2VMX 2, WB2ICH 1. (Feb.) W2QNL 37, WB2BCS 20, W2NIY 2, WB2QGB 2.

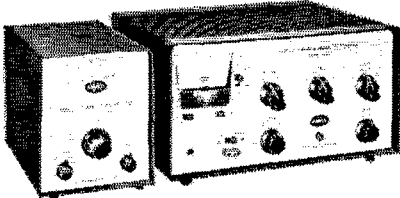
MIDWEST DIVISION

IOWA—SCM, Dennis Burke. **W0NTB—SEC:** K0BRE. Your SCM is in Mary Greely Hospital at Ames, as we write, so the following data are submitted by K0BRE, SEC. Any additional March traffic and reports will be included next month, if possible. OBS W0SEF, gives Novice-speed code practice each Wed. on 3734 kc. at 8 p.m. CST. The Iowa 75 Phone Net held 23 sessions. QNI 1564. QTC 179. K0EVC handled traffic for the Illinois Central Railroad, the telephone company and others in the March ice storm. WA0DEM was busy with all the storms, acting as net control Nebraska and (for LXL) for the Iowa AREC nets. Excellent reports were received from Observers W0USL, K0AZJ and W0LPS. W0PFP on Mar. 13-14 observed aurora on 50 and 144 Mc. W0GPL indicates that the rain fall reports collected through the Amateur Weather Observer's Network (7 p.m. Mon.-Fri., and 9 a.m. Sun.) go into the *Iowa Weather and Crop Bulletin*; storm reports into the *Weather-Data-For-The-Month*. Ray is ably assisted by WA0KZP and K0POI. He lists 71 stations (9 new) to give them full credit for daily operations. WA0KAC's Iowa Weather Traffic Net (9 p.m. Wed., 1 p.m. Sat.) and W0GPL worked together the day of the big storm. Traffic: WA0DEM 1097, K9RCK, W86PEE 112, W0USL 98, WA0DYV 52, K0EVC 48, K0DKM 44, K0QKD 14, W0FDI 9, W0NGS 7.

KANSAS—SCM, Robert M. Summers, K0BXF—SEC: K0EMB. RM: WA0JH. PAM: K0JMF. V.H.F. PAM: W0HJL. The c.w. net, QRS, is handling more traffic and having more QNI than it has had in a couple of years. W0UYK has been spending too much time fighting grass fires around Mound City. K0KED says gardening is good exercise. K0JDB is setting up a regular sked from Newton to Wichita via 2 at the same

AMECO*Leader in Compact, Quality Ham Gear*

NEW VFO FOR TX-62 or any other VHF TRANSMITTER



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 1/2 meter transmitter.

Because it uses a transistorized oscillator circuit, it is extremely stable. An amplifier stage provides high output at 24-26 MC. The VFO includes a built-in solid state Zener diode regulated AC power supply.

This new VFO is truly an exceptional performer at a very low price **Model VFO-621 \$59.95 net.**

The NEW **AMECO** TX-62

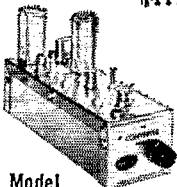
In response to the demand for an inexpensive compact VHF transmitter, Ameco has brought out its new 2 and 6 meter transmitter. It is easy to tune because all circuits up to the final are broadbanded. There is no other transmitter like it on the market!

SPECIFICATIONS AND FEATURES

Power input to final: 75W. CW, 75W. peak on phone.
 Tube lineup: 6GK6—osc., tripler, 6GK6 doubler, 7868 tripler (on 2 meters) 7984-Final. 12AX7 and 6GK6 modulator. Crystal-controlled or external VFO. Crystals used are inexpensive 8 Mc type.
 Meter reads final cathode current, final grid current and RF output.
 Solid state power supply.
 Mike/key jack and crystal socket on front panel. Push-to-talk mike jack.
 Potentiometer type drive control. Audio gain control.
 Additional connections in rear for key and relay.
Model TX-62 Wired and Tested only \$149.95

AMECO EQUIPMENT CORP. 178 HERRICKS RD., MINEOLA, L. I., N. Y.

NUVISTOR CONVERTERS FOR 50, 144 AND 220 MC. HIGH GAIN, LOW NOISE



Model CN

Has 3 Nuvistors (2 RF stages & mixer) and 616 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

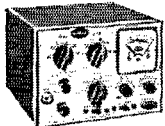
ALL BAND NUVISTOR PREAMP 6 THRU 160 METERS



MODEL PCL, Wired, \$24.95
MODEL PCLP, with built-in power-supply, wired, \$32.95

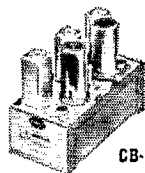
2 Nuvistors in cascade give noise figures of 1.5 to 3.4 db. depending on band. Weak signal performance, image and spurious rejection on all receivers are greatly improved. PCL's overall gain in excess of 20 db. Panel contains bandswitch, tuning capacitor and 3 position switch which puts unit into "OFF," "Standby" or "ON," and transfers antenna directly to receiver or through Preamp. Power required — 120 V. at 7 ma. and 6.3 V. at .27 A. — can be taken from receiver or Ameco PS-1 supply. Size: 3"x5"x3".

COMPACT 6 THRU 80 METER TRANSMITTER



Model TX-86

Handles 90 watts phone and CW on 6 thru 80 meters. Final 6146 operates straight thru on all bands. Size — only 5" x 7" 7" — ideal mobile or fixed. Can take crystal or VFO. Model TX-86 Kit \$89.95 — Wired Model TX-86W. \$119.95. Model PS-3 Wired \$44.95. Model W612A Mobile Supply wired \$54.95.



CB-6

CB-6K — 6 meter kit, 6ES8-rf Amp., 6U8-mix./osc. \$19.95
 CB 6W — wired & tested \$27.50
 CB-2K — 2 meter kit, 6ES8 1st rf amp., 6U8 — 2nd rf amp./mix, 616 osc. \$23.95
 CB-2W — wired and tested, ... \$33.95
 Model PS-1 — Matching Power Supply — plugs directly into CB-6, CE-2 and CN units. PS-1K — Kit ... \$10.50
 PS-1W — Wired \$11.50

EASY TO WIRE AMECO BOOKS



Amateur Radio Theory Course \$3.95
 Amateur License Guide50
 Radio Operators' Lic. Guide, EL 1-275
 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.

Dept. Q-6

Ameco equipment at all leading ham distributors.

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NEW

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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

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time as QKS. Flint Hills Amateur Radio Club is setting up 147.15-Mc. f.m. for the stormy WX season. WAOCGS is about to reach DXCC. KOZTS is putting together an SB-400 and an SB-200. The Newton Club has 5 new Novices completing the code class. KOGZP is on the sick list. V.h.f.-wise the Wichita Amateur Radio Club is promoting 50.34 Mc. The Kansas PI Net, on 145.350 Mc. at 2100 CST Sat., is now listed as an official Kansas Section Net. At the same time 52.525 Mc. was established as the 6-meter f.m. emergency frequency for Kansas.

	Freq.	Mgr.	QNI	QTC
KPN	3920	KØJMF	52	21
KsBN	3920	KØJMF	79	96
QKS	3610	WØJJI	248	90
KWN	3920	KØEMB	576	6
KansPI	145.350	KØEMB	61	2

Traffic: WOOHJ 729, WAØMLE 179, WØINH 124, KØHGI 112, WAØJJI 98, KØGII 76, KØJMF 71, KØEMB 51, KØBXF 37, WAØFCO 26, KØJDD 21, WAØEMQ 18, WØFDJ 17, KØKED 17, KØLPE 5.

MISSOURI—SCM, Alfred E. Schwaneke, WØTPK —SEC: WØBUL. New appointments: KØYGR as ORS. WØTDR as ORS, WØZLN as OPS with KØGYK as trustee. Appointments renewed: KØYGR as OES, WØGCL as ORS, KØONK as BC and PAM, KØJWN as OBS, WØUCK as OPS. An SCM Field Day Trophy will be awarded to the affiliating club group reporting the highest single band score in the section. Report must be made by radiogram to the SCM before Aug. 1 giving the number of contacts and total of sections worked on one band and mode of operation. Band designations are according to ARRL Field Day rules. Score will be the product of stations worked times number of sections. All club groups reporting will receive a participation certificate suitable for framing. Contacts must be made during allowed Field Day hours and from the portable location. The first club to win the trophy 3 times keeps it permanently. HBN holds simultaneous sessions on 3880 and 7280 kc. WAØIWR is Gen. Cl. WNØONF and WNØONW are new Novices in Harrisonville. KØYIP placed 1st for the section in the Mo. QSO Party and K2EUI/5 was 1st for out-of-state. OES reports were received from KØJWN and WØJTD. KØIOG and WAØ-MKN have new Eico 753 kits on the air. New reports:

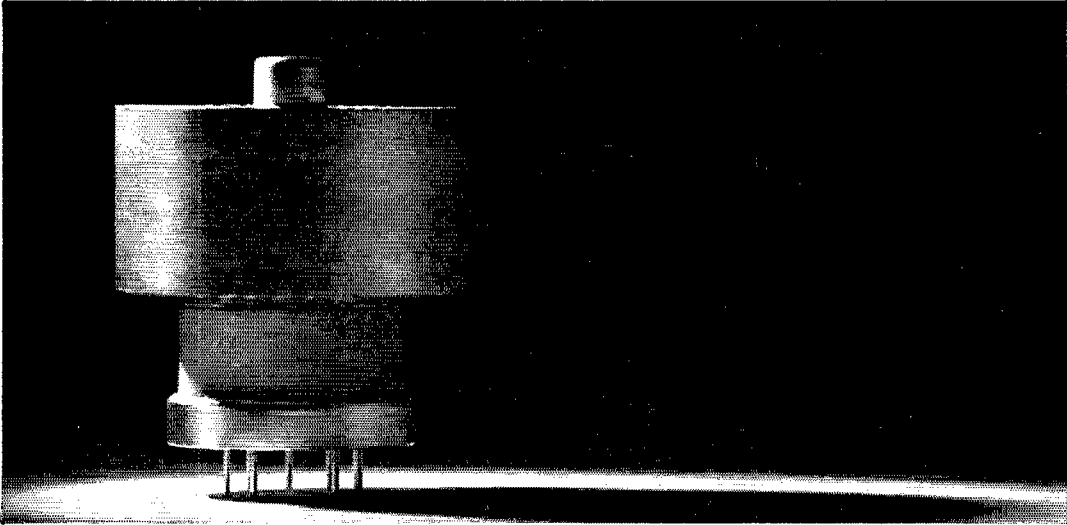
Net	Freq.	Time	Days	Sess.	QNI	QTC	Mgr.
MEN	3885	2330Z	M-W-F	13	237	16	WØBUL
MON	3580	0100Z	Daily	31	221	171	WØWYJ
SMN	3580	0400Z	Daily	25	111	102	KØAEM
MNN	3580	1900Z	M-Sat.	25	38	14	WØUD
QMO	3580	2300Z	Sun.	4	13	11	WØGFKD
MSN	3715	0300Z	Daily	30	22	14	KØONK
MoSSB	3963	2400Z	M-Sat.	26	57	164	KØTCB
MoPON	3810	2100Z	M-F	21	299	114	WØHJL
MITTN	3940	2300Z	M-F	23	241	77	WØELEM
HBN	3880	1805Z	M-F	31	987	207	WØSHWJ
PHD	50.4	0130Z	Mon.	4	92	6	WØFLL

Traffic: WAØFKD 303, KØAEM 264, WAØFMD 149, KØYGR 144, KØONK 101, KØJPL 98, WØHVJ 83, WAØCMO 77, WØUD 76, WØZLN 64, WØTPK 44, WØYO 43, WØEEE 42, WAØKNW 38, WAØHWJ 31, WAØFQL 30, WAØLYE 29, KØJPS 20, WØRTO 17, WAØELM 15, KØLGZ 15, KØTCB 15, WAØBGU 11, WAØHQ 10, KØOYV 10, WØBUL 8, WAØQR 8, WAØCHH 7, WØGQR 6, WAØFLL 4, WØBYL 3, KØBWE 3, KØYIP 2, WAØDKT 1, WAØIHV 1.

NEBRASKA—SCM, Frank Allen, WØGGP—SEC: KØJXN. Monthly net reports for Mar.; Nebr. C.W. Net, WAØGHZ, 1st session, QNI 130, QTC 35; 2nd session, QNI 95, QTC 28. Nebr. AREC C.W. Net, WAØEI, QNI 15. Time during the summer is now 0230Z. Nebr. Emer. Phone Net, WAØGHZ, QNI 1733, QTC 93. Nebr. Storm Net, WAØGD, 1st session, QNI 989, QTC 34; 2nd session, QNI 924, QTC 44. West Nebr. Phone Net, WØNIK, QNI 574, QTC 53, Wx QTC 162. Nebr. AREC Net, WØIRZ, QNI 159, QTC 3. Nebr. Morning Phone Net, KØUWK, QNI 823, QTC 44. 160-Meter Wx Net, WAØCBJ, QNI 611, QTC 5. Pine Ridge ARC, at Chadron, has a new HW-12 at WØFLO, the club station. Two picnics are on tap for June: The Pine Ridge ARC at Chadron June 5, and Tri City ARC at Scottsbluff June 19. Traffic: (Mar.) WAØDOU 363, WAØGHZ 267, WØLOD 156, WØNIK 113, KØOAL 102, WAØIBL 53, KØJFN 40, WAØGJV 37, WØBVF 34, WØGGP 32, WAØBOK 27, WAØGJD 27, WAØHWR 26, WAØBE 24, WØVFA 20, WAØBD 19, WØEWZ 19, WAØEUM 17, WØWKP 16, WØFQB 12, WAØIXD 10, KØULQ 10, WØWRY 10, WAØGD 8, WAØHY 8, WAØXF 8, WØRJA 8, KØRRL 8, WØAGK 6, KØBMP 6, WAØEI 6, WAØIBB 6, KØJMM 6, KØUWK 6, WAØFIQ 5, WØYFR 5, WØFTQ 4, WAØHOP 4, WAØSX 4, WØ-



New from PENTA: Beam Pentode with -40db 3rd-Order Distortion at 300w PEP Output



The new PL-8583/267 Penta beam pentode for 300-400 watt linear amplifier application offers a minimum of -40db 3rd-order intermodulation distortion, without feedback, at 300 watts PEP output. This PL-8583/267 in multiplex service significantly reduces co-channel interference to permit addition of new channels in new equipment or to greatly improve performance in existing equipment. Precision alignment of electrodes contributes to both low distortion figures and low drive requirements.

The PL-8583/267 electrical characteristics:

Heater voltage for oxide unipotential cathode	26.5 volts
Heater current	1.0 amperes

Maximum ratings—CCS	
DC plate voltage	2,000 volts
DC plate current	300 ma
Anode dissipation	350 watts

Size: 2.16" height x 1.75" diameter

For full details, write The Machlett Laboratories, Inc.—Penta Plant, 312 N. Nopal St., Santa Barbara, California 93102

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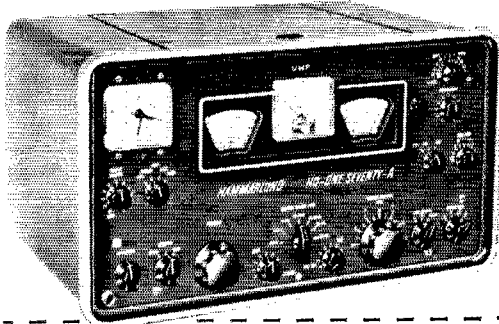


HAMMARLUND'S NEW HQ-170A-VHF

CAPTURES ALL POPULAR HAM BANDS

The exciting HQ-170A-VHF is the only Ham Band receiver that gives you everything you want. Separate NuVistor front ends (0.3 uV for 10 db S/N) for both 6 and 2 meters completely eliminates need for add-on converters or jury-rigged adaptations. Built-in 6 and 2 meter operation employs matched circuitry for outstanding performance.

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MITI 4, WOPHA 4, WAOJAV 3, WAOJZL 2, WAOJUF 1, WOWHY 1. (Feb.) WAOJES 7.

NEW ENGLAND DIVISION

CONNECTICUT—Acting SCM, Milton E. Chaltee. W1EFW—SEC: W1PRT, RM: W1ZFM, PAM: W1YBH, V.H.F. PAM: K1RTS. March net reports: CN (3640 daily 2345Z) 81 sessions, traffic 422 from 357 QNI, high attendance W1ZFM, W1APY, W1RFJ, CPN (3880 M-S 2300Z Sun, 1500Z) 30 sessions, traffic 154 from 464 QNI, average net 40 minutes, high attendance W1YBH, K1LUH, W1NQO, K1RSK, K1PKQ, K1SRF, W1MPW. Members of CPN and CN joined in a dinner meeting Mar. 26 with 38 in attendance enjoying good talk, good meal, good fellowship. Club Council President W1WHQ reports the Meriden, Bloomfield and Southington Clubs brought the council membership to 13. New PON activity now is evident on 145.98 Mc, as expansion of 6-meter PON. With proper liaison to CN and CPN this could be the prime v.h.f. traffic outlet needed. SEC W1PRT continues contacts in areas needing an EC; his list is growing. W1GEA will serve as Asst. SEC for Eastern Conn. K1LMS added 7 new countries to his worked list in the DX Contest. K1BUI returns to activity and renewed as OES. K1AFC is active in Navy MARS and DX on the side. K1QPN reports the arrival of a new jr. operator and experiments with a TA-36 beam. Bloomfield C.D. Director K1TBA is running a new radiological course. K1ZND credits the new TCC sked for a BPL. W1QV has a new tilt-over tower which should be working soon. W1BDI skeds W1ZJJ/V/EI and had a ball in the DX Contest within the time available. He was one of several who nailed the Conn. gang operating PJ5ME (W1BGD, W1BHI, W1DYE, W1ADE, et al). Endorsements: W1AW, W1BDI, W1BNB, W1WPR, K1ZND as ORSs; W1AW, K1QPN as OBSs; W1NQO as EC; W1EQV as OO; W1BDI, K1BUI as OESs; W1AW, K1QPN as OBSs. Is yours due for renewal? An OES report was received from K1MRT and an OO report from W1ECL. Traffic: (Mar.) K1ZND 529, W1EFW 358, W1APY 327, W1NJL 237, K1RSK 177, K1LMS 162, W1AIDGK 136, K1RQO 129, K1EYY 115, K1OQG 90, W1YBH 73, W1ZFM 59, W1BDI 56, K1QPN 55, W1RFJ 39, W1MPW 30, K1PKQ 23, W1CTI 20, K1ECL 18, W1QV 18, K1NTR-16, K1EFR 14, K1SRF 14, W1ZL-10, W1CUE 9, W1BNB 8, W1ADEM 8, W1BHV 7, K1YGS 2. (Feb.) W1AIDGK 48, W1RFJ 48, K1QPN 33, W1CTI 17, K1YGS 3.

EASTERN MASSACHUSETTS—Frank L. Baker, Jr., W1ALP—SEC W1AOG received reports from W1s JVZ, BHD, LVK, STX and K1PNB. New appointments: W1MNK Topsfield, K1WPF Burlington as EC. Sorry to have to report W1MB as a Silent Key. K1ZZY is on many bands. The new Yankee S.S.B. Net meets on 50,110 kc, Sun, at 9 A.M. with W1EPL as acting NC and covers N.E., N.Y., N.J. Write W1BHD for details on the AMRAD Reunion scheduled for Aug. 27. W1KR had a serious operation. The OOT Net meets Thurs. at 6 P.M. on 3940 kc. W1BHD is building slow-scan TV. W1AJ, ex-W1GWE, is in the Boston area to stay. K1BIF will be on T.S. Bay State in the Caribbean. W1MME showed some films of past Field Days to the South Shore Club. W1EPZ has a Johnson Challenger. W44AGU/1 is now in Shirley, says EC W1LPZ. W1VAH is working DX on 80 c.w. W1NEOT passed the General Class exam. K1YMW is in the Navy. K1LJK is QSYing to Mich. W1ACNO is now General Class. W1AEC members are enjoying their new equipment at the SEMARA shack. W1DAL, ex-K4GPI, now in Carlisle, has an Extra Class license. The T-9 Club met at W1ISX's QTH. W1s FAE, DFS and ALP spoke at a meeting of the Chelmsford Club. W1NF has been a ham for 64 years. K1WVW is on the 2- and 6-meter nets. K1OJQ is working c.w. DX. W1HLL is net mgr. of QRA's 10-meter net. W1UIR has taken over as PAM for 2 meters and we thank W1DOM for a job well done. K1ESG has a 40-w.p.m. certificate from the CWA. K1GPH is working on RTTY. W1EYY is working DX. W1OFY says the Yankee RC C.W. Net is training as a traffic net and will send some into our Eastern Mass. C.W. Net. W1RZP has a complete new s.s.b. rig. W1GLF has a new R4A receiver. W1AUI has a new Swan 350. K1YUB says there now is a station at the Somerville "Y." W1NFBJ qualified for RCC with W1ACPV. The 6-Meter Crossband Net had 23 sessions, 356 QNIs, 7 traffic. W1DEL is on 2. W1DLY is moving to Sudbury. W1CAS still is on 6. Wellesley ARS held an auction with W1AIFM doing the chore. K1BTF worked some DX on aurora openings on 2 and has skeds with W1SWEN and W1BRN. W1EYF will move to Texas in June. W1ADLT is in both of our c.w. nets. W1OJM is in N.A. S.S.B. Net 0900, 14,280 kc. W1GRVZ, operator at K1KBO says they will hold Novice and General classes and have a new RTTY setup with M.19 and 15 running 700 watts. The Capeway Club met at K1HGT's QTH. W1NFWI is on 40 and 80 c.w. K1RAO is on 6 and 2

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ALL-BAND VERTICALS

QUALITY MATERIAL

Brand new mill stock aluminum alloy tubing with Aluminate finish for protection against corrosion. Loading coils made by Barker & Williamson.

ALL-BAND OPERATION

Loading coil not required on 6, 10, 15 and 20 meters. For 40, 80, and 160 meters, loading coil taps are changed manually except if a wide-range pi-network output or an antenna tuner is used; in this case band changing can be done from the shack.

EASY ASSEMBLY

Less than two minutes is all you need to put your vertical together. No special tools or electronic equipment required. Full instructions given.

SIMPLE INSTALLATION

Goes almost anywhere. On the ground, on the roof, or outside your window.

AMAZING PERFORMANCE

Hundreds of reports of exceptional DX operation on both low and high power. You will work wonders with a Gotham vertical.

NO GUY WIRES

Our design eliminates unsightly guy wires. You save time, trouble, space and money by avoiding guy wires.

"All band vertical?" asked one skeptic. "Twenty meters is murder these days. Let's see you make a contact on twenty meter phone with low power!" So K4KXR switched to twenty, using a V80 antenna and 35 watts AM. Here is a small portion of the stations he worked: VE3FAZ, TI2FGS, W5KYJ, W1WOZ, W2ODH, WA3DJT, WB2FCB, W2YHH, VE3FOB, WA8CZE, K1SYB, K2RDJ, K1MNV, K8HGY, K3UTL, W8QJC, WA2LVE, YSIMAM, WA8ATS, K2PGS, W2QJP, W4JWJ, K2PSK, WA8CGA, WB2KWY, W2IWI, VE3KT. Moral: It's the antenna that counts!

V40 vertical for 40, 20, 15,
10, 6 meters \$14.95

V80 vertical for 80, 75, 40,
20, 15, 10, 6 meters. . . . \$16.95

V160 vertical for 160, 80, 75,
40, 20, 15, 10, 6 meters . . \$18.95

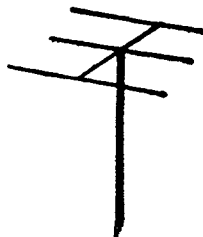
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BEAMS

Compare the performance, value, and price of the following beams and you will see that this offer is unprecedented in radio history! Each beam is brand new; full size (36' of tubing for each 20 meter element; for instance); absolutely complete including a boom and all hardware; uses a single 52 or 72 ohm coaxial feedline; the SWR is 1:1; easily handles 5 KW; 5/8" and 1" aluminum alloy tubing is employed for maximum strength and low wind loading; all beams are adjustable to any frequency in the band.



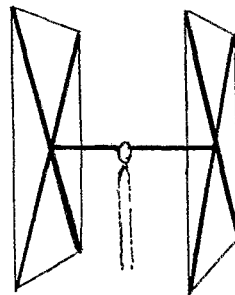
2 El 20	\$16	7 El 10	\$32*
3 El 20	22*	8 El 10	36*
4 El 20	32*	4 El 6	15
2 El 15	12	5 El 6	20*
3 El 15	16	6 El 6	24*
4 El 15	25*	7 El 6	26*
5 El 15	28*	8 El 6	28*
4 El 10	18	9 El 6	30*
5 El 10	24*	10 El 6	32*
6 El 10	28*		

* 20' boom

QUADS

NEW! NEW! NEW! CUBICAL QUAD ANTENNAS

— these two element beams have a full wavelength driven element and a reflector; the gain is equal to that of a three element beam and the directivity appears to us to be exceptional! ALL METAL (except the insulators) — absolutely no bamboo. Complete with boom, aluminum alloy spreaders; sturdy, universal-type beam mount; uses single 52 ohm coaxial feed; no stubs or matching devices needed; full instruction for the simple one-man assembly and installation are included; this is a fool-proof beam that always works with exceptional results. The cubical quad is the antenna used by the DX champs, and it will do a wonderful job for you! Now check these startling prices — note that they are *much lower* than even the bamboo-type:

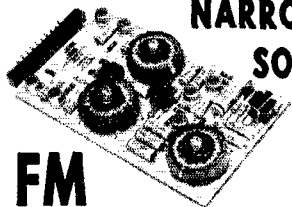


TWENTY METER CUBICAL QUAD . \$25.00
FIFTEEN METER CUBICAL QUAD . 24.00

YOU ASKED FOR IT! NOW ESSCO BRINGS YOU NARROW SHIFT FM

Completely Compatible!

THE ESSCO-W2JAV NARROW SHIFT SOLID STATE



FM DEMODULATOR

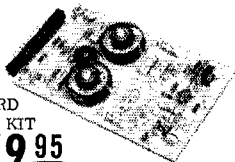
The ESSCO-W2JAV NARROW SHIFT FM RADIO TELEPRINTER DEMODULATOR is a completely solid state device, employing seven transistors, four diodes and an FM discriminator. The unit is completely interchangeable with the ESSCO-W2JAV Standard Shift Demodulator, Model TU-1. The TU-2 Demodulator is designed to copy narrow shift signals of 170 cps, but will receive signals with shifts from 50 to 300 cps. The input impedance is 600 ohms and is designed to be driven from any 600 ohm source, such as a communications receiver or a narrow shift audio frequency shift keyer.

KIT TU-2K Complete with instructions, \$27.95
pre-tuned filters and connector -----

FACTORY ASSEMBLED & TESTED TU-2 --- \$39.95

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FOR RTTY



ESSCO-W2JAV STANDARD
SHIFT DEMODULATOR KIT
with pretuned filters
& connector, TU-1K \$19.95

FACTORY ASSEMBLED & TESTED, TU-1 \$29.95

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with a Seneca, HQ-100 receiver and 60-ft. Rohn Fold-over Tower with beams on top. WA1FRI is the call of a new YMCA Radio Club at the Roxbury Branch of the Boston "Y." Code and theory classes are being held on Sat., WIDXM is pres.; WIQIC, vice-pres.; WN1-ENU and KIASK secy.; WNIHEX, treas.; W1AQV, club mgr. West Medford CC RC had a radio blackboard drill by A3e Harold Gibson, up from Miss.; also KI-PSV, who was home on leave, EM2MIN had 23 sessions, 210 QNTs, 171 traffic. EMNN had 13 sessions, 87 QNTs, 49 traffic. New members are WN1s F1W, F1K, ESI, FPF. Traffic: (Mar.) WIPEX 727, KICLM 256, W1EMG 195, K1ESG 186, W1OFK 185, K1GPH 182, K1KBO 168, K1PNB 128, K1VOK 106, K1GKA 77, K1VPJ 77, W1ZSS 71, W1DOM 64, W1EAT 56, W1AOG 55, W1EYY 43, W1ADLT 33, W1CTR 30, K1LCO 18, W1OJM 18, W1MX 11, K1ZBZ 10, K1BGK 9, W1DEF 7, W1ACBG 6, W1OFY 6, K1ETT 5, K1OKE 3, W1AID 2, W1KGU 2, K1YUB 2, WN1FIJ 1. (Feb.) W1ZLX 36.

MAINE—SCM, Herbert A. Davis, K1DYG—SEC; K1QIG, PAMs: K1WQI, K1ZVN, RM: K1TZH, V.H.F. PAM: K1OYE, Traffic Nets; Sea Gull Net, 1700 to 1800 and 2000 to 2100 on 3940 kc. Mon. through Sat. Pine Tree Net C.W., daily at 1900 on 3596 kc. K1TZH is looking for stations for the Pine Tree. Congratulations to K1-MTJ on working 16 states in 5 call areas on 2 meters. K1YJE is the new EC for Kennebec County. W1GRG is holding down the EC post in Hancock County. K1-BXI sure is making a lot of noise and getting out with his setup on s.s.b. The state AREC Net meets Sun. at 0900 on 3940 kc. for drills. All are invited to join. The Maine Hoss Traders Net will be on vacation after the time changes to DST. Some of our southern exposure friends should be operating up here by this time. Traffic: WINND 96, K1YUO 80, K1WQI 72, K1ZVN 47.

NEW HAMPSHIRE—SCM, Robert C. Mitchell, W1SWX/K1DSA—SEC: W1ALE/W1TNO. PAM: K1-APQ, RM: W1DYE. The GSPN meets on 3842 kc. Mon. through Fri. at 2330Z and Sun. at 1430Z. The VTNH Net meets on 3685 kc. Mon. through Fri. at 2330Z. W1-LOO and K1JFQ have a new boat and expect to do lots of fishing around N.H., Vt. and Maine. W1BYS is in Florida. W1DYE received his USA-CA certificate. K1-IK now is in Georgia for training and hopes to work all of you from there. W1DYE reports that there will be no convention by the Concord Brasspounders this year. K1YSD has a new Eico 753 and expects to be starting a N.H. emergency net soon. Please excuse this brief report as an home for one night from Florida (Apr. 15) so must get to the income tax forms. Traffic: (Mar.) W1ALE 56, W1DYE 53, W1MHX 24, K1IK 9, K1YSD 5. (Feb.) W1MHX 29.

RHODE ISLAND—See next page

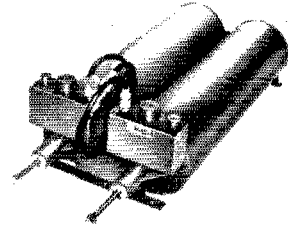
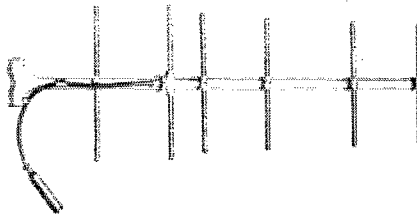
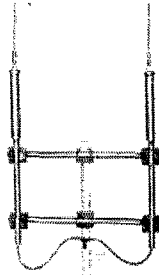
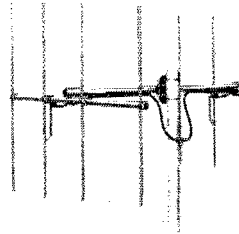
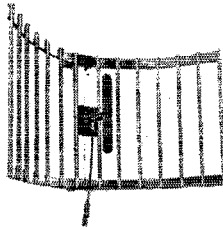
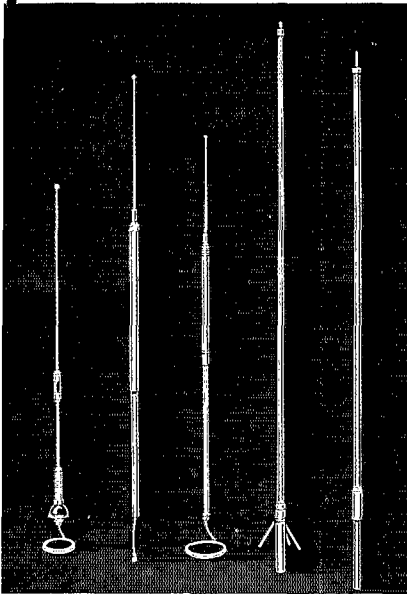
VERMONT—SCM, E. Reginald Murray, K1MPN—SEC: W1VSA, Mar. net reports:

Net	Freq.	Time	ONI	OTC	NCS	
Gr. Mt.	3855	2130Z	Dy x S	1017	36	W1VMC
Vt. Pone	3855	1300Z	Sun.	160	0	W1UUL
VTNH	3685	2230Z	M-F	107	37	K1UZG
VTCD	3900½	1400Z	Sun.	131	35	W1AD
VTSS	3909	2230Z	M-S	641	34	W1CWB
		1230Z	Sun.			

Plans are being made for the Central Vt. and Burlington Clubs to sponsor International Field Day this year. BARC announced a new award, the Vt. Century Club (VTCC), on confirmation of 100 Vermont contacts. Seal endorsements are issued for working 10, 25, 50, 75 and 100 different Vermont amateurs. Write Fred Field, KIURQ, 22 East St., Essex Jct., Vt. 05452, with s.a.s.e. Traffic: (Mar.) K1BQV 181, K1UZG 32, W1KJG 17, K1-MPN 17, K1IJJ 10, W1WZF 9, W1FRT 7, K1EQI 4. (Feb.) W1FRT 6.

WESTERN MASSACHUSETTS—SCM, Percy C. Noble, W1BYR—SEC: K1IJJ, C.W. RAI: K1IJV, New England Director WIQV and W1PNY were the speakers at the March meeting of the Hampden County Radio Association. The HCRA has a fine beginners' class now in operation. K1NWF is now SVØWKK. QSLs may be sent via SVØWG. RM K1IJV reports that WMN handled 123 messages during the month with the following in attendance (listed according to activity): K1IJV, K1WZY, W1DWV, W1BYR, K1LBB, W1ZPB, K1SSH, W1MNG, W1ADNB, W1DWA, W1YK, W1AML. "Home Brew Equipment" was the subject of the talks at the March meeting of the Berkshire County Amateur Radio Association. W1UUK has a new three-element 20-meter Cush-craft beam. W1GTO has a new tribander beam. W1JGZ is connecting Antarctica to many parts of Berk-
(Continued on page 122)

If it's used in
Communication Antenna
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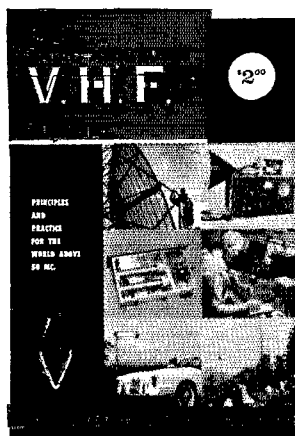
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IN DEMAND



This recent addition to the ARRL family of publications for the radio amateur, *THE RADIO AMATEUR'S V.H.F. MANUAL*, by Edward P. Tilton, is a book about things that work on v.h.f. It begins with the first history of v.h.f. ever written, and progresses through a discussion of the nature of the world above 50Mc., to receiving and transmitting principles, techniques and construction. The complete *V.H.F. Manual* is profusely illustrated with numerous photos, charts and diagrams. Emphasis throughout is on tried and tested equipment and practice. *THE RADIO AMATEUR'S V.H.F. MANUAL* is an exciting new addition to the radio amateur's library.

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The American Radio Relay League

Newington, Conn. 06111

RHODE ISLAND—SCM, John E. Johnson, K1AAV—SEC: WIYNE, PAM: W1TXL, RM: W1BTV, V.H.F. PAM: K1TPK, RIN reports 23 sessions, 40 QNI, 39 traffic, R1SPN reports 31 sessions, 573 QNI, 102 traffic. The Amateur Radio Clubs of Rhode Island will hold Amateur Radio Week June 4 through 10, 1966. A certificate signed by the Governor will be issued for Rhode Island stations who contact 10 different R.I. stations during the week and send a copy of the log with a stamped self-addressed envelope to R.I. Amateur Radio Week, P.O. Box 1662, Providence, R.I. The Newport County Amateur RC, W1SYE, will hold open house at its meeting June 6 in connection with R.I. Amateur Radio Week. The club will have several rigs on the air to demonstrate to the public and will show movies of its last two Field Days. WA1FTB received his Tech. Class ticket and is now a full member of the club. WA5-BNH/1 also was elected to membership. W1YKQ is presently building an SSB-400 and hopes to have it completed soon. Traffic: W1YKQ 213, W1BTV 109, W1TXL 103, K1TPK 53, K1VYC 49, K1YEV 28, K1VPK 23, K1-VYN 8.

Rhode Island Amateur Radio Week

June 4-11, 1966

The amateur radio clubs of Rhode Island invite all amateurs to participate in the first R.I. Amateur Radio Week Recognition Award. Operating times are from 0400 GMT June 4 to 0400 GMT June 11. Awards: All stations outside R.I., Mass., and Conn. are required to contact 3 different R.I. stations. Mass. and Conn amateurs must contact 5 different R.I. stations and R.I. amateurs must contact 10 different R.I. stations. Any band or mode may be used. All amateurs who submit logs meeting the above minimum requirements will receive a certificate signed by the governor.

The general call will be CQ RI on c.w. and calling any Rhode Island station on phone. Rhode Island amateurs will identify themselves by signing DE W1XXX RI on c.w. and this is W1XXX in Rhode Island on phone. All contestants will exchange a signal report, their county and state. Logs must indicate the date, time and band on which the contact was made.

Suggested frequencies: 3600, 3720, 3850, 7030, 7170, 7250, 14050, 14250, 21150, 21320, 28650, 29000 kc. 50.2, 50.7 and 145-147 mc.

Logs should be postmarked no later than June 25, 1966 and sent to: Rhode Island Amateur Radio Week, P.O. Box 1662, Providence, Rhode Island. A self addressed stamped envelope should be enclosed for the return of your certificate.

FEEDBACK

Are you among the many who have built one or more of the several versions of Ted Crosby's, W6TC, "HBR" receivers? If so, you'll probably be interested in some additional modifications and adjustment procedures that will lead to even better results. They're summed up by W6TC in a four-page bulletin that you can get by sending a self-addressed, stamped envelope, No. 10 size, to Alex Stewart, WA4ZNI, 916 Croton Drive, Alexandria, Va. 22308.



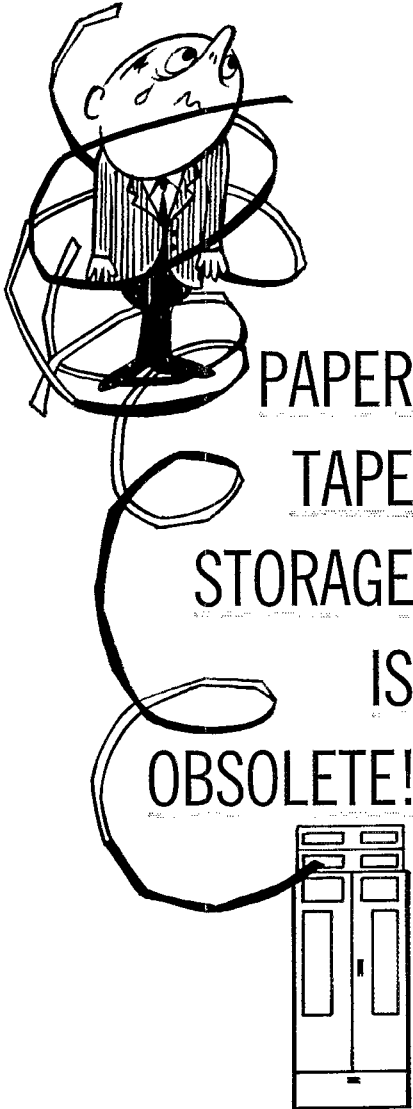
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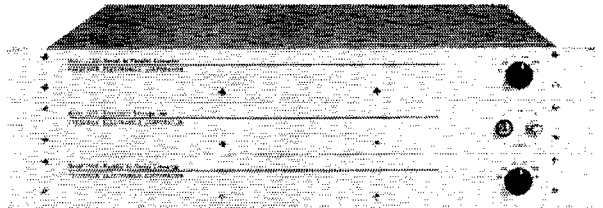
SOUND & TV SYSTEMS
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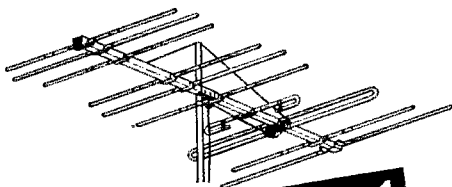
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2 ANTENNAS in 1

MODEL A-62 · 300 OHM

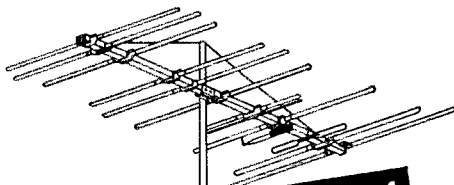
On 2 Meters:

- 18 Elements
- 1-Folded Dipole Plus Special Phasing Stub
- 1-3 Element Colinear Reflector
- 4-3 Element Colinear Directors

On 6 Meters:

- Fully 4 Elements
- 1-Folded Dipole
- 1-Reflector
- 2-Directors

Amateur Net \$33.00
Stacking Kit \$2.19



2 ANTENNAS in 1

MODEL A-62 GMC · 50 OHM

On 2 Meters:

- Equivalent to 18 Elements
- 1-Gamma-Matched Dipole
- 1-3 Element Colinear Reflector
- 4-3 Element Colinear Directors

On 6 Meters:

- 4 Elements
- 1-Gamma-Matched Dipole
- 1-Reflector
- 2-Directors

Amateur Net \$34.50
Stacking Kit \$18.00

MODEL AB-62 GMC

On 2 Meters:

Equivalent to 30 Elements

On 6 Meters:

Equivalent to 5 Elements

Amateur Net \$52.50

Also:

- 5 New 6 Meter Beams
- 3 New 2 Meter Beams
- 1 New 1/4 Meter Beams

Gold Corozided for Protection Against Corrosion

See Your Finco Distributor
or write Dept. QS for Catalog 20-226

The FINNEY Company - Bedford, Ohio

shire County. K1AHI is active on the MARS net. WIWV and his XYL vacationed in Florida. KIWZY now has 90 confirmed. The section mourns the death of K1FQS. Our deepest sympathy. W1EFW is the new manager of the First Region Net (LRN covering New England) replacing W1HVR, who resigned after nearly 17 years as its manager. Traffic: W1BVR 115, K1IJV 90, K1LBB 52, K1WZY 42, K1SSH 39, W1DWV 15, W1ZPB 13.

NORTHWESTERN DIVISION

MONTANA—SCM, Joseph A. D'Arcy, W7TYN—
SEC: W7RZY, V.H.F. PAM: K7IOA.

Montana S.S.B. Net	3910 kc.	1800 MST	Mon.-Fri.
Montana P.O.N. Net	3885 kc.	0815 MST	Sun.
Montana RACES	3998.5 kc.	0900 MST	1-3 Sun.
Missoula Area Emergency Net	3890 kc.	0900 MST	Sun.

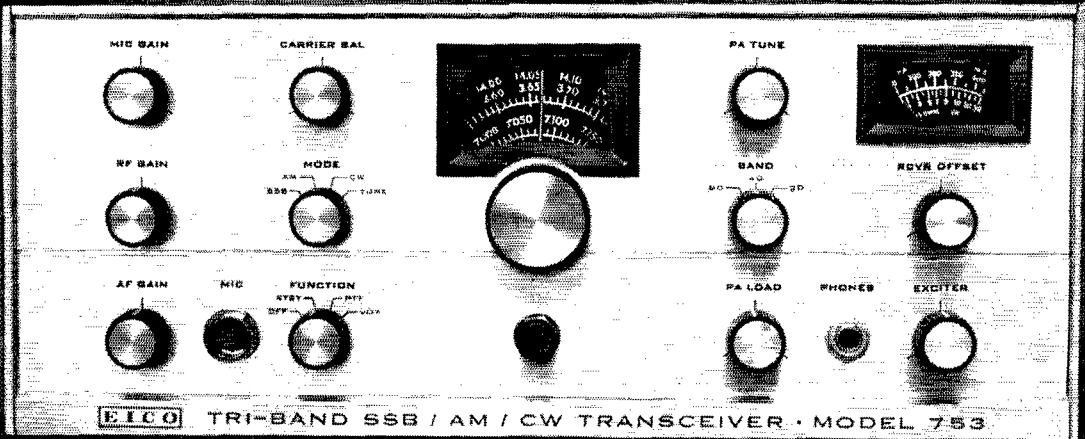
Appointment: K7CHA as EC. K7YPC has been in the hospital in Billings but is now out and back on the air. The Missoula gang has a MARS net going on 2 meters. K7IMZ has a new Twoer. W7TYN has a new SB-100 on the air. We have some news of the hamfest from the Anaconda group. On the program this year a Homebrew Contest is planned so now is the time to get started on your pet project or put the finishing touches on one you have built in the past. All types of equipment will be eligible except kit-type projects. There will be a c.w. contest and also hidden transmitter hunts on 2 meters and 75 just outside of the park entrance. If you have ideas on the Hamfest, write Box 655, Anaconda, Mont. Traffic: K7DCH 19, K7DCI 15, K7EGJ 12, W7FL 8.

WASHINGTON—SCM, Everett E. Young, W7HMQ—
SEC: W7UWT, RM: W7OEB, PAM: W7LEC, V.H.F. PAM: W7PGY, NTS nets:

WSN	3535	Daily	0100Z	QNL-273	QTC-564	Sess. 28
WARTS	3970	X-Sun.	0100Z	" 668	" 54	" 24
NTN	3970	Daily	1930Z	" 1252	" 582	" 28

K7THG says thanks for making the above report possible. W7BV was honored at a special banquet prexided by W7ZHZ for 50 years in our fraternity given by the Lower Columbia Amateur Radio Club. EC K7MGA reports a very FB 34th Annual Hamfest for the Yakima Amateur RC. New officers of the Puget Sound Council are W7HMQ, pres.; K7IMN, vice-pres.; K7ZEP, secy.; W7JBZ, treas. Contact K7RSB for information on the First Annual Washington Section QSO Party set for Sept. 17-19. Your SCM visited ARAB to present the SEC certificate to W7UWT. W7MCW has been appointed as Kitsap EC. W7LEC is working hard on phone traffic men who also are ARRL members to sign up. To all members of WSN: Your SET activities were not in vain. Our section activities could not have been successful without your total effort. W7PI filled in for W7KZ for the Mar. WSN report. W7OEB states NCS and RN7 liaison is now complete. K7CWO/7 and W7FQD are training for W.S.P. W7JC renewed as ORS. K7CHH/7 now is firm on bulletin service. Clallam County ARC, Lower Columbia ARC and ARAB, are planning big for FD. Richland ARC now is graduating new Novices. K7QOM is in the Navy. K7NV whips TVI by making a ham of the complainant. W7OEB nailed ZD8AA. W7MCW is sporting a new SBE-34. W7GVC completes 1156th RACES. W7GYF is pushing 2 meters for Grant county. K7MGA is DXing on 15 and worked ZF1GC. W7BTB reports sunspots-blackouts on LF so goes ten with two QSOs. Irv says KL7ENT is improving. W7CFY now is 75 from Texas. W7SAB and W7MCW are mobile from Datsun's. K7MGP is improved after ticker trouble. K6HMX visits friends in the Brenerton area. K7VMH now is working DX from a hilltop in Manette. W7HMA gets WAS-WAC, now is gunning for DXCC. W7OS is excited over the growth of membership since his election to the proxy job. All hams interested in v.h.f., contact K7CYZ for FD operation. W7AZI says the RC of 47 needs good red blood so join up. W7WMY worked H18XAL, XE2ZF, KV4DB, VP2-VI, UAOKFG and 6Y8BB on 3.5. An informative discussion by W7LG on transistors power supplies was presented to the Mount Baker ARC. W7JJK is operating from a new QTH. Stations participating in the Daffodil Parade for Puyallup were W7IYU, K7LVS, W7SLB, W7OIV, W7DNU, K7SGG, W7JJK, K7KOT, K7LPZ, W7WHV and W7HMQ. W1KE, Asst. General Manager of our League, will visit Washington, Richland, June 14. Red Cross Building; Seattle, June 15, time and place later. Traffic: (Mar.) W7BA 1320, W7DZX 733, K7TCY 651, W7HMA 617, W7PI 248, K7CTP 200, W7JEY 127, W7BTB 96, W7HMQ 61, K7MGA 61, W7PWA 59, W7APS 45, W7GYF 42, W7BJG 38, W7GVC 32, W7AMC 25, W7OEB 18, K7YDZ 18, K7ZVA 17, W7AIB 16, K7CWO/7 10, W7EVV 3. (Feb.) K7MGA 24.

NOW! A 3-BAND SSB TRANSCEIVER KIT FOR 189.95



NEW EICO 753 SSB/AM/CW 3-BAND TRANSCEIVER WITH SILICON SOLID STATE VFO

Build the finest of SSB/AM/CW 3-band transceivers with 200 watts of SSB punch and every wanted operating facility, plus the extra reliability and maintenance ease inherent in kit design. Assembly is made faster and easier by VFO and IF circuit boards; plus preassembled crystal lattice filter. Rigid construction, compact size, and superb styling make this rig equally suited for mobile and fixed station use. The new EICO 753 is at your dealer now, in kit form and factory-wired. Compare, and you will find that **only the 753 has all these important features:**

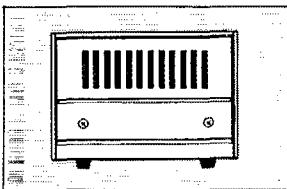
- Full band coverage on 80, 40 and 20 meters.
- Receiver offset tuning (up to ± 10 kc) without altering transmitter frequency.
- SILICON SOLID-STATE VFO for drift-free and voltage stable operation in both fixed and mobile installations.
- Built-in VOX.
- Panel selected VOX, PTT & STANDBY.
- High level dynamic ALC to prevent flat-topping or splatter and permit the use of a linear amplifier.
- Automatic carrier level adjustment on CW and AM.
- Dual ratio ball drive permits single knob 6:1 rapid tuning and 30:1 vernier bandsread (over 10 degrees of scale).
- Position of hairline adjustable on panel.
- Illuminated S-meter/PA Cathode Current Meter and tuning dial.
- Fast attack, slow decay AGC.
- Grid-block break-in CW keying.
- Product detector for SSB and CW, triode detector for AM.
- TR relay with auxiliary contacts for use with high power linear amplifier.
- Includes mobile mounting bracket.

ADDITIONAL SPECIFICATIONS

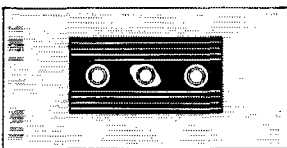
FREQUENCY COVERAGE: 3490-4010kc, 6990-7310kc, 13890-14410kc. SSB EMIS- SIONS: LSB 80 and 40 meters, USB 20 meters. RF POWER INPUT: 200 watts SSB PEP and CW, 100 watts AM. RF POWER OUTPUT: 120 watts SSB PEP and CW, 30 watts AM. OUTPUT PI NETWORK MATCHING RANGE: 40-80 ohms. SSB GEN- ERATION: 5.2 Mc crystal lattice filter; bandwidth 2.7kc at 6db. STABILITY: 400 cps after warm-up. SUPPRESSION: Carrier-50db; unwanted sideband-40db. RECEIVER: Sensitivity 1uv for 10db S/N ratio; selectivity 2.7kc at 6db; audio output over 2 watts (3.2 ohms). PANEL CONTROLS & CONNECTORS: Tuning, Band Selector, AF Gain, RF Gain, MIC Gain with calibrator switch at extreme CCW rotation. Hair- line Set (capped), Mode (SSB, AM, CW, Tune), Function (Off, Standby, PTT, VOX), Carrier Balance, Exciter Tune, PA Tune, PA Load, Receiver Offset Tune, MIC input, phone jack. REAR CONTROLS & CONNECTORS: VOX Threshold, VOX delay, VOX sensitivity, Anti-VOX sensitivity, PA Bias adjust, S-Meter zero adjust, power socket, external relay, antenna connector, key jack, accessory calibrator socket. METERING: PA cathode on transmit, S-Meter on receive. SIZE (HWD): 5 $\frac{1}{8}$ " x 14 $\frac{1}{4}$ " x 11 $\frac{1}{4}$ ". POWER REQUIREMENTS: 750 VDC at 300 ma, 250 VDC at 170 ma, -100 VDC at 5 ma, 12.6 VAC at 3.8 amps.

The Model 753 is an outstanding value factory-wired at \$299.95.

Power Supplies Tailored for Optimum Performance of the 753.



Model 751 Solid State AC Supply/Speaker Console. Matching table-top companion unit. Built-in PM speaker. Kit \$79.95 Wired \$109.95



Model 752 Solid State Mobile Supply. For use with 12 volt positive or negative ground systems. Fully protected against polarity reversal or overload. Kit \$79.95 Wired \$109.95



For FREE Catalog and 753 Spec. Sheet write to EICO Dept. QST-6, 131-01 39th Ave., Flushing, N. Y. 11352

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VARIABLE FREQUENCY ANTENNA SYSTEM

This exclusive and amazing system possesses the unique property of an even performance over all frequencies between 1.4-30 Mcs.

Every JOYSTICK System is supplied complete with feeder and an antenna matching unit—selected by you to suit your personal set-up. It is ready to go on the air and gives a 'lift' to signal strengths for 'cliff' and 'cave' dwellers—EVEN FROM A BASEMENT! Naturally the advantages of using the 'JOYSTICK' up-in-the-clear are even greater!

4,000 licensed stations and SWLS all over the world have already found that the performance for such a compact unit is surprising. Even the skeptics have been convinced once they have understood the basic principles and have followed the simple 'load' and 'dip' procedure given in the instructions.

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Including types 3 and 5
Antenna Matching Units

\$32.50

There is now a whole new range of Joystick Systems—made to match your QTH, your rig and your pocket! The SYSTEMS cover TX/RX, SWL, indoor and outdoors, mobile and even a new JOYMAST! Made only in the finest materials the SYSTEMS are reliable and permanent!

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PACIFIC DIVISION

EAST BAY—SCM, Richard Wilson, K6LRN—WA6WNG will graduate from Berkeley High School in June. WA6PTU is telephone relaying. W6QJW finished his SB-100 and is making many contacts with it. W6IDY has a 70-ft. crank-up tower with a Mosley TA-36 on top. WA6QZA reports his model 28 and all the rest of the gear are operating OK for once. WB6RKQ is using a 30-ft. piece of wire and an LC circuit for an antenna. W6YKS/6 worked H18-6Y5-JA-UA-CO2 on 80 meters during the DX Test. K6LRN blew a trap in the 2nd week end of the DX test and then was called to work at 10 p.m. at the peak of the 40-meter action. WN6REC snagged rare WS6BW on a CQ while looking for a local QSO on 40 meters at 0700Z. WA6KLL makes his presence known in the April LARK with some handy hints. The East Bay Radio Club may adopt the El Cerrito-S Porto-La Rec center for its permanent meeting place. The Hayward Radio Club reports circulation of its *Chewed Rag* has reached 200 with copies going as far as New York and Viet Nam. The HRC welcomes WB6-RUA, WB6SBU, WA6DJZ and W6BSW as new members. K6CKR had his Swan stolen from his car. Legislation has been introduced by Assemblyman Pearce Young, WB6BHY, of Napa, providing for formation of local districts to put utilities wires underground. Help wanted: The East Bay section desperately needs ECs in most areas. Contact this area for more details. All you need to qualify is a basic knowledge of NTS and AREC. WA6RRH is looking for help on BAN. Would like to have more net controls and some more QNTs. BAN meets daily at 0245Z on 146.7 Mc. WN6SRE is a new Novice in San Leandro. WN6RSU took the General Class test on Good Friday. Support your section nets—NCN at 0300Z daily on 3635; BAN at 0245Z on 146.7; NCTN at 0230Z on 3.905. Traffic: (Mar.) W6TYM 333, W6IDY 201, K6LRN 149, WA6WNG 132, W6YKS/6 121, WB6RKQ 56, WA6PTU 32, WA6FBS 24, WA6QZA 8. (Feb.) WA6-FBS 18.

HAWAII—SCM, Lee R. Wical, KH6BZF—Asst. SCM/SEC: Ernie J. Kuriansky, KH6CCL, PAM: KH6-ATS. RM: Vacant. V.H.F. PAM: Vacant, too!

Net	Freq.	Time	Days
Friendly	7.290	2030Z	M-F
50th State	3.895	0500Z	Tue.-Sat.
NO KA OI	7.290	2230Z	Sat.
Makuli	14.250	0700Z	Nightly (When No DX coming in)

KH6GG coordinates the following:

RACES 40	7.225	1930Z	2&4 Sun.
RACES 10	28.700	1930Z	2&4 Sun.
RACES 6	50.252	1930Z	2&4 Sun.
RACES 2	147.00	1930Z	2&4 Sun.

We deeply regret the passing of KH6CI. KH6EPW is heading up the Honolulu ARC Field Day. FD forms are available from your SCM or ARRL Hq. KH6IJ and W6EDG/KH6 did bang-up jobs at recent Honolulu ARC meetings. While visiting Baguio, P.I., I met W4ZNN/DU and Mr. Cipriano at A14BG. W4ZNN heads up the group at the Clark MARS station. Your SCM is elected by you to serve you. Let him know your needs today. See page 6 for his address. Traffic: (Mar.) KH6EOQ 17, KH6BZF 8, KH6IJ 4. (Feb.) KH6AIG 146, KH6CCL 6, KH6EOQ 6, KH6EXT 5. (Jan.) KH6AIG 136, KH6EOQ 25. (Dec.) KH6AIG 124, KH6EOQ 27.

NEVADA—SCM, Leonard M. Norman, W7PBV—SEC: WA7BEU/W6EBS. W7K0I reports no activity from the Elko area. K7ICW still is active with Oscar 4. K7ZAU handled emergency and other traffic on a plane crash in Baja, Calif. K7NYU is on 40-meter s.s.b. K7-RBM is reported to have a Navy Reserve serial number ending in 88-73. WA4DSI/7 and WN7FJR are new 2-meter stations heard. W7ANW has a new Henry Z-K and rotator. W7PRM has a new HB TU for RTTY. The following 2-meter f.m. group provided communications for the North Las Vegas CD Drill: W7s AKE, FJN, PBV, PRM, VYC, WA7BEU, K7s ALG, PPE, RKH, VUL, TDQ, YXX, ZOK, W7YDX is active in Ely. Traffic: K7RBM 158, K7ZAU 21, W7PBV 4.

SACRAMENTO VALLEY—SCM, John F. Atinks, III, WA6JDT—SEC: W6BWB, ECs: W6ALXD, K6-RHW, W6SMU, WA6TQJ. RM: W6CMA. PAM: WA6-YK.

Net	Freq.	Time	Days	Sess.	ONT	OTC	Mgr.
SVN	3600 kHz	0230Z	Daily	17	52	19	W6CMA
"	146.28 MHz	0330Z	TThS	13	99	25	W6YVK
SCEN	146.28 MHz	0400Z	Wed.	5	105	-	W6BWB
NCN	3635 kHz	0300Z	Daily	31	569	517	W6HVA
NCTN	3905 kHz	0100Z	Daily	31	543	37	K6YBV

Nothing halfway about the



DRAKE L-4 LINEAR AMPLIFIER

built for continuous duty at full capacity

- 2000 watts PEP SSB—1000 watts DC input power on CW, AM and RTTY. Massive plate transformer, large heavy duty plate tank components and voluminous cooling system insure continuous operation at these ratings.
- High efficiency Class B Grounded Grid circuit uses two 3-400Z or 8163 zero bias triodes. These two tubes have a total plate dissipation rating of 800 watts and their rugged construction withstands abuse.
- A broadband tuned input circuit is employed on each band for minimum distortion, higher efficiency and a 50 ohm input impedance.
- The L-4 Linear Amplifier matches the TR-4 Transceiver and the T-4/T-4X Transmitters in appearance and drive requirements to run the maximum legal input power. Any exciter that can deliver 100 watts PEP SSB and 75 watts on CW will be able to drive the L-4 to the maximum legal input power. An advantage of the Grounded Grid Circuit is that most of the driving power adds to the output power.
- RF negative feedback decreases distortion to better than 35 db and tends to equalize tube characteristics from tube to tube and from brand to brand.
- A transmitting AGC circuit controls the exciter gain to allow a higher audio level without peak clipping. An adjustment is provided to set the threshold level for optimum operation of different exciters.
- Rapid heating filaments and the solid state power supply allow the L-4 to remain off until its use is required. It needs only 3 seconds from switch on to 2000 watts.
- Two taut-band suspension meters indicate plate current, grid current, plate voltage, and relative RF output power. The frictionless suspension eliminates sticking and improves accuracy.
- An internal changeover relay feeds the antenna through when on receive or when power is off. A pair of relay contacts bias the output tubes to cut off, eliminating any diode noise when receiving.
- A quiet, low velocity, high volume internal blower effectively cools tube base seals, envelopes and plate seals.

The buy of a lifetime . . .
to last a lifetime . . . only

\$695⁰⁰ Amateur Net

including Power Supply

SPECIFICATIONS

Frequency Range: Ham bands 80 thru 10 meters. All frequencies 3.5 to 30 Mc may be covered with some retuning of input coils.

Plate Input: 2000 watts PEP-SSB, 1000 watts DC on CW, AM, RTTY and Tune.

Drive Requirements: 100 watts PEP-SSB, 75 watts CW, AM, RTTY and Tune.

Input Impedance: 50 ohms.

Output Impedance: Adjustable Pi-Network matches 50 ohm line with SWR not to exceed 2:1.

Power Requirements: 230 volts, 50-60 cycles, 15 amperes or 115 volts, 50-60 cycles, 30 amperes.

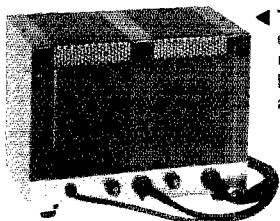
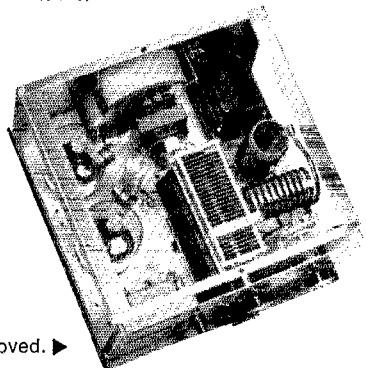
Tubes: Two 3-400Z or two 8163.

Size: Amplifier—13¹/₁₆W x 7⁷/₁₆H x 14¹/₁₆D;
Power Supply—6³/₁₆W x 7⁷/₁₆H x 11D.

Weight: Amplifier 32 lbs; Power Supply 43 lbs.

◀ The solid state Power Supply provides excellent dynamic and static voltage regulation. The Power Supply is separate to keep the weight off the operating desk and to make a more flexible installation.

L-4 Linear Amplifier with cover removed. ▶



For more information, see your distributor, or write:

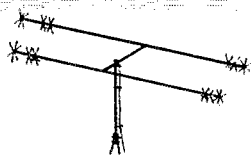
R. L. DRAKE COMPANY, Miamisburg, Ohio 45342

CRAMPED FOR SPACE?

NOW . . . MINIATURIZED,
QUALITY ANTENNAS FOR . . .

- APARTMENTS
- SUBURBAN HOMES
- PORTABLE USE

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 18.5'... 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 seamless 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-Product's Miniaturized Antenna Catalog.

If there is no stocking distributor near you, order direct from factory. Free shipping to your QTH and we will prepay the costs in continental U.S.A.

DISTRIBUTORS WANTED IN KEY AREAS. Write for details to: Tom Yenabie, K3JZL Sales Manager.

Mini-Products, Inc.

1001 West 18th Street, Erie, Pennsylvania

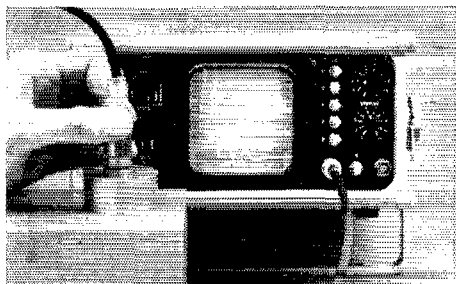
• LEADERS IN COMPACT ANTENNAS •

WB6HAW is a new ORS. WA6YZA says the Golden Bear Net (GBN) is looking for QNI from Northern California. The net meets daily at 1900 local time on 3975 kHz. Your SCM has moved—see page 6 for new address. The Sacramento ARC held its Mar. meeting at the Calif. Disaster Office and toured the communications facilities. WB6HVA is the new net mgr. of NCN with W6LNZ as secy. The RAMS held a Liar's Night on 2 meters. WB6POP, a new General, is an active member of the GEARS. WN6SFK is a new Novice. The North Hills RC finally got its gavel back from the RAMS. K6SDP has moved to Oregon from Crescent City. W6GDO has made 4 out of 5 QSOs with W7UAB in Portland via 2 meters. This is the first Portland-Northern Calif. Tropo QSO on record. W6AF built a 50-watt 40-meter rig for Field Day. WA6YQS has a new 86-ft. tower with six-element beam. WB6MAE has moved to Fair Oaks. Traffic: (Mar.) WB6HAW 144, WA6JDT 50, K6IKV 24, W6LNZ 24, W6QZL 23, W6CMA 22, WB6BWB 21, WB6MAE 13, K6YBY 3, WA6CXB 2. (Feb.) WB6HAW 87. (Jan.) WB6HAW 61. (Dec.) WB6HAW 92.

SAN FRANCISCO—SCM, Hugh Cassidy, WA6AUD—SEC: W6KZF. New appointments: WB6OGF as EC in Southern Marin, WB6AVS as ORS and W6HSA as ORS. Activity in the Northern Calif. Net is increasing with W6WLW, WB6OGF, K6SAA and WB6AVS checking in regularly. The net meets daily at 0300Z at 3635 kc. W6CYO has put up a tower and beam to improve his DX standing. WA6ROJ reports intercepting Oscar IV signals but unable to copy the translator. WA6NDZ has overhauled a "Mite" portable RTTY teleprinter, making some needed parts from old typewriters. W6DZM is chairman of the FD activities for the Sonoma County Radio Amateurs. The Eureka High School Amateur Radio Association has affiliated with the ARRL. WA6IVM scored 115,437 in the c.w. portion of the DX Contest. The Marin Radio Club is preparing to install new 144-Mc. gear to enlarge its emergency capabilities. W6YKS is working portable from Oakland. WA6STS has been rebuilding his equipment. W6MTJ worked 12 new countries in the DX Test. W6WLW is holding down a RN6 liaison spot on the NCN. W6BIP won again in the 1965 Sweepstakes but was in OX4-Land during the April CD Party. K6TWJ again is active as NC on the Golden Bear Net. WA6QXV has a new antenna up for 160-meter work. W6CQA got a special tube he needed through an advertisement in the San Francisco Section Courier. If you have not received a copy, drop a line to the SCM. WOPL publicly declares that he will get his 1st-class radiotelephone ticket in 1966. WB6GLD is a mainstay on the Mission Trail Net. The San Francisco Radio Club made its annual pilgrimage to a local brewery in May. The Marin Radio Club again is in the Greater Bay Area Hamfest to be held in Oakland Oct. 22/23. W6KHE is operating again from a new QTH in San Rafael. W6BCM has switched from his a.m. rig to s.s.b. gear. W6IFF gave a talk on the uses of test equipment at the April meeting of the S.F. Club. WB6SFP is a new General call in the section. W6GGC is giving concerts (amateur variety) on his new Lowry electric organ. Public Service Awards were mailed to amateurs in Sonoma and Humboldt Counties for their activities in the Jan. flood threat on the Russian and Eel Rivers. Traffic: (Mar.) W6WLW 127, WB6GLD 74, K6SAA 54, W6NL 39, W6KVQ 31, K6TWJ 25, W6BIMO 23, WA6AUD 20, WB6GVT 14, WB6DMP 9, WB6BVV 8, W6BIP 7, WA6IVM 7, W6OPL 6, W6CYO 4, W6GQA 4, K6TZN 4, WB6AIS 2, WA6STS 2. (Feb.) WB6GLD 68.

SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6JPU—W6KUT, W6HYG, W6HVV, W6JCB and W6JPU had a miniature hamfest at the 30th class reunion of Fresno High School, on Mar. 26. All of the above were charter members of the QRAL Radio Club at Fresno High School. W6KUT and W6HYG are over the 300 mark on the DX Honor Roll. W6QFR, who was mobilizing along with high power, heard a pistol shot, went off the air, and found out his mobile power supply literally blew up. W6KAB is studying linear amplifiers. W6JXY is on 20 and 40 s.s.b. W6TZI is experimenting with high frequency transistors. WB6FTQ is active on 75 s.s.b. WB6NCJ is busy keeping break-in relays working. WB6HVA is NCN net mgr. WA6BYK is attending the U. of Nebraska. K6AXV built a 2-meter superhet. W6RRN is building a 2-meter transmitter. K6KVM is on 2. W6YGZ is starting a code class for anyone. WB6NPB got his General Class license. The Delta Amateur Radio Club is going to conduct code classes again with K6GZN and WA6FBL as instructors. They will be held each Mon. and Thurs. at the Junior Museum. WA6BOH built up the code oscillator. Activity will drop somewhat during the summer, but take an extra minute and drop me a line regarding your activities. Traffic: WB6HVA 236, W6ADB 183, W6ARE 27, W6LLR 10, W6NKJ 8, WB6NCJ 7, W6LEM 4, W6ARE 3.

New battery-powered CRT will travel



Hams with two-letter calls will remember the early dry-cell-operated radio receivers with mixed emotions. The sets used tubes with thoriated tungsten filaments with little to their credit other than the absence of warm-up time and low filament current drain.

Still, history has a way of repeating itself, as evidenced by a new battery-operated cathode ray tube developed by Sylvania. It employs a high-efficiency heater that draws only 140 mils at 1.5 volts, and thereby makes possible the design of portable oscilloscopes of small size and weight, capable of being powered from a rechargeable nickel-cadmium battery and a transistorized high-voltage supply operating from the same power source.

The advantages are obvious. Engineers can now design virtually any type of oscilloscopic devices for military or industrial use in the field and completely divorced from the power line. And, aside from the fact that an N/CD battery can be recharged several thousand times before going west, it has been demonstrated that such batteries can readily serve as highly efficient power-supply filters when it is desired to operate the oscilloscope from an a-c line.

You'll find the Sylvania SC-3511 CRT of particular interest. The tube has a square screen with a useful viewing area of $2\frac{1}{2}'' \times 2\frac{1}{2}''$. The heater is the "instant on" type, so there's no waiting for readings on the face of the tube. The SC-3511 also features helical-resistor post-deflection acceleration to achieve a high writing rate, high deflection sensitivity, and a distortion-free pattern. And the tube itself weighs only $1\frac{1}{2}$ pounds. Weight of equipment is further reduced because the tube uses electrostatic focusing and deflection.

The SC-3511 CRT is already filling the bill in the Sonoray model 301 ultrasonic flaw/thickness tester, developed by Branson Instruments Inc. This battery-operated unit weighs only 16 pounds, and uses dual transducer crystals for obtaining direct readings of pipe wall thicknesses, the detection of corrosion in ships' hulls, and the location of fatigue cracks in jetliners. The tester is small enough to be carried into such difficult areas as manholes, catwalks and scaffolds. The instrument is shown in use in the accompanying illustration.

Sylvania has also developed the SC-3802 with a round faceplate, and two other square-faced CRTs - the SC-3551 and SC-3377 - the latter having a 6.3-volt heater requiring 600 mils. These square-faced units have useful viewing areas of $2\frac{1}{2}'' \times 2\frac{1}{2}''$, while the round CRT's useful screen diameter is $2\frac{3}{8}''$. If you'd like data sheets on these new CRTs, just drop a line to the Sylvania Electronic Components Group, Sylvania Electric Products Inc., 1100 Main Street, Buffalo, New York 14209.

73,

Bob Lynch

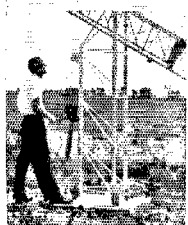
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SANTA CLARA VALLEY—SCM, Jean A. Gmelin, W6ZRJ—Asst. SCM; Ed Turner, W6NVO. SEC: WA6-HVN. RM: W6QMO. K6GK reports his own station activity and Red Cross station (SCCARA) W6UW, which he operates when possible. The Red Cross group checks into NCN, MTN, SCD and PCN. K6GK is active as OO and OBS. W6HC is back in operation on the TCC after a successful eye operation. W6AUC is active on several nets and as OO. W6ASH is busy with O-sear traffic operations and is working on AREC/c.d. operations. WA6JSA is operating auto-start RTTY and with O-sear. W6BVB works NCN. K6YKG is trying for a high-speed code certificate and reports that W6PAK is off the air for a time. W6ACW is working on an HV-32 for 20 meters. K6PJW is active in the AREC Net. WB6-IZF reports that there were no 6-meter openings in the King City area during March but that 2-meter signals are working out for quite some distance on a very steady basis. W6ZLO is working over his rig and his receiver, which has original tubes from 1946. Glen also reports that W6AZN is a Silent Key. W6YHM is working 2-meter aeronautical mobile with a Heath Tower, and has worked into the San Diego area from the Bay Area. W6SAW reports his OBS schedule on RTTY is as follows: Fri. 7130 kc., 146 Mc., 2000 PST/0400Z; Sat. 3610 kc. 146 Mc., 2000 PST/0400Z; Sun. 14,095 Mc., 146 Mc., 1300 PST/2100Z. Herb also is active as OO and is now Navy MARS RTTY Coordinator. W6VZE reports the AREC activity for Burlingame. W6JXK works NCN, RTTY and MARS. W6RSY made the BPL. Ed works PAN and RN6. K6DYX works RTTY. WA6CVU is a busy ORS in Cupertino and works NCN, RN6 and PAN. W6YBV is active on NCN. W6DEF is back as EC for the Redwood City/Menlo Park area. WA6AEA has WAS confirmed. K6IEE is writing a history of the South County Amateur Radio Society. WB6CAB is FD chairman for SCARS. W6VZT gave a talk on receivers to the SCCARA. W6QMO had big trouble during March but reports all OK now. K6AAN is Radio Officer for San Mateo, and also chairman of the Hospital Net of San Mateo County. WB6HVA, new NCN mgr., sends out a nice looking Net Bulletin. Your SCM sent out a newsletter to most League members in the section. If you did not receive a copy and wish one, contact W6ZRJ. Traffic: (Mar.) W6RSY 559, K6DYX 329, WA6CVU 193, W6JXK 163, W6YBV 128, W6DEF 80, W6QMO 55, K6GK 33, W6-HC 30, W6ASH 22, W6AUC 22, WA6JSA 20, W6UW 10, W6BVB 8, K6YKG 8, W6ZRJ 6, W6ACW 2. (Feb.) W6-JXK 107, K6GK 19, W6UW 2.

ROANOKE DIVISION

NORTH CAROLINA—SCM, Barnett S. Dodd, W4BNU—Asst. SCM; Robert B. Corns, W4FDV. SEC: W4MFK. RMs: K4CWZ and WA4ANH. PAMS: W4AJT and WA4LWE. V.H.F. PAM: W4HJZ. WB4BGL was checking into NCN and handling traffic before his General Class license was a week old. W4HJZ says he is proud to announce the arrival of his first jr. operator, a YL, on Feb. 18. K4QIF completed a 432 transistorized preamplifier with 2N2415 and it measured one db. better than a Parks 2N3399 preamplifier. WA4PEN is now on s.s.b. on 8 meters. WA4QLP placed second in the Louisiana QSO Party and his DXCC standing is 62/40. WA4ANH now has a nine-element 2-meter beam up. K4EO has been awarded a Certificate of Merit by THEN mgr. WA4NUO says he bets he has the only DX-20 on s.s.b. in North Carolina.

Net	Freq.	Time	Days	QTC	Mgr.
NCN(E)	3573 kc.	0030Z	Daily	247	K4CWZ
NCN(L)	3573 kc.	0300Z	Daily	111	WA4ANH
THEN	3865 kc.	0030Z	Daily	60	K4ODX
SSBN	3938 kc.	0030Z	Daily	51	WA4LWE

Traffic: (Mar.) W4LEV 1625, W4LWZ 189, W4EVN 187, W4ERE 97, K4IFX 84, W6GXQ/4 72, K4CWZ 69, W4-OTE 56, W4UWS 33, WA4ANH 30, WA4FJM 29, W4BNU 23, WA4CFN 22, W4RWL 19, K4DJZ 17, K4EO 16, W4-UFQ 14, K4GNX 13, WA4ICU 13, W4AJT 10, WA4VTV 9, K4ZKQ 8, WA4UVH 6, WB4BGL 5, K4SHU 4, K4-TTN 4, WA4KWC 3, WA4NUO 3. (Feb.) WA4VTV 16, K4GNX 9, WB4BGL 6.

SOUTH CAROLINA—SCM, Charles N. Wright, W4PEL—SEC: WA4ECJ. Asst. SECs: W4WQM, WA4-EFP. RM: K4LND. PAM: K4WQA.

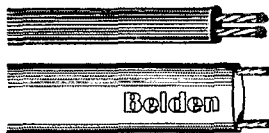
SCN	3795 kc.	Daily	0000Z/0300Z	Mar. Tfr.: 113
SCSSBN	3915 kc.	M-F	0100Z, S-S 0000Z	Mar. Tfr.: 238
SCSN	3795 kc.	Daily	2300Z	Mar. Tfr.: 11

WA4NIG, in Aiken, has a new SB-100. The SCSN is going strong but needs more members; K4JIF and WA4HFA welcome help with the net. WA4LS, in Spartanburg, reports a new 2-meter array 96 feet up is quite effective. K4VOR is active on 2 meters from Chesnee, with a Seneca and 20 elements at 60 feet. WICE

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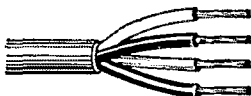
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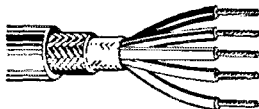
Made with brown virgin polyethylene for best weather resistance and lowest losses. Uniform quality control prevents standing waves and mismatches.

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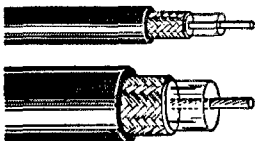
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**Ham Transmission Lines—
75 Ohm Foam Core RG/U Type**



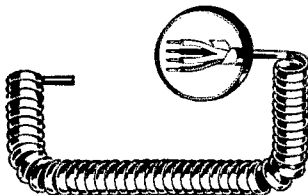
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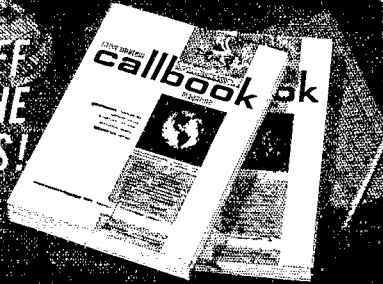


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and W4PED had an FB eyeball QSO at the LEEF meeting and the S.S.B. Show in New York. WA4YAY, WA4-TBV, WB4C11, and WA4QKQ have new T4X rigs in Anderson. WB4AEM is a new ham in Varunville and is active on section nets. Don't forget to report your Field Day results to the SCM in order to be eligible for the State Radio Council trophy. Traffic: K4LND 201, K4LNI 160, W4WQM 69, W4JA 43, W4NTO 32, W4PED 25, WA4HFA 13, WA4QKQ 7, WB4AEM 5.

VIRGINIA—SCM, H. J. Hopkins, W4SHJ—SEC: W8VZO/4. PAM: K4SCL. RMs: W4SHJ, W4AEUL, K4-LJK. The VN is now operating a late session at 0315 GMT daily. Area 1 EC, K4ASU, finds the Ezzo road map ideal for marking and mounting on the operating desk—it's all on one side. W4OWE received the following, all in Mar.: ARRL CP-35, CWA CP-50, A-1 Operator and USA-CA 500 for c.w. Area 3 EC, WA4DA1, now has the area net on 28.6 Mc. at 0100 GMT Mon. WA4NJG is getting to be highest in attendance on VSBN. Baseball will curtail the activity of K4MXF during the summer; for W4BZE it will be fishing. W4-JUJ still is participating in many contests and QSO parties. W4A2PF is back on the air after rig troubles. W4NLC has accepted the appointment as Area 10 EC. W4ZMT reports attaining Amateur Extra Class. Section NTS nets:

C.W. 3680 kc. 2330-0330 GMT & 0515 GMT daily
S.S.B. 3935 kc. 2300 & 0300 GMT daily

Virginia section nets traditionally remain on the above GMT schedule during the summer months of daylight time. Traffic: (Mar.) W4PFC 311, W4DVT 209, WA4-UMX 188, K4LJK 179, W4RHA 173, W4NLC 156, WA4-YSE 142, WA4EUL 121, W4ZM 104, W4BWF 66, WA4-URN 60, K4PSS 57, W4OKN 51, K4ASU 50, K4SCL 50, K4ITV 49, W4OWE 46, WA4DAL 43, W4TE 36, W4SNT 35, WA4IFR 34, WA4JW 31, W4ZAU 17, WA4QC 16, WA4NJG 14, K4PIK 14, W4GPD 12, W4WG 12, K4MXF 11, W4BZE 10, W4AIK 10, K4MLC 10, W4A2PF 10, W4KX 7, K4YCH 7, K4LMB 6, K4PCY 6, WA4UJ 5, W4LK 5, W4OXG 4, WA4PZF 4, W4PTR 3, W4ZMT 2, W4SHJ 1. (Feb.) WA4FCS 47, W4KFC 9.

WEST VIRGINIA—SCM, Donald B. Morris, W8-JAM—SEC: W8SSA. RMs: W8LMF, K8TPF. PAMs: K8-CHW, W8IYD. S.S.B. Net Mgr. K8HSP. C. W. Net Mgr.: WA8GRE. Nets meet on 3570, 3890, 3903, 3905; regional Nets on 29.6, 50.2 and 144 Mc. K8TPF has a new TR-4 with a.c. and d.c. power. WVN C.W. Section Net certificates have been issued to WA8GRE, W8HZA, W8-CKX, W8HRQ, WA8KCO, K8MIYU, WA8POS, WA8-PXF, K8QQS and K8TPF. K8QEW reports the 2-Meter Net growing. Weirton area, 3 sessions in Mar., 51 stations and 32 messages. W8PZT is spear-heading a drive for a West Va. chapter of the QCWA. K8UHC has new 6-meter s.s.b. and a three-element beam. Grafton Club members and memorial station W8EP are on every Sun. at 2030 on 3950 kc. Silent Keys: W8XXV and W8DDE. New ORS: K8QQS. Renewals: K8TPF as ORS, WA8-POS as OBS. The State Radio Council will award a Field Day plaque to some club in the state. West Va. State Radio Convention, July 2 and 3, Jackson's Mill.

WVN C.W.	3570	0001	Sess.	27	Stns.	148	Msgs.	124	WA8GRE	Mgr.
WVN Phone	3890	2330		23		491		115	K8CHW	
WVN PON	3905	2230		11		146		41		

Traffic: WA8QND 417, K8TPF 150, WA8GRE 79, WA8-PXF 74, W8HZA 52, K8WVW 42, K8BIT 24, W8CKX 24, WA8POS 19, WA8MAT 17, WA8CO 13, W8AY 11, WA8CKN 10, WA8MY 10, K8QEW 9, WA8KAN 8, WA8MRK 7, K8MIYU 7, K8MQB 6, WA8KAZ 5, K8-CHW 4, K8ZPR 3, WA8ALI 2, WA8BSE 2, K8DFS 2, WA8FIE 2, WA8AYB 1, W8CZT 1, WA8EUC 1, WA8-HPQ 1, WA8KGU 1, K8QYJ 1, WA8RQB 1, W8VYI 1.

ROCKY MOUNTAIN DIVISION

COLORADO—SCM, Donald Ray Crumpton, K0-TTB—Asst. SCM: A. E. Hankinson, WA9NQL. SEC: W0SIX. The Colorado report again is written by WA9-NQL. Since I have been unable to locate the SCM, who is in the wilds of Alamosa, the bulk of the news is from the eastern slope. Word came up from Colorado Springs that a top-notch technical program is planned for the Division Convention. Colorado Springs AREC appears to be in good shape with many mobile units. I am happy to mention that WA0ERA saved the life of a neighbor during a fire. He received a commendation from the fire chief. The Hamsters Club of Denver provided communications at a ski race on Apr. 3. Boulder ARC held an auction in March. A few concerned ama-

SWAN is "Big DXer's" Choice !



Shown to the left is "Butch" Greve, W9EWC (Eat Wisconsin Cheese), operating his new SWAN 400 mobile rig. Butch, who started operating in 1925, has confirmed hundreds of countries and holds many DX Contest Certificates. The W9EWC home station is located at #1 Cheddar Lane, Hilbert, Wisconsin. When Butch is not Hamming, he is busy manufacturing the famous Wispride Cheese.

TERRY SEZ . . .



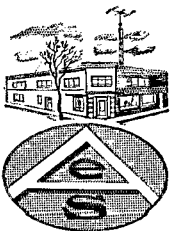
Terry Sterman
W9DIA
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117XC 117v. AC Supply w/cab. & spkr. ..	(2.88)	85.00
14-117 12v. DC Supply w/cable	(4.15)	120.00
VX-1 Plug-in VOX for 350 & 400		35.00
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100kc Calibrator Kit for 350		19.50
Deluxe Mobile Mounting Kit		19.50
10 Meter Full Coverage Kit (early 350's)		15.00
RC-2 Trunk Remote Control Unit		25.00
45 Swantenna - Manual	(2.16)	65.00
55 Swantenna - Remote Control	(3.25)	95.00
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14-230 12v. DC Supply w/230v. Basic ..	(4.51)	130.00
117-X Basic 117v. AC Supply only	(2.16)	65.00
230-X Basic 230v. AC Supply only	(1.52)	75.00
14-X 12v. DC Module w/cable	(1.80)	55.00
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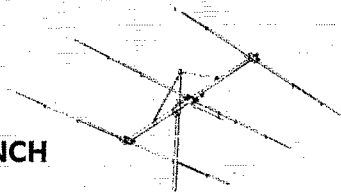
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teurs in the Greater Denver area are trying to establish some consistent liaison between area clubs. A Colorado Call Book is now available for \$2 from the Denver Radio Club, P.O. Box 356, Denver 80210.

NEW MEXICO—SCM, Bill Farley, WA5FLG—SEC: K5HTT, PAM: K5FPO, W5R0H is really working the rare ones with his new Swan 350. The El Capitan V.H.W. Club is planning a new repeater on 2. New Mexico is in need of an EC for the Albuquerque area. K5-HTT is about ready to move into his new shack. WA5-FJK reports good success with his new Collins equipment. With Field Day just around the corner each club seems to be looking for a spot on which to light. We hear of one fellow who has plans to mount all of his equipment and a generator up in a tree house near Clondicroft. Nets throughout the state report that since K5FHU has gone to Turkey they are having trouble moving New Mexico traffic. KOMVX/5 is now active on 2 and 40. W5OWT will leave soon for the West Coast where he will enroll at UCLA for some graduate work. K5VXJ and K5ONE are having their own private contest on the NM Breakfast Net. Seems they are having a lot of snow and one doesn't like the other to get more than he does. At last count they were neck and neck. Traffic: K5VXJ 59, WA5DUH 46, WA5FPL 46, WA5FJK 30, WA5FLG 22, W5WZK 21, K5ONE 19, WA5MIX 12, W5DMG 5.

UTAH—SCM, Marvin C. Yitting, W7MWR/W7-OAD—Asst. SCM: Richard E. Carnan, W7APY, SEC: W7WKE, Section nets: BUN meets daily on 7272 kc. at 1930Z; UARN meets Sat. and Sun. on 3987.5 kc. at 1500Z. The committee for the Defense of Utah Amateur Radio has announced a settlement out of court. In helping to protect the operating rights of W7VEO and his XYL K7SVN the amateurs of the state have helped to protect their own rights. Newly-elected officers of the Utah Council of Amateur Radio Clubs are W7RQT, pres.; W7VSS, vice-pres.; and the president of each participating club is a director. This year's Utah Hamfest will be held in July in the vicinity of Ogden. W7-JHM has been elected Net Control Station of the FARA Net. Traffic: W7OCX 120, WA7BME 20, K7ERR 4, W7-MWR 3.

WYOMING—SCM, Wayne M. Moore, W7CQL—SEC: W7YWE, RM: W7BHL, PAMs: W7TZK, K7SLM, OBS W7TZK, K7SLM and K7ZHT. Nets: Pony Express, Sun. at 0830 on 3920; YO, Mon., Wed., Fri. at 1830 on 3610; Jackalope, Mon. through Sat. at 1215 on 3920. New officers of the Sheridan Radio Amateur League are K7-HDP, pres.; K7RFL, vice-pres.; WA7BDI, secy.-treas. K7HDY is now at Redondo Beach, Calif. K7ZHT is on the air with a new HW-12. A new club is being formed at Casper College. At this writing, everyone is making preparations to capture the Field Day trophy from Cheyenne. Remember the hamfest and keep the July 23rd week end open to meet the rest of the gang at Deer Haven Lodge. Traffic: WA7CLF 100, W7DXV 42, K7HHW 23, K7SLM 12, K7FOX 10, K7TTH 9, WA7-BFV 6, K7NQX 6, W7NKR 4, W7ASB 2, WA7BPO 2, K7OVD 2, W7VJI 2.

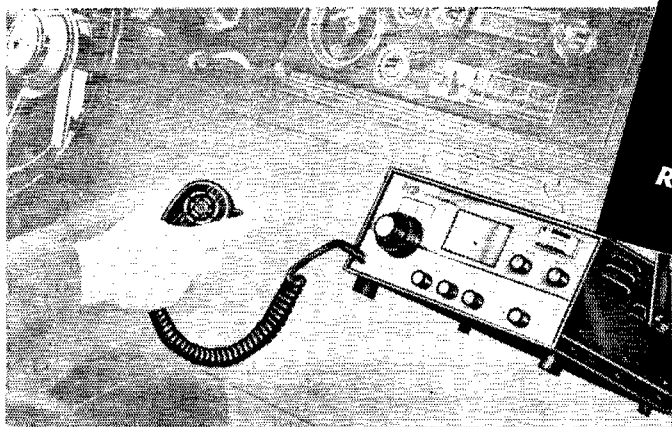
SOUTHEASTERN DIVISION

ALABAMA—SCM, William S. Crafts, K4KJD—Asst. SCM/SEC: W4NML, RM: WA4EXA, PAM: K4-WHW. April QST credits Alabama for 3 years 100%. SEC reports, an FB job by W4NML, K4FZM, W4NML and K4YUD received A-1 Operator certificates. WA4-GCS and WA4HOM have DXCC. WN4BMO is now General Class. WA4TID and W4AKS won 1965 Alabama SS awards. Mar. net reports (times GMT):

Net	Freq.	Time	Days	Sess.	Ave. Tfc.	Ave. QNI
AENB	3575	0100	Daily	28	2.1	5.5
AENH	50.7	0200	Sun./Tue.	8	.875	18.4
AENM	3965	0030	Daily	31	3.8	44.7
AENP	3955	1230	Mon.-Sat.	27	2.7	13.7
AENR	50.55	0115	Wed./Fri.	9	.55	21
AENT	3970	2230	Daily	34	1	5.5

Remember, the Alabama group with the top Field Day score wins the SEC cup. K4WHW urges all to turn out for the V.H.F. QSO Party June 11-12. New equipment: W4NML, 70-ft. tower and TA36; K4TNS, tri-bander. Glad K4OYV is out of the hospital. K4IKR, W4USM and W4WG1 helped get out DXpedition QSLs. Some Huntsville stations are getting on 2 meter i.m. For information contact W4GI. WA4UXC has full break-in. Traffic: (Mar.) W4ZJY 269, WA4TID 217, W0HXB/4 161, K4HJX 76, W4NML 64, WA4UXC 64, WA4EXA 61, K4NUW 50, K4BSK 41, WA4EXB 31, K4GHX 30, K4-KJD 26, K4WTTW 19, W4GGD 17, K4DJJ 13, WA4FFC 12, WN4BMO 8, K4CFD 6, K4NSU 6, WA4RES 6, K4-CZZ 5, WA4YTK 4, W4DGH 3, WA4EBS 3, WA4FYO

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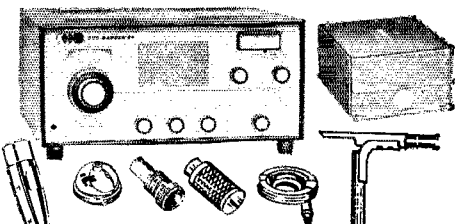
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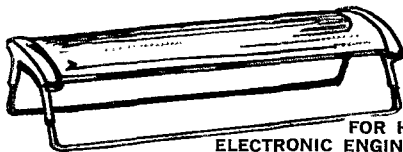
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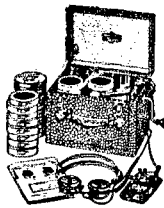
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ALABAMA QSO PARTY

July 2-3, 1966

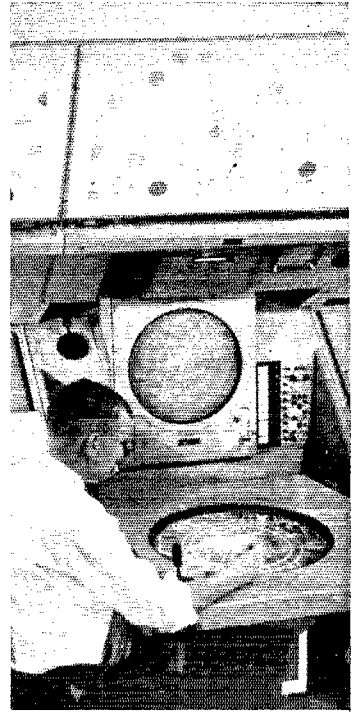
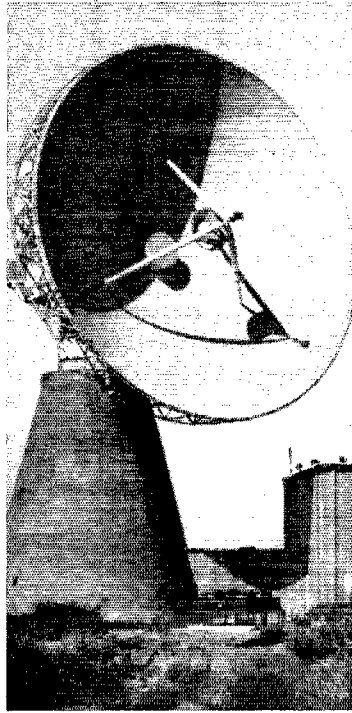
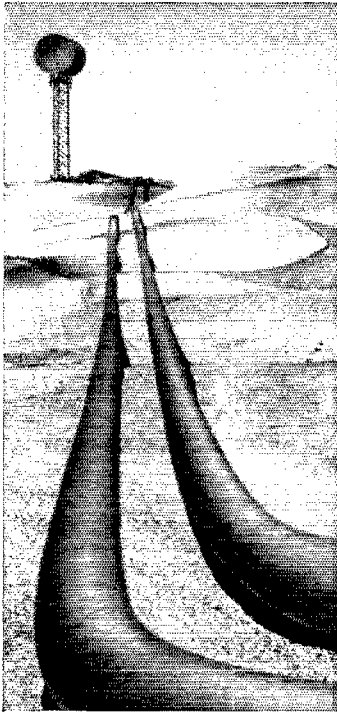
All amateurs are invited to participate in the Alabama QSO Party, sponsored by the Huntsville Amateur Radio Club. Alabama stations are urged to work as many out-of-state stations as possible so that those interested can earn credit toward WAS and USA-CA awards. **Rules:** (1) Operate any 24 out of the 30 hour period from 2100 GMT, July 2, to 0300 GMT July 4, (2) **Suggested frequencies:** 3577, 3965, 7040, 7230, 14040, 14290, 21040, 21390, 28600, 50550, 144400 and all novice bands, (3) General call to be used on phone and CW is CQ Ala, (4) Alabama stations send number of QSO, report and county. Others send QSO number, report and section, (5) Alabama stations score one point per contact and multiply by the number of ARRL sections and foreign countries worked. Outside stations score three points per Alabama station and multiply by the number of Alabama counties worked. All stations running under 150 watts at all times multiply score by 1.25. The same station may be worked once per band. Phone and CW are to be considered the same contest. (6) Certificates will be awarded to the highest scoring station in each ARRL section and foreign country providing the station has a minimum of 100 points. In addition a trophy will be awarded to the highest scoring outside station. A trophy will also be awarded to the top Alabama scorer, with 2nd, 3rd and 4th place stations receiving a certificate. Awards will be announced and presented to the Alabama winners at the North Alabama Hamfest August 21st. (7) Logs should be postmarked no later than August 1, 1966 and sent to the Huntsville Amateur Radio Club, c/o Richard Rodkin WA4TID, 4030 Medford Dr. SE, Huntsville, Alabama 35802. Alabama stations are urged to be active and reply to QSLs promptly.

CANAL ZONE—SCM. Mrs. Lillian C. Smith, KZ5-TT—Former KZ5s are requested to send QTH and call to the new SCM for the information of local clubs. KZ5FX was in all four week ends of the DX Test and reports not much KZ5 activity. KZ5MM appreciated her ARRL Public Service Award for her work during Hurricane Betsy. Some information on departed KZ5s: KZ5LC to Southern California; KZ5JT to Florida, will be W45NMW/4; KZ5TG, future QTH undetermined; KZ5DW to Pacific Fleet, hopes to be WA5OKY/MM; KZ5TJ and KZ5WW will be WA1EFK and WA1FFF; KZ5QC to California. KZ5OB and KZ5OA are back in operation from their new Canal Zone QTH. Field Day plans are going forward with lots of activity in prospect. KZ5NH has a new Drake T4X and R4. KZ5LT is mobile with a new Drake TR4. KZ5DR has been off the air with transmitter trouble. Traffic: KZ5FX 27.

EASTERN FLORIDA—SCM. Albert L. Hamel, K4SHJ—SEC: W4YRT, RM RTTY: W4LUV, RM RTTY: W4RWM, PAM S.S.B.: W4OGX, PAMs: W4SDR, W4TUB, V.H.F. PAM: WA4BMC. Since just about all phone operation on our traffic nets is on s.s.b. (except for v.h.f.) all voice operations will be just so considered and referred to without reference to s.s.b. or a.m. W4OGX is now another hard-working, well-qualified PAM along with W4SDR and W4TUB. The BARC of Broward is doing fine with its "Help the Blind Ham" program under the able guidance of K4QAY. K4ENW now is disguising himself around Indian River City. No T.VI, George? K4YOQ just won't quit. He tried twice for that Extra Class and is going back again. WA4JHJ has a new 3.5-kw. emergency power unit. K4BNE is really legal again; he has his renewal now. We still are waiting for OO applications from the BARC, St. Pete and Bradenton/Sarasota groups. Come on, fellers. It's a real worthy cause. Traffic: (Mar.) W3CUL/4 2018, W4DFU 1219, WA5CK 845, WB4IW 541, WA4NEV 410, W4FPC 381, W4RQR 254, WA4BC 224, W4TUB 218, WA4NBT 189, WA4JH 179, W4VR/4 177, K4EYV 165, WA4BK 144, W4EHW 126, WA4DEL 122, K4SHJ 115, W4SDR 113, W4OGX 104, K4BNE 103, W4FP 77, K4YOQ 69, K4BY 63, K4K1N 63, WA4NBE 59, K4ILB 53, W4YHT 53, W4KRC 82, WA4DEV 51, WA4SHJ 51, WA4HO 50, W4DVO 41, WA4CQ 40, WB4AJV 38, W4VDC 37, W4SMK 29, K4DAX 26, W4LUV 25, W4VPO

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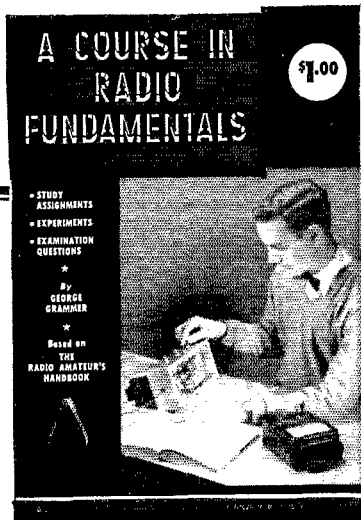
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23. W4BK 22, W4IE1 19, WA4LRW 18, WA4VZD 18, WA4QLZ 15, W4TJM 14, W4IE 13, WA4WZZ 13, WA4MOL 12, K4OER 12, WA4RXG 12, K4EBE 11, W4MVB 10, WA4PDM 9, W4DFZ 5, W4CWI 3, K4QAY 3, WB4CAP 2, WA4PWF 1. (Feb.) WA4RQR 2656, W4FPC 277, WA4ELDH 106, WA4FGH 71, W4LAD 56, WA4IZZ 53, WA4VZD 44, W4ANBE 36, W4IEI 32, W4MVB 22, W4GUJ 17, W4QBY 15, K4QAY 13, WA4WZZ 12, WA4QLZ 3, WA4WAJ 2.

GEORGIA—SCM, Howard L. Schonher, W4RZL—Asst. SCM: James W. Parker, Sr., W4KGP, SEC: W4DDY, RM: W4CZN, PAMS: K4PKK, WA4JSU, WA4GAY, K4TXK sends outstanding OES reports. K4TBJ spent his furlough in Griffin and found time to build a linear, K4QNA's change in shift allows him to investigate early a.m. QRM-free operation. WA4KWW is operating from a new QTH. WA4POM now is located in Columbus. K4NFP will attend Young Harris College. W4HWY reports increased activity. WB4APC QRD Germany.

Net	Freq.	Time (GMT)	Sess.	QNI	QTC	Mgr.
G8N	3595	0000& 0300 Dy.	62	715	233	W4CZN
G8SN	3975	0100 Dy.	31	871	127	WA4JSU
G7N	3718	2200 Dy.	31	219	57	K4NFP
G Teen Net	3855	1600 Sat. 2130 Wed.	9	98	29	WA4GAY
Cobb Co. AREC	145.8 Mc.		9		261	K4YZE
NEGEN	52.250	1730 Sun.				WA4TOW

WA4WQU earned a Public Service Award for Hurricane Betsy activity. Church activity has limited operation at WA4LLI. Athens ARC officers are W4EEE, pres.; W4LXL, vice-pres.; W4OVS, secy.; W4FGU, treas.; WA4WKZ, act. mgr. Traffic: K4FLR 138, W4FOE 128, W4CZN 95, WA4UPE 95, K4NFP 87, K4BAI 74, W4GXU 74, W4DDY 70, W4RZL 58, W4TFL 56, WA4GAY 48, W2TPV/4 32, WA4JES 32, WA4JSU 26, WA4WQU 22, K4UTM 17, WN4ARB 11, WA4LLI 11, WA4UYT 11, WA4WKZ 11, WA4WDE 10, W4HYW 8, K4YZE 7, K4BVD 4, WN4BXZ 1.

WEST INDIES—SCM, Albert R. Crumley, Jr., KP4DV—KP4WT does an excellent job keeping Dominican families in Puerto Rico in contact with relatives in Santo Domingo, as well as making daily contacts with HI3PC, HI3DAC, HI8HW and others of the Dominican Republic in the Antilles Weather Net. KP4JM has returned from Argentina. The Annual Hamfest and election of PRARC Club officers resulted in KP4CK, pres.; KP4BBN, vice-pres.; KP4AQJ, secy.; KP4CL, treas.; KP4BKP, KP4BL, KP4AVB, KP4AMN, KP4MS, board members. KP4JA says, "Itching to get back on." KP4DJ was conspicuous by his absence from the Annual Hamfest. KP4ANH is active on the Weather Net. KV4BA, of Saint Thomas, V.I., and KV4AA both are heard regularly. KP4ES says his son does all the hamming for the family nowadays. Get your reports in my box by the 2nd of the month, fellows, if you want to "see it in QST." Traffic: KP4WT 441.

WESTERN FLORIDA—SCM, Frank M. Butler, Jr., W4RKH—SEC: W4MLE, PAM: K4NMZ, RM: W4BVE. Section net reports:

Net	Freq.	Time	Days	Sess.	QNI	QTC
WFPN	3950 kc.	2300Z	Daily	31	664	203
QFN	3651 kc.	2330/0300Z		62	703	491

Tallahassee: WA4EOQ is going mobile with an HW-12. WA9NEW/4 has left FSU for a new assignment in Louisiana. Chipley: W4IKB went s.s.b. all the way with the S-Line. Marianna: W4KCA had a nice photo in Florida Skip. Panama City: WA4FIJ operated /mm and /KG4 while on extended sea duty. W4FJF handled traffic for all the crew members. WA4NRP worked 24 stations and 5 states during the recent 2-meter opening. Seagrove Beach: It's good to have K4QVL back in the area again. Fort Walton: WA7ABH has reactivated the EARS newsletter. New officers of the Playground Radio Club are W4UXW, pres.; W4HWX, vice-pres.; W4BVE, secy.-treas.; W4IID, custodian. W4ZGS and WA4HWX are working on 432-Mc. gear. K5DCI/4, WB4CSI and WB4CNZ are new on 2 meters. W4MIW and W4BVE handled much of Central Florida tornado traffic. Pensacola: Current operators at WA4ECY, Cory Field station, are K8MMD, WA6FUA and WA6ZLK. W4UIF is the leading 2-meter DXer. W4IIF moved to a new QTH. W4ETE has a new Drake R-4 and T-4X. K4ZDF got a Telrex beam. Traffic: (Mar.) K4VY 293, WA4MC 256, K4BSS/4 169, W4BVE 137, K4NMZ 120, WA4ECY 76, K4VJF 28, WA4EOQ 65, WA9NEW/4 52, W4IKB 30, W4FJF 28, W44JM 23, W4FIJ 22, WA4NRP 6, K4SOI 1. (Feb.) K4VY 229, K4BSS/4 135.

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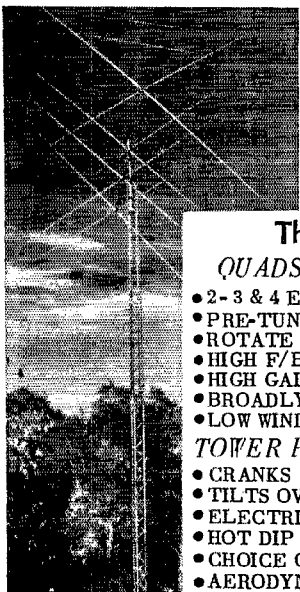
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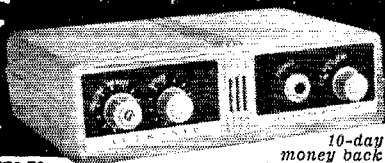
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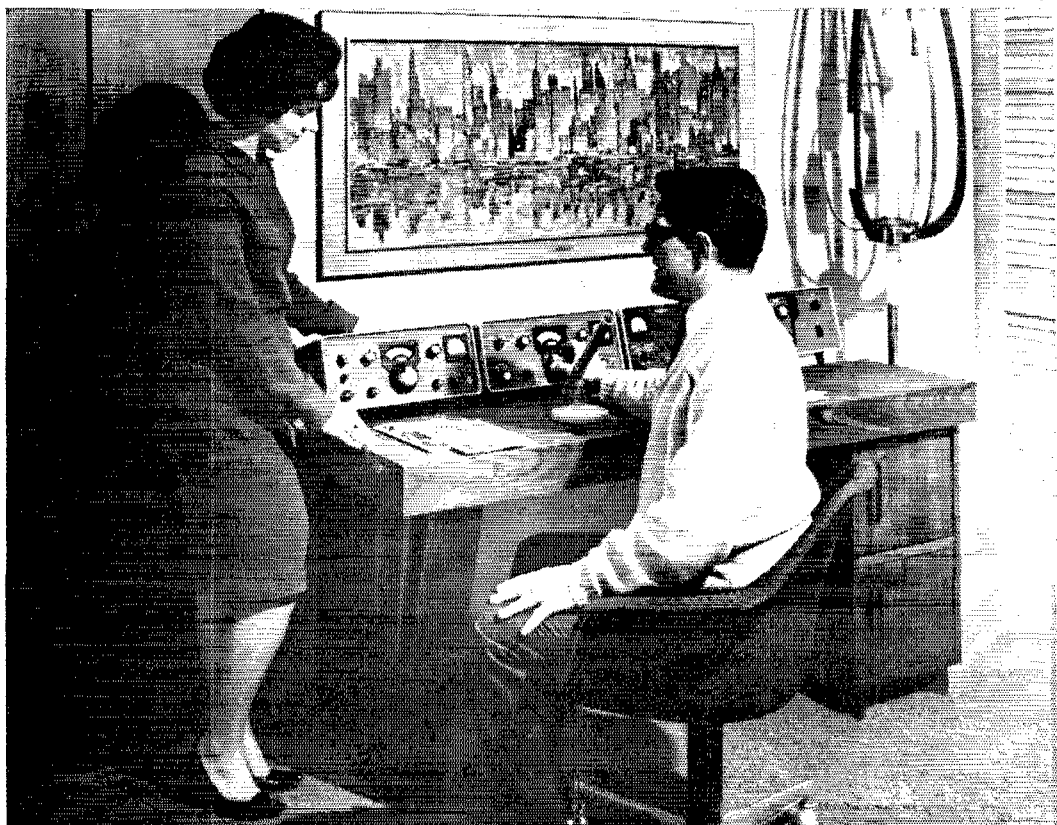
SOUTHWESTERN DIVISION

ARIZONA—SCM, Floyd C. Colyar, W7FKK—SEC: K7NYY, PAM: W7CAF, RMs: K7NHL, K7TNW, W7QHC has a new Heath SB-100 transceiver. K7HUJ has returned from a trip to New Zealand, Singapore, Hong Kong and Hawaii. Officers of the Amateur Radio Council of Arizona are K7KCB, chairman; K7GHS, vice-chairman; W7CAF, secy.; K7HJO, treas. K7VOR is the new editor of the Arizona Amateur Radio Club's newspaper. K7NII reports he is having fine results from a new 144-Mc. converter using three T1XMO5s. Endorsement: K7OFL as OES. It is with deepest regret we report the untimely death of K7SXQ, past pres. of the Arizona Amateur Radio Club. Dick was killed when his plane crashed into Lake Havasu. The Copper State Net meets Mon. through Fri. at 0200Z on 3873 kc. and TWN meets daily at 0300Z on 3570 kc. Traffic: K7NHL 251. K7RWI 183. K7UXB 19. W7FKK 16.

LOS ANGELES—SCM, H. G. Garman, W6BHG—Asst. SCM/SEC, Wallace R. Calkins, W1KUX/6, RMs: W6BHG, W6BBO, W6QAE, PAMs: K6MDD, W6MLZ, W6ORS, W6BNX has moved to the Orange section. BPLers are W6BBO, K6EPT, K6IOV, W6QXY, K6WAH, W6WPF and K6YVN. Correction to our Apr. QST column: ECs: W1KUX/6, W6LVQ, W6MLZ, W6OI and W6WJT. BPLers were W6BBO, W6BVK, K6EPT, W6GYH, W6TXJ, K6WAH and K6YVN. A late reporting BPLer was W6HRH for Dec. K6IOV was elected manager of the Gold and Silver Slow Speed Net. 3590 kc. W6GYH has been on the sick list at the VA Hospital. W6TXJ has the old Viking working on 80 meters. K6LDM is constructing a five-element Hy-Gain beam for 6 meters and a 2-meter J and also is building a 2-meter nuvistor converter. W6WXP is revamping the station. W6GGGL broke his right wrist. W1KUX/6 and W6UCR are busy on AREC nets and ASTRONET. W6AEL needs one more QSL card for WAS. W6BMZ/6, from East Bay, is temporarily in this section in Malibu. W6MQF has a DX-100 perking on 80 meters. W6KVA has a new Apache. W6AM has a Swan 400 running 500 watts mobile and reports the Johnson ignition shielding is absolutely quiet. K9ELT/6 is having trouble being heard on SCN. W6GHB still is looking for 432-Mc. walkie-talkie activity. W6MEP and K6NYK are rebuilding. W6PUZ has built a 1-Mc. Frequency Standard which is good to 1296 Mc. K6MQG worked his 300th country. W6RWF lost his five-element 2-meter beam in a February wind. W6RZH passed the General Class exam and is getting his cubical quad ready for 10 and 15 meters. The Amateur Radio Program conducted by W6MLZ over KPEK-FM, 90.7 Mc., has been changed to Sat. at 1130 local Pacific Time. K6IUV's OM, K6YDJ, was scheduled for surgery in April. The Eight Ball Net (EBN) meets Mon. through Fri. at 1615Z and Tue. through Sat. at 0230Z on 50.5 Mc. The Southern California Net (SCN) meets daily at 0300Z on 3600 kc. Information from *LERC Bulletin*: Instructors in affiliated and non-affiliated clubs who want a single set of the examinations and hand-out material we print and distribute free to our W6LS licensing class students should send a self-addressed 10 by 12 inch manila envelope, plus \$1.50 in stamps to LERC Amateur Radio Club (W6LS), 2814 Empire Ave., Burbank, California 91504. For information on the 10th Annual W6SD Hamfest, jointly sponsored (this year) by the San Fernando Valley Radio Club (W6SD) and the LERC Amateur Radio Club (W6LS), write Hamfest Committee, 2814 Empire Ave., Burbank, Calif. 91504. Enclose a self-addressed, stamped envelope. Traffic: (Mar.) K6EPT 1705, W6BBO 881, K6YVN 808, K6WAH 785, W6QXY 650, W6WPF 423, W6MLF 419, K6IUV 283, K6IOV 258, K6MDD 200, W6FD 143, K6ASK 131, W6TXJ 119, W6WKF 73, K6LDM 52, W6KKGK 51, W6BYK 46, W6RHG 42, W6WXP 38, W6GGGL 35, W6GYH 27, W6DGH 26, W6KUX/6 21, W6AUA 20, W6AEL 19, W6MLZ 18, W6MSU 15, W6MBZ/6 12, W6BBH 11, W6NKR 11, W6USY 10, W6QJW 9, W6KZI 6, W6PCP 6, K6HV 5, W6HUJ 4, W6MQF 4, W6GXI 3, W6OI 3, W6RE 3, W6WJT 3, W6JNG 2, W6MOX 2, W6RWF 2, W6KVA 1. (Feb.) W6MQF 13, W6QJW 8.

ORANGE—SCM, Roy R. Maxson, W6DEY—W6OPA, CHOP of K6MCA, is handling traffic direct to Vietnam through Navy MARS. We welcome W6BNX as OO/ORS/OPS. W6PHO and W6AHO/K6HLJ are OESs. RTTY term equipment now is working at W6FB. The Palm Springs Emergency Center has new high-power equipment for K6DJD-1 for RACES manned by Desert RATS. EC W6TAG reports K6LFK as a possible AREC member. EC K6RCK assisted the Red Cross and USMC Chaplain in helping a marine at NQEF, Vietnam, contact his very sick wife locally. SEC W6WRJ assisted K6DIQ in urgent traffic from OC to Hermosillo, Mex., where a boy undergoing medical treatment in the U.S. was able to return for the balance of treatment. EC K6GGS reports increased AREC activity in the San Bernardino, Redlands and Riverside area. EC

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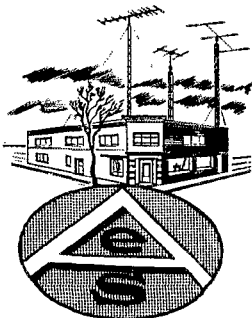


Shown above is Ray Grenier, K9KHW, and his wife, Margaret. As you can see by the smile on Margaret's face, his new living room Ham Shack is definitely Wife-Approved. Approval was secured by the use of the new Design Industries Diplomat Desk (\$139.95), and of course, Modern Equipment. Incidentally, Ray is the manager of Mail Order Sales at **AMATEUR ELECTRONIC SUPPLY** — should you be in the market for such a desk, or any New or Reconditioned Equipment, etc., be sure to get his deal before you do business.

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K6LJA, Orange Co., reports on upcoming AREC activities. W6VOZ had a siege of flu. WB6QGG, with a new Swan #50, got 8 new countries the first week end. WB6MVU, OES/OPS, finished the DDDR antenna and 6-meter transistorized preamplifier. WB6PHO, OES, also finished the 6-meter preamplifier. WB6ASQ and WB6KVA plan a chess net for 80. WA6CXB sent a nice note from his QTH. Traffic: K6MCA 2278, W6ZJB 996, WA6ROF 207, WB6JFO 205, K6IME 146, WA6OQM 107, W6WRJ 85, WB6ODU 77, K6YVN/6 22, K6RCK 21, WB6MVU 15, W6PQA 14, K6GMA 12, WB6ASQ 8, W6FB 8, W6RIQ/6 6, WA6TAG 6.

SAN DIEGO—SCM, Don Stansifer, W6LRU—The featured speaker for the San Diego V.H.F. Club in April was W6CMQ, who spoke on automatic station identification. W6NLO is V.H.F. QSO Party chairman for the June 11-12 event. Helix Club's officers are W6-YSP, pres.; W6KYB, vice-pres.; W6MMI, secy.-treas. SOBARS officers are W6JPB, pres.; WA6JQM, vice-pres.; WB6CAZ, secy.; WA6TIF, treas. The March meeting of the San Diego DX Club was held at the home of W6OME. A new General in San Diego is WB6-POD, eighth-grade son of Old-Timer W6CAE. The brother of WA6XJ married the daughter of SCM W6LRU in April. WN6SHE moved to Menlo Park where she works for the U.S. Geological Survey group. Field Day messages from San Diego Section stations may be sent or given to any station connected with the National Traffic System and then rerouted to me as W6-LUR/WA6VUI. I will be operating as WA6VUI from June 20 through Sept. 4 and checking into the Southern California Traffic Net, which meets regularly on 3800 kc. at 0300 GMT. Traffic: K6BPI 6826, W6YDK 5585, W6IAB 3731, WB6JUH 802, W6VNO 514, W6EOT 412, WB6GMAI 337, W6RGE 219, W6JZK 110, W6LRU 21.

SANTA BARBARA—SCM, Cecil D. Hinson, WA6-OKN—SEC: WB6NDP. RM: W7WST/6. WB6ONW is departing for Viet Nam to work with tropo scatter communications. K6ARK is spreading the v.h.f. bug around the Ventura ARC. Look for him on 147-Mc. f.m. We finally have some news on W6NY and can report that while Johnnie is no longer mobile, he can be found in the evening on 75-meter s.s.b. with the buzzards. WB6BII has a new tower up but nothing on top of it except someone's safety belt. The Simi Valley ARC is a young and aggressive group with a club project of building a 6-meter mountain-top repeater. W6QMV has a new buddy v.h.f. station, WA6UEF and WA6UXP (Mr. & Mrs.) were given a farewell party by the Satelite ARC. K6ZYP is this section's tie to the SoCalSix Net. K6GV has his SBE-34 back in operation and can be found on 3895 kc. Again I must appeal for reports from clubs and individuals who can report on section activities.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. L. Harbin, W5BNG—Asst. SCM: E. C. Pool, W5NFO. SEC: W5PYI. RM: W5LR. PAM: W5BOO. It was a real pleasure to be able to attend another hamfest in Midland; 375 had registered by noon Sun. and many came in later. Congratulations to K2EUI/5 on being top man in the C.W. SS and K5RHZ as top man on phone. Both are in the Northern Texas section. K2GKK/5, acting net mgr. for the NTTN, is having trouble keeping net control stations. It seems they are all being transferred out of the country—K5LSV has gone to Saigon, W5EGZ to Viet Nam and W0DTG/5 to California. W5AHO is back in Amarillo after a few years in New Mexico. K5SXX is back in Ft. Worth. W5CMC, Wichita Falls EC, is experiencing some trouble with the City. It seems that the City Dads have forgotten the hurricane that wiped out part of Wichita Falls a few years back and that the hams did a fine job furnishing communications. The County, however, seems to remember and is cooperating very well. W5MSG worked a 7GI and ZDB during the DX Contest. The Dallas ARC has designated the even month as the time for a social meeting and the odd month for a technical meeting. I hope you didn't forget to make plans to attend the West Gulf Convention at the Inn of the Six Flags June 3-5. Traffic: (Mar.) K5-DBJ 96, K2GKK/5 59, W5BOO 25, W5LR 7, K2EUI/5 5. (Feb.) W5LR 15.

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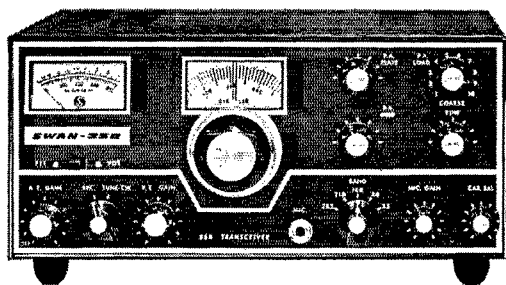
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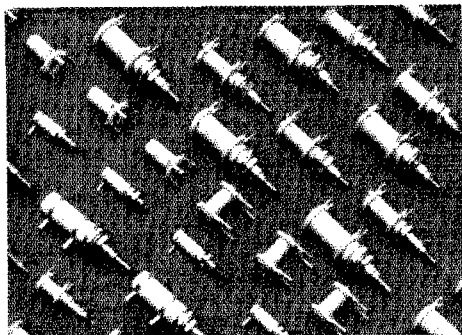
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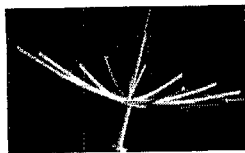


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W5FVJ, Garfield County EC, held his first AREC net in March and used 2 meters. K5CAY received a RACES license for the civil defense station located in Enid. Lawton-Fort Sill Amateur Radio Club has voted to join Army MARS. W5HIM has a new 80-meter back in operation. Mobile activity in the Lawton area has picked up on 75 meters. There are five 2-meter a.m. mobile stations in Enid. The Bartlesville Club is working with several prospective Novice operators. The Electron Benders of Tulsa gave about 20 exams for Novices in March. K5QL, of Yale, has his 432- and 144-Mc. antenna installed on a 70-ft. tower and is looking for contacts. The Tulsa Club and Electron Benders received from ARRL a special award for their work during the tornado in Louisiana. Thanks to W5FFW and W5BNI for their fine OO reports. Traffic: K5TEY 1038, K5MBK 176, W5NBI 123, W5QMJ 44, W5NML 34, W5FLK 20, W5WAX 8, K5CBA 5, W5DZP 2, W5FVJ 2, K5OCX 2.

SOUTHERN TEXAS—SCM, G. D. Jerry Sears, W5AIR—SEC: K5QQG. PAM: W5ZPD. RM: K5ANS. Reports from Southern Texas are getting better. Please pass along information on all your amateur activities that will be of interest. W5ABU wants items of interest to the general public about amateur radio. Drop him a line at radio station KWHL, Brenham, Tex., with news and happenings to be broadcast on Sun. at 1445 S on 1280 kc. Tune in and get a special QSL card. From the W5MS *Bulletin*, Corpus Christi amateurs K5GJX, W5LYC, W5AQK and K5PNC have a nice Novice class going with 25 members. Watch for W5FJN on 6 meters. He is captain in the Merchant Marine and uses a Gonset Sidewinder. K5LQJ, now in Seabrook, wishes to hear from other stations using the "Joystick." EC W5DAA reports the Kingsville Radio Club held a trial run getting ready for Field Day. EC K5HZR reports band conditions are playing havoc with the 7290 Net. Most of the antennas are up at W5SC now. The San Antonio 8-meter i.m. group furnished communications for Sports Car Races which were very successful. K5RZB, K5AVN, W5ICL, W5COD and W5GYQ are NCSs for the Six-Meter Emergency Net at Orange, Tex. The net meets daily at 1820S and participation is very good. The fixed rig at W5AIR has hardly been operated since the new TR4 was installed in the mobile. OOs in Southern Texas must get on the ball. W5NGW turns in a monthly list of stations notified of bad notes and other things observed on the amateur bands. Let's keep the amateur bands clean and cooperate with the OOs. The hurricane season is upon us in Southern Texas. Again I urge you to check your emergency power supply and antennas. From reports this will be a bad year for turbulent weather along the Gulf Coast. W5KWU, at Red Cross Headquarters in Houston, is getting ready for a busy season. Traffic: W5AUZ 332, K5HZR 157, W5CZR 82, K5ANS 70, W5KLV 56, K5PNC 35, W5ABQ 31, K5QQG 16, W5AIR 10.

CANADIAN DIVISION

ALBERTA—SCM, Harry Harrold, VE6TG—SEC: VE6FK. PAM. APN: VE6ADS. PAM S.S.B.: VE6ALQ. ECs: VE6s SA, SS, AFJ, HB, ALL, XO, XC, ORS; VE6BR, OPSs: VE6s CA, HM, SS, BA, ADS, OOs: VE6s HM, NX, TY, AKV. OBSs: VE6s HM, AKV. OBSs: VE6s DR, AKV. Your SCM, VE6TG, is on holidays and so the SEC is submitting this monthly column, 1967 is Canada's Centennial Year. Check with your local committee, or send ideas to your SCM or SEC. A Centennial project for the Amateur Radio League of Alberta was chosen at a recent Board of Directors meeting. The formation of a Canadian organization, through the cooperation of the various provincial associations, is planned. I wish to request assistance from

INSTANT SHACK NEATNESS!!



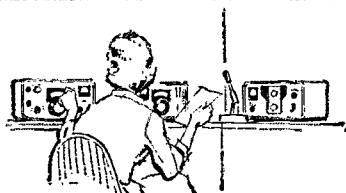
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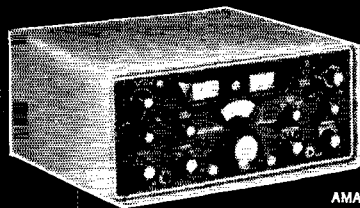
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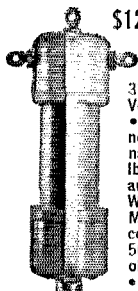
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all of you for this enterprising group. The Annual Central Alberta Radio League Picnic will be held at Pine Lake June 18 and 19. The Waterton-Glacier International Hamfest will be held in Glacier National Park July 23 and 24. Traffic: VE6FK 130, VE6HM 106, VE6XC 50, VE6ALQ 12, VE6ADS 10, VE6SS 9, VE6PZ 6, VE6A00 3.

BRITISH COLUMBIA—SCM. H. E. Savage, VE7FB—VE3CSB is a new call for Prince George. VE7BHW is now VE7SE and an active member on the Trans-Canada Net Sun. West Kootenay ARC is laying solid plans for a fine FD. New members of the Duncan ARC are VE7BZ, formerly VOIDJ, and VE7AIG. Ex-VE7-AHN is poorly health-wise in England. East Kootenay ARC claims more 2-meter rigs per capita than any other place in Canada. VE7IA is back in Halifax for awhile. Nanaimo has a new EC, VE7BDR. Chilliwack has a new Asst. EC, VE7BEN. The Penticton ARC is preparing a certificate for British Columbia's Centennial 1966. VE7ASY is now in Williams Lake. VE7BBV now has his Class "A." VE77QQ, RM, attended the B.C. Fire Marshall's conference in Kitimat representing the AREC for B.C. VE7DH reports the Nanaimo Club is not very active these days. VE7BJO is back in Ocean Falls after a spell in the hospital. VE7BLO is starting to collect his code certificates with 10 words confirmed. This is the second year that VE7BBB has won the YLRL Membership Contest. The BCARA was incorporated in 1924 and still is in business, so please support it through your club or join a club and support both. Traffic: VE7BHH 156, VE7BLO 40, VE7BLS 33, VE7SE 8, VE7DH 6.

MANITOBA—SCM. John Thomas Stacey, VE4JT—SEC: VE4OL, ECs: VE4EO, VE4GM, VE4HB, VE4HF, VE4IW, VE4LG, VE4LU, VE4NW, VE4W, VE4JQ, VE4JT. A side effect of the 1965 SET was the presentation of a citizenship scroll to VE4HT by the Mayor of Winnipeg and accepted on behalf of the ARPSC. Under the SEC our AREC is working closely with the Emergency Measures Organization (EMO) at local and provincial level. Four 2-meter f.m. units have been located strategically in hospitals to provide back-up communications in the event of power or telephone breakdown. In the realm of reality AREC provided services for a checkpoint system during a teenage snowshoe race through desolate areas on the route from Mattock to Winnipeg. The big blizzard early in March brought the AREC to the forefront. The membership is now 79 but every amateur is urged to join and support AREC. Traffic: (Mar.) VE4JT 144, VE4LG 115, VE4EI 67, VE4NE 50, VE4QZ 42, VE4SC 38, VE4XN 22, VE4EF 15, VE4QJ 10, VE4JA 8, VE4OL 6, VE4TM 6, VE4SW 5, VE4DQ 4, VE4QD 4, VE4EG 3, VE4GN 2, VE4IW 2, VE4LQ 2, VE4SD 2, VE4TE 2. (Feb.) VE4JA 2.

MARITIME—SCM. D. E. Weeks, VE1WB—Asst. SCMs: A. E. W. Street, VE1EK, R. P. Thorne, VO1EI. SEC: VE1HJ. Deepest sympathy is extended to the relatives and friends of VE1LH, who has joined the ranks of Silent Keys. G6GC (past-pres. of RSGB) was a recent visitor to the Halifax-Dartmouth area. Winners in the 1966 VE1 Contest are: (C.w. section) VE1PM with 2772 points, runner-up VE1AJT; (phone) VE1AV and VE1PM tied with 6786 points each, runner-up VE1UT. The newly-formed Lakehead ARC (Deer Lake, Nfld.) elected VO1FI, pres.; VO1EJ, secy.; Lew Warren, treas. Congratulations to VE1AI, VE1FQ, VO1II and their NYLS on the arrival of new harmonics. VE1OW has transferred to the VE3 district. VE1RT is active again after an extended sojourn in the hospital. The Halifax Club recently held a successful smoker and auction. VO2s AD, GA and ZZ have been on a technical course at Ottawa. The AP (Atlantic Province) Net has changed frequency to 3655 KHz. VO1AE (recently chosen for the Bob Lewis Award) has transferred to the Halifax area. VO1EL is another s.s.b. convert, while VO1GQ has a new SB-100. Traffic: VE1MX 29, VE1ABS 16, VE1OM 1.

ONTARIO—SCM. Richard W. Roberts, VE3NG—We welcome our Canadian Director, VE3CJ, back to Canada. Noel was on vacation in the Cayman Islands.

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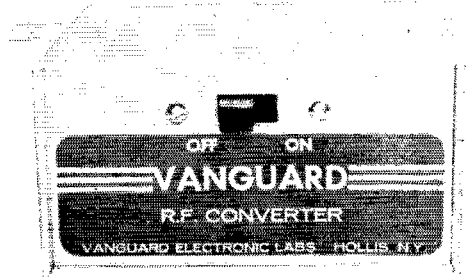
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	301-R	144-148	7-11
	301-S	143.5-148.5	30-35
6M	301-B1	50-51	.6-1.6
	301-B2	51-52	.6-1.6
	301-C1	50-54	7-11
	301-C2	50-54	14-18
	301-J	50-52	28-30
20M	301-G	13.6-14.6	.6-1.6
CB	301-A1	26.5-27.5	.6-1.6
	301-A2	26.8-27.3	3.5-4.0
40M	301-K	7-8	.6-1.6
CHU WWV	301-L	3.35	1.0
	301-H	5.0	1.0
Int'l. Marine	301-I1	9-10	.6-1.6
	301-I2	15-16	.6-1.6
	301-M	2-3	.6-1.6
Aircraft	301-N1	118-119	.6-1.6
	301-N2	119-120	.6-1.6
	301-N3	120-121	.6-1.6
	301-N4	121-122	.6-1.6
	301-N5	122-123	.6-1.6
	301-N6	123-124	.6-1.6
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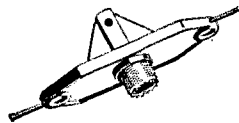
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Field Day is upon us. Got your FD report forms? Our PAM for 2 meters, VE3HW, is hoping to stir up some interest in the Hamilton area. This is the only gap now in the Horseshoe Net. This net will cover from Ft. Erie to Cornwall around the north shore of Lake Ontario. Links to the U.S.A. and Montreal also will be formed. VE3CFR, our genial PAM (75) of London, is coming along fine after hospitalization. Our congratulations to all those who passed the DOT exams recently from the Metro, Skywide, Peel and Cornwall Radio Clubs. VE3-EIO is now residing in London. July 17 is the date for all s.s.b. operators to gather together at Haysumum Park. Details of this unique group called "The Chicken-Pluckers, Turkey Gobblers and Hog Callers" can be had from VE3VF, Oshawa. The Clinton ARC (RCAP types) had a bang-up party. VE3FNV is on from the Clinton Radar School with 400 watts on 2. The NPARC Convention Committee will be getting out pre-convention information to all of you. Remember, it's at Niagara Falls Sept. 16 and 17 at the Sheraton Brock. The National Calling and Emergency Frequencies for Canada: C.w. 3535-7050-14,000 kc. Phone, 3765-14,160, 28,250 kc. Traffic: VE3CYR 143, VE3NG 113, VE3BII 112, VE3BJV 111, VE3DPO 91, VE3EBH 82, VE3GI 62, VE3DVE 55, VE3NO 55, VE3BZB 54, VE3EBC 54, VE3-DVG 49, VE3TT 47, VE3FGV 46, VE3EHL 41, VE3BLZ 38, VE3AWE 35, VE3FHV 24, VE3DU 17, VE3ATI 16, VE3AUI 16, VE3BUR 15, VE3ETM 9, VE3VD 1.

QUEBEC—SCM, C. W. Skarstedt, VE2DR—SEC: VE2ABV, RM: VE2OJ. The AREC supplied communications during a province-wide meeting of civil service employees. BQP for this successful operation goes to VE2s BMS, BQP, ANH, BSQ, AYD and BGB. VE2ABV acted as relay during difficult receiving periods. The latest repeater station VE2ZO, installed on Mt. Gabriel, receives on 146.5, transmits on 146.94, VE2BYU reports into the Green Mt. Fone Net. VE2s NB, 1E, PT and BE enjoyed their Florida "outing." VE2WA and VE2FY received certificates in connection with their work with the Easter Isl. Expedition. VE2BZH finished his SB-100 and is now building a 2-meter transmitter. From VE2-EC: VE2AXY is ready to join AREC activities. VE2-ALR has elaborate 2-meter equipment. VE2ANK is WAC, both phone and c.w. The CRT gang is progressive under the direction of VE2AOL. VE2TI is recuperating. VE2OJ had transmitter miseries. VE2AP reports: DERNIERMENT, à Québec, a eu lieu la Clinique de Sang du Bonhomme Carnaval. Trois stations fixes de radio et quelques mobiles opérant à 8755 kc. furent installés à différents points stratégiques dans le but de coordonner le mouvement des automobiles. Le tout était sous les auspices du Réseau d'Urgence de Québec et du EC. VE2AP et de l'assistant EC VE2BEP. Cette réussite est due à la collaboration des amateurs suivants: VE2s ADR, AYN, BLL, BVH, BUB, BUY, DF, LG, RB. Traffic: VE2DR 115, VE2EC 50, VE2BLL 36, VE2CP 29, VE2ALE 22, VE2UN 21, VE2AJD 20, VE2BG 20, VE2BGJ 20, VE2CK 20, VE2BRD 19, VE2BZH 18, VE2BB 17, VE2AYU 16, VE2WM 16, VE2BRT 11, VE2-AGM 10, VE2BEY 10. (Feb.) VE2XT/2 75, VE2QI/2 38, VE2AYD/2 33, VE2ANH/2 19, VE2ABV 15.

SASKATCHEWAN—SCM, Mel W. Mills, VE5QC —Sincerest congratulations and thanks to SEC VE5CU and all the ECs and AREC members for a tremendous accomplishment in less than 2 years; that of having the highest points for all of Canada in 1965! High praise and credit is deserving all down the line for it was a team effort that accomplished a Corps with balance and, the real important thing, readiness. The publicity gained is now showing in requests from many public bodies for assistance, showing their confidence in the Corps. All hams in Saskatchewan owe a "thank you" to the AREC and its members for giving our craft and hobby a lift in the public eye. Last call to get ready for the big July 1 doings down in Regina for Hamfest '66. Make your reservations and preregistrations now so as to give the committee a break. I am sorry to announce that it seems to be impossible for me to continue with QSO; main reason is lack of time and interest. Hope by you chaps have got in your nomination for SCM as it is far overdue. See you on Field Day. Traffic: VE5HP 115, VE5LM 46, VE5OB 17, VE5-HQ 6, VE5BO 5, VE5IR5, VE5GX 4, VE5IL 4, VE4PU 3, VE5JJ 1, VE5YR 1.

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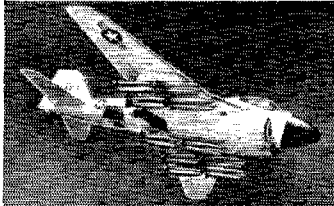


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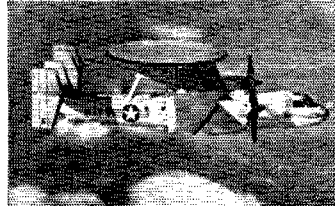
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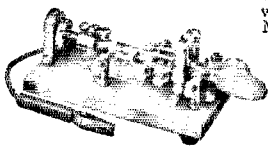
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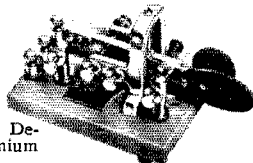
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Breaking the 5650-Mc Record

(Continued from page 88)

to be transmitted. Reflected power from the antenna is directed into the mixer arm of the hybrid-T along with the incoming 5840-Mc. signal. The resulting 80-Mc. i.f. signal generated in the crystal is then fed to the high-gain f.m. i.f. strip. Mixer crystal current is adjusted by means of an E-II tuner between the hybrid-T and the antenna. Klystron frequency is then read by using the crystal mixer as a detector and tuning the wavemeter through resonance. Operation of the crystal as a mixer is unaffected by the presence of the wavemeter.

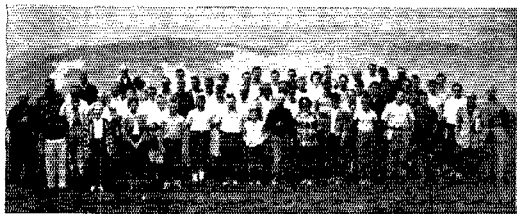
My rig consists of a converted Motorola C-band microwave transmitter-receiver. The receiver is a waveguide-mounted crystal mixer and a Raytheon 6115 klystron local oscillator. Between the mixer and the antenna are four fixed-tuned cavities in the waveguide, for pre-selection and transmitter rejection. An 80-Mc. f.m. i.f. strip with a 3-Mc. bandwidth is used after the crystal mixer. Minimum detectable signal in both receivers was about -96 db. above 1 milliwatt representing a noise figure in the neighborhood of 13 db. A 6115 klystron is also used as the transmitter with an output of power 80 milliwatts.

Antennas are conventional 3-foot spun-aluminum parabolic reflectors with waveguide feeds. Measured gains are 32 db. over isotropic, and the beamwidth is 4 degrees.

Location

Mount Hamilton and Yosemite were chosen primarily because they were both easily accessible by road and did not require much equipment toting. There are locations much farther apart in California but these two were used in the interest of speed and economy. Theoretically the equipment is capable of delivering readable signals in excess of 900 miles, line of sight. All that remains to increase the record distance is finding the locations. We're looking for volunteers to go with us to the top of Mount Shasta. We'll supply the beer if they'll carry the generator.

We would like to thank the following persons for their helpful assistance on the project. George Davis, WB6ECG; Gary Grant, K6VOQ; Will Jensby, WA6BQO; Les Maurer, W6OSA; Bob Melvin, W6VSV; Bill Sanders; Bob Tellefsen, W7SMC/6; Frank Wyatt, WA6JSA; and Dr. Leo Young.



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Please send me the Booklet and Application Blank for the Camp Albert Butler Radio Session.

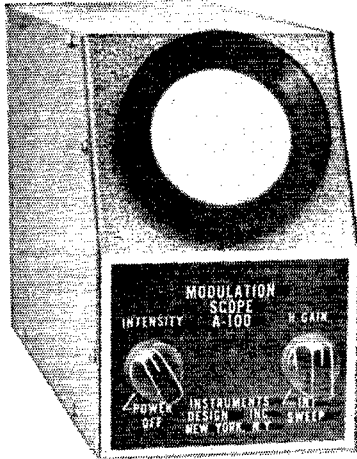
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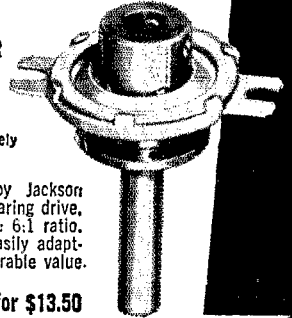
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PIV	Sale	PIV	Sale
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AMPS	25 PIV	50 PIV	100 PIV	200 PIV
3	5¢	7¢	12¢	19¢
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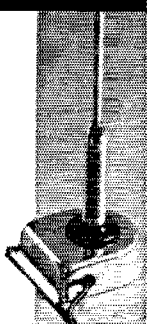
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89¢

Silent Keys

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

- W1BGA, Leonard M. Luther, Pawtucket, R. I.
W1NL, Albert Jackson, West Hartford, Conn.
W1RKD, Clifford J. LaBounty, Hopkinton, Mass.
K2VXF, Henry P. Koert, Lake Hiawatha, N. J.
W3BLM, Allyn M. Freese, Reading, Pa.
W3KGB/K3SNN, John B. Romanosky, Throop, Pa.
W4EIS, Henry M. Clayton, Memphis, Tenn.
K4FUE, William T. Roughton, Thomasville, Ga.
W4IQR, Robert W. Percy, Alexandria, Va.
W4ZIB, Carl H. Hefton, Memphis, Tenn.
W5AEN, Leroy H. Scott, Shreveport, La.
W5DN, Willard W. Travland, Port Arthur, Texas
W5ETR, William B. Kendall, Tulsa, Okla.
WA5HME, Luther E. Bazemore, Muskogee, Okla.
W5TKN, Mason H. Booth, Tulsa, Okla.
W5ZTB, Lee R. Tesson, Woodville, Texas
W6AMZ, Charles V. Janes, Fresno, Calif.
W6BR, Ernest O. Robbins, La Mesa, Calif.
W6JAM, Harold W. Beach, Placentia, Calif.
K6JBP, Harold P. Layton, Thousand Oaks, Calif.
W6PJB, Dennis D. Jones, Esparto, Calif.
W6SXX, Clifton A. Olver, Oakland, Calif.
W6WNZ/KH6NB, Norman E. Blackie, Redondo Beach, Calif.
WN7CMT, Boris E. Dincov, Redmond, Wash.
ex-K7EKW, Gerald Duncan, Aberdeen, Wash.
ex-W7JNZ, Charles L. Roberts, Carson City, Nev.
K7LMU, Charles N. Swain, Tucson, Ariz.
K7SXQ, Richard C. Stoke II, Phoenix, Ariz.
W7VX, George W. Fitzpatrick, Seattle, Wash.
WA8DTV, David S. Marshall, Detroit, Mich.
W8LTD, Robert L. Simpkins, Berkeley, Mich.
W8MRL, Thomas N. Branch, San Angelo, Texas
W8OA, Elra E. House, Battle Creek, Mich.
W8QQO, Edgar G. Weed, Benton Harbor, Mich.
WA8RBK, James C. Wagner, Lakeville, Ohio
W9FYQ, Henry H. Harney, Indianapolis, Ind.
K9KSG, Howard L. Myers, Robinson, Ill.
W9ALL, William E. Cagle, Edinburg, Ill.
WA9NOK, Harold J. Foulkes, Homewood, Ill.
W9SAA, Henry J. Dean, West Bend, Wisc.
W9TD, Robert D. Ashlock, Plainfield, Ind.
W0CPE, Karl V. Nyquist, Stromsburg, Nebr.
WN0JDC, Charles A. Ways, Kansas City, Mo.
K0JNH, Warren H. McGinnis, St. Louis, Mo.
K0JZQ, John R. Hammelman, Waterloo, Iowa
WA0KLL, Roselyn M. Mahowald, New Market, Minn.
W0KYZ, Charles G. Atkinson, Sioux Falls, So. Dak.
W0SGZ, Richard G. Brew, Bloomington, Minn.
W0VRD, Charles R. Van Dyke, Muscatine, Iowa
CE3DG, Jorge Bernain G., Santiago, Chile
CT1BJ, Octavio L. DaFonseca, Viseu, Portugal
KH6CI, Earl A. Nielsen, Honolulu, Hawaii
ex-KL7SFN/W7SFN, Paul Davenport, Aberdeen, Wash.
VE1LH, F. C. Forsyth, Bridgetown, N. S.
ZL2AWJ, Ted M. Thorpe, Wainui-O-Mata, New Zealand
9Q5GI, Burleigh A. Law, Lodja, Rep. of Congo

Because of the need for accuracy in our "Silent Keys" listing, please send all notices to the ARRL and include both name and call of the deceased.

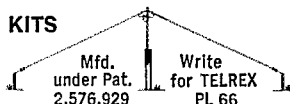


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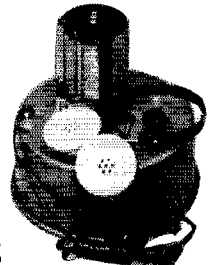
A. J. Gironda, W2JE, Executive Secretary
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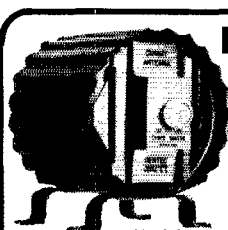
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Model 525

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SPECIFICATIONS—DC to 250 MCS. (50 Ohm Units)

Price	\$1.95	\$11.95	\$19.95	\$19.95	\$19.95	\$29.95	\$29.95
Model	507	525	525L	525B	510U	510N	510B
Term's	UHF	UHF	N	BNC	UHF	N	BNC
VSWR (max)	1.05	1.1	1.05	1.05	1.1	1.05	1.05
Power	7W	125W	(250W ICAS)		500W	(1KW ICAS)	

Terms: C.O.D. plus postage or ppd in U.S.A. when check included with order.

Write for Free Literature (50 and 70 Ohm Units)

GENTEC INCORPORATED, P.O. Box 233, Raritan, New Jersey

1966 ARRL Field Day Rules

(Continued from page 58)

(Example: 60 watts s.e.b. rates as 30 watts.) 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.

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

10. 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.

11. Reporting: Mail reports or entries on or before July 25. 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. QST

IARU News

(Continued from page 77)

- Senegal:* Ch. Tenot, 6W8BF, P.O. Box 971, Dakar
Sierra Leone: Radio Society of Sierra Leone, P.O. Box 907, Freetown
Singapore: QSL Manager, M.A.R.T.S., P.O. Box 777
Somali Republic: Box 397, Mogadiscio
South Africa: S.A.R.L.L., P.O. Box 3037, Cape Town
Spain: U.R.E., P.O. Box 220, Madrid
St. Vincent: QSL Bureau, P.O. Box 142, St. Vincent, West Indies
Surinam: QSL Manager (PZ1AR), Surinam Amateur Radio League, P.O. Box 240, Paramaribo
Sweden: Sveriges Sandare Amatorer, FACK, Enskede 7
Switzerland: U.S.K.A., 6233 Buron/LU
Syria: P.O. Box 35, Damascus
Tanzania: 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: HV1CN, Domenico Petti, Radio Station, Vatican City
Venezuela: R.C.V., P.O. Box 2285, Caracas
Virgin Islands: Graciano Belardo, KV4CF, P.O. Box 572, Christiansted, St. Croix, V. I. 00820
Wake Island: KW6DS, U.S. Army Radio Station, P.O. Box 217, APO, San Francisco, Cal. 96501
Wales: via Great Britain
Yugoslavia: S.R.J., P.O. Box 48, Belgrade
Zambia: Radio Society of Zambia, P.O. Box 332, Kitwe QST

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See Sommerkamp ad on page 156 for photographs of equipment.

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McCOY "GOLDEN GUARDIAN" 9 MC DSB CRYSTAL FILTER. With upper and lower sideband I.F. Crystals. **\$35.00.** (New)

WATERS CODAX AUTOMATIC KEYSER-MODEL 361. **\$85.00.** (New)

B & W MODEL 600 GRID-DIP METER. With Model 600A Coil Set. Like new. **\$55.00.**

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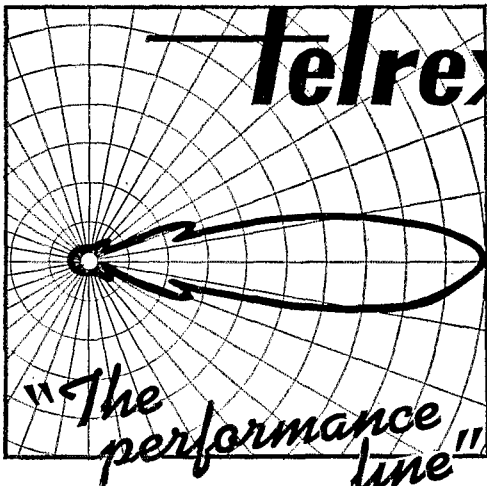
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FIBERGLAS QUAD KIT

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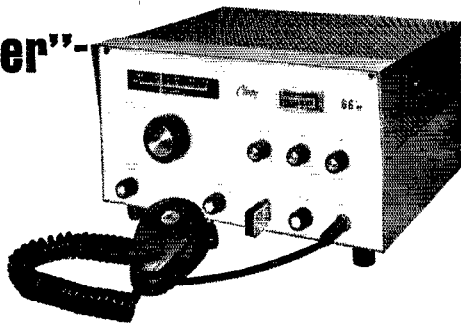
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Please send the free E-V booklet on choosing communications microphones. I am interested in the following areas of two-way radio: Amateur Aviation CB Business.

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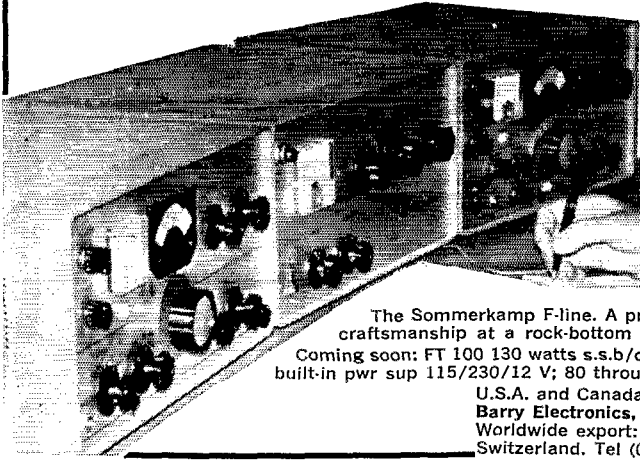


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FL-200B 130 watts s.s.b./c.w./a.m. Same bands and size as FR-100B. v.f.o.; one mech filter 2.1 kc; carrier and sideband suppression 50 db; built-in ant relay; vox, anti-trip; built-in pwr sup 115/230 vac, 60 cps; upper & lower sideband; transceive plug; 13 tubes, 7 diodes. Supplied with plugs. \$350.00

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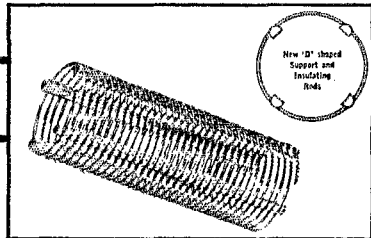
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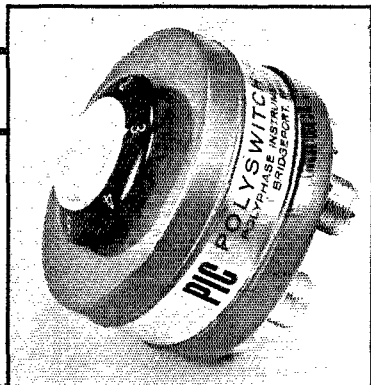
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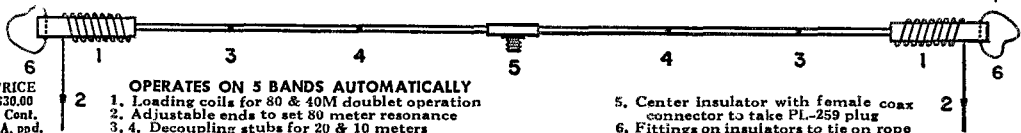
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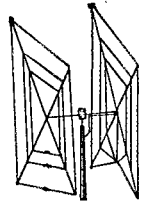
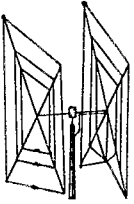
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W2AU now brings you a new W2AU Super 2el. tri-band 10-15-20 meter quad using the all new **EXCLUSIVE** heavy duty vinyl jacketed spreader.

This new spreader is made of selected bamboo entirely encased in a heavy duty vinyl covering, making it salt spray proof and completely weather resistant. No varnishing or treating necessary. Dark brown in color for resistance to ultra violet sun rays.

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Set of 8 Vinyl Jacketed spreaders, 12'6" long (sets only)	\$21.50 set
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Manufacturer of W2AU Baluns. See page 144 this issue

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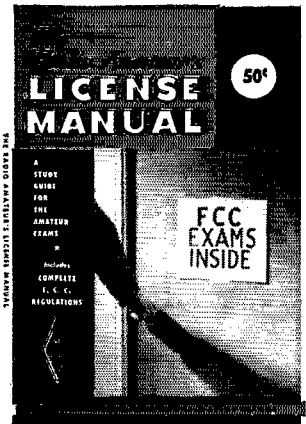
YES, the ARRL License Manual is for aspiring radio amateurs and is indispensable to them. It is indispensable also to all active amateurs, whether old timers or recently licensed Novices. The "LM" contains study material for the amateur-to-be. It also contains the complete text of FCC amateur regulations, which ought to be in the shack of every amateur for reference. The 55th edition is complete, up to date and revised to include latest regulatory information.

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(1) Advertising shall pertain to products and services which are related to amateur radio.

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others. No Box Reply Service can be maintained in these columns nor may commercial type copy be signed solely with amateur call letters. Ham-ads signed only with a box number without identifying signature cannot be accepted.

(3) The Ham-Ad rate is 35¢ per word, except as noted in paragraph (6) below.

(4) Remittance in full must accompany copy, since Ham-Ads are not carried on our books. No cash or contract discount or agency commission will be allowed.

(5) Closing date for Ham-Ads is the 20th of the second month preceding publication date.

(6) A special rate of 10¢ per word will apply to advertising which, in our judgment, is obviously non-commercial in nature. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, takes the 10¢ rate. Address and signatures are charged for. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising so classified takes the 35¢ rate. Provisions of paragraphs (1), (2) and (3) apply to all advertising in this column regardless of which rate may apply.

(7) Because error is more easily avoided, it is requested QSL, signature and address be printed plainly on one side of paper only. Typewritten copy preferred but handwritten signature must accompany all authorized insertions. No cheap-copies can be supplied.

(8) No charge for advertising in this column regardless of which rate may apply.

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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.

HAMFEST Seven Springs Resort, June 19, 1966. Advance Registration, \$1.50. For more information, write Somerset County Amateur Radio Club, Box 17, Ursina, Penna.

HAMFESTERS Radio Club, Chicago, Illinois, proudly announces its 32nd Annual Midwestern Hamfest, Sunday, August 14th at Santa Fe Park, 91st Wolf Road near Chicago. The Hamfest features manufacturer and distributor exhibits, swap-meets, row, contests, awards and a variety of activities for all. Clowns and games for the children, activities for the XYL while you enjoy amateur radio with friends and acquaintances. The Hamfest climaxes "Illinois Amateur Radio Week August 8-14th" by proclamation of Governor Otto Kerner. For complete details and a map of the location, write: Gregory Purteck, WA9MRE, 2916 West Marquette Road, Chicago, Illinois 60629.

HAMFEST: Annual SRRC hamfest, June 5. Same place as last year. See May Hamfest calendar in QST for details or write G. E. Keith, W9QLZ/W9MKS, RFD 1, Box 171, Oglesey, Illinois 61348.

LANCASTER Ohio Hamfest Swap and Shop Sunday June 19th Fairfield County Fairgrounds. Good food. Bring your gear, sell or trade. Meet your friends.

NORTHLAND Amateur Radio Club (NARC) presents "HARC-NARC" an original Alaskan Novice contest. Starts 0001 June 19 to 0001 (GMT) June 20, 100 points for working the "Nusset Station" K1TDC/KL7, Honolulu, Alaska. A Alaskan-Hawaiian QSOs 5 points each. Intra-Alaskan QSOs 1 point each. Equal points for intercont copy in U.S.A. HARK-NARC frequencies 3730 kc and 7160 kc. Mail contest copy P.O. Box 3373, Anchorage, Alaska 99501 by July 1st. Emblem award, QSL "CO HN".

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WANT Callbooks, catalogs, magazine, pre-1920 for historical library. W4AAA Wayne Nelson, Concord, N.C. 28025.

WANTED: All types of aircraft on ground radios. 17L 618F or 5388, 390, GRC, PRC, 1 JRVX, Collins linear amplifier, Type 294; Especially any item made by Collins Radio, ham or commercial. Also large type tubes and test equipment in general. For fast cash action contact Ted Dames W2KUW, 308 Hickory, Arlington, N.Y.

SELL swap and buy ancient radio set and parts magazines. Lavery, 118 N. Wycomb, Landsdowne, Penna.

WANTED: Military and commercial laboratory text equipment. Electroncraft, Box 13, Binghamton, N.Y. 13902.

SAVE On all makes of new and used ham equipment. Write or call Bob Grimes, 89 Aspen Road, Swampscott, Massachusetts; 617-598-2530 for the gear you want at the price you want to pay.

WANTED: 2 to 12 304TL tubes. Callanan, W9AU, 118 S. Canton, Chicago 6, Ill.

304TL tubes wanted. Also other xmtg and special purpose tubes. We will buy military or commercial transmitters and receivers with designations AR3, GRC, UR, R, S1 and MN. Air Ground Electronics Co., 64 Grand Pl., Kearney, N.J.

WANTED For personal collection: WE 1A mike mounting case with or without 38¢ 1A microphone. Also WE 618-A dynamic, Gardner, W0JJD, 23 Welch, Ames, Iowa 50010.

TUBES Wanted. All types, highest prices paid. Write or phone Ceco Communications, 120 West 18th St., N.Y. 11, N.Y. Tel: 242-7359.

QSLs, samples 20¢. QSL Press Box 281, Oak Park, Illinois 60303.

QSLs "Brownie" W3CJI, 3111 Lehigh, Allentown, Penna. Samples 10¢. Catalog 23¢.

C. FRITZ For better QSLs! Bringing hams greater returns for over a quarter-century. Samples 25¢ deductible. Box 1684, Scottsdale, Arizona 85252 (formerly Joliet, Ill.).

QSLs: Quality with service. Samples free. R. A. Larson Press, Box 45, Fairport, N.Y.

QSLs-SMS. Samples 10¢. Malgo Press, Box 373 M.O., Toledo 1, Ohio 43601.

DELUXE QSLs Petty, W2HAZ, P.O. Box 5237, Trenton, N.J. 08638. Samples, 10¢.

QSLs. See our new "Eye-Binder" cards. Extra high visibility. Samples, 5¢. Dick, W8VXK, 1994 N. M.-18, Gladwin, Mich. 10¢ Brings free samples. Sims Advertising Service, 32227 Missouri Ave. St. Louis, Mo. 63118.

DON'T Buy QSL cards until you see my free samples. Bollis, W5OWC, Box 9363, Austin, Texas.

QSL Specialists. Distinctive Samples, 15¢. DRJ Studios, 2114 N. Laverne Ave., Chicago, Illinois, 60639.

SUPERIOR QSLs, samples 10¢. Ham Specialties Co., 108 East Palace, Hobbs, New Mexico.

QSLs, SWLS, XYL-OMS (sample assortment approximately 9¢) covering designing, planning, printing, arranging, mailing, eye-catching, comic, sedate, fabulous. DX-attracting, prototypal, snazy, unparagoned cards (Wow!) Rogers K0AAB, 961 Arcade St., St. Paul 6, Minn.

3-D QSL cards add prestige with spectacularly different glittering colors and raised designs. Samples 25¢ (refundable). 3-D QSL Co., Monson 2, Mass.

QSL, SWL, cards that are different. Quality card stock. Samples 10¢. Home Print, 2416 Elmo Ave., Hamilton, Ohio.

QSL, SWLS, WPE. Samples 10¢ in adv. Nicholas & Song Printery, P.O. Box 11184, Phoenix 17, Ariz.

QSLs 300 for \$4.35. Samples 10¢. W9SKR, George Vesely, Rte. #1, 100 Wilson Road, Ingleside, Ill. 60041.

QSL 3-color glossy, 100, \$4.50. Rutgers Vary-Typing Service. Free samples. Thomas St., Riegel Ridge, Millford, N. J.

QSLs Kromekote 2 & 3 colors attractive, distinctive, different. Free ball point pen with order. Samples 15¢. Agent for Call-D-Call decals K2VOB Press, 31 Argyle Terrace, Irvington, N.J.

QSLs-100 3-color glossy \$3.00; silver globe on front, report form on back. Free samples, Rusprint, Box 7575, Kansas City, Mo. 64116.

DAZZLING QSLs, Samples 10¢ (ex-W2QCC) Ted Besesparis, WA4WVK, Box 1275, Lake Worth, Fla.

QSLs. Finest YLRs, OMs, samples 10¢. W2DJH Press, Warrensburg, N.Y. 12885.

QUALITY Rubber stamps; Complete QSL 3"x5" \$5.00. Call, name, address \$1.50 "Wes's, W1FP, RFD No. 1, Amesbury, Mass. 01913 (Srv. Oms. Price type in last ad!)

LOW Cost QSLs; 100 4-color glossy, \$3.99. Free samples. Ed's Press, 3232 Le Moyne, Chicago, Ill. 60651.

QSLs Stamp and call brings samples. Eddie Scott, W3CSX, Fairplay, Md.

DX-QSL. The original plastic display for ur cards. Holds 20 cards, 3 for \$1; ten for \$3. Satisfaction guaranteed. Dealers inquiries invited. DX-QSL, Box 19033, Houston, Texas 77024.

FINE Embossed QSL cards. Ace Printing Service, 3298 Fulton Road, Cleveland, Ohio 44109.

RUBBER STAMPS \$1.00. Call and address. Clint's Radio W2UDO, 32 Cumberland Ave., Verona, N.J.

QSLs: 100 4-color, \$3.99. Free Samples. Ed's Press, 3232 Le Moyne, Chicago, Ill. 60651.

QSLs—Free samples. Attractive designs. Quick Service, W711Z Press, Box 183, Springfield, Ore.

ORIGINAL EZ-IN double holders display 20 cards each in plastic. 3 for \$1.00 or 10 for \$3.00 prepaid and guaranteed. Free sample to dealers or clubs. Tepabco, John K4NMT, Box 198T, Gallatin, Tenn. 37066.

SMART Ham operators buy their QSL cards from the Ham Wholesale Card Club. See 1/2 p. ad (p. 157) in this magazine.

QSL Cards, Quality printing. Samples 15¢. Sargent Press, 19 Glenn Ave., Lynn, Mass.

QSLs, 18 samples, 10¢. Filmcrafters, Box 304, Martins Ferry, Ohio.

HUNDRED QSLs, \$1.00. Samples, dime. Holland, R3, Box 649, Duluth 3, Minn.

SELL: Heath DX-60 and HG-10 VFO. Exclnt condx, \$100. Knight R-100. Needs work, \$50.00. F.o.b. Berkeley, Calif. John McPeak, WA6IZY, 902 San Benito.

QSLs?? SWLS?? Made-to-order! Rainbow maps? State maps? Flags? Cartoons? Space, age? Photographic? Earles? Special cuts? Gospel? Samples 25¢. De Luxe, 35¢ (refundable). Sakers, W8FED, Box 218, Holland, Michigan 49423.

QSLs, Radio Press, Box 17112, San Diego, Calif. 92117.

QSLs, 18 samples, 10¢. Filmcrafters, Box 304, Martins Ferry, Ohio.

QSLs-SWLS 3 & 4 colors. 100 \$2.00. Samples dime. Bob Garra, Lehighton, Penna. 18235.

HUNDRED QSLs: \$1.00. Samples, dime. Holland, R #3, Box 649, Duluth 3, Minn.

QSLs. Large selection, including photos, rainbows, glossy stocks, cuts, etc. Fast service. Samples 25¢. Ray, K7HLR, Box 1176, Twin Falls, Idaho 83301.

AT Last! Something new in QSL cards! All original designs. Send 25¢ for samples to Yarsco, Box 307, Yorktown Heights 1, N.Y.

QSL Print K1FF samples 25¢ (deductible). Design-yourself kit 35¢ deductible. P.O. Box 33, Boston, Mass. Melrose Highlands, BR 02177.

CANADIANS: HQ-170C receiver for sale. Asking \$325.00. VESNM, 20 Caithness Dr., Welland, Canada.

CANADIANS: NCX-3 A.C. supply crystal calibrator, perfect condition. All for four hundred dollars. VESJR, 3225 Parliament Ave., Regina, Sask., Can.

CANADIANS: Sell or swap Tristao crank-up tower, 6 section, 22 to 105 feet, Tristao trailer, fold-over mount for tower. Perfect for field day and fixed. Want: Receiver, old radio gear and publications. B. McPherson, VE3CMM, Pickering, Ont. P., Canada.

CANADIANS: For sale, Hallicrafters SR-150 and PS-120 p/s, Astatic D-104 microphone. New condition. Ronald Schindler, 219 Hewat St., Preston, Ont. P., Canada.

OLD Old Timers Club now over 600 members with verified 2-way contacts before 1925. Life membership, \$15 bi-monthly "Spark-Gap Times", \$2.50 annually; also available to non-members. \$3.00. Write Secretary WIMPP, Lovell, Maine 04051. SELL: Eimac 4X250B tubes. Guaranteed gud condx. \$6.50 each, \$10.00 pair prepaid in U.S.A. Send check or m.o. Everett Stidham, Jr., WSJLQ, 722 So. 30th, Muskogee, Okla.

MANUALS for surplus electronics. List. 10¢. S. Consalvo, 4905 Roanne Drive, Washington, D.C. 20021.

WANTED: Teletype equipment, R-388, R-390A. Cash or trade for new amateur equipment. Altronics-Howard Co., Box 19, Boston, Mass. 02101. Tel: (617-742-0048).

MCHIGAN Hams! Amateur supplies, standard brands. Store hours 0830 to 730 Monday through Saturday. Roy J. Purchase, W8RP, Purchase Radio Supply, 327 E. Hoover St., Ann Arbor, Michigan, Tel. NOrmandy 8-8262.

TOOOBES: 6146B, \$4.00; 6CW4, \$1.40; 417A, \$3.95; 6360, \$3.45; 6146, \$2.25; 5894, \$15.50. All new, boxed guaranteed. No pulls, seconds or JAN. Catalog of many other types, free. Vanbar Distrib., Box 444Z, Stirling, N.J. 07980.

WANTED: Antique transmitting and receiving tubes made prior to 1920. W2EZM, 431 Oakland Ave., Maple Shade, N.J.

HALLICRAFTERS SX-117 receiver, \$285.00; Johnson Viking kilowatt amplifiers, \$1095.00. W. Bruring, Route 2, Box 313, Onalaska, Wis.

SELL: QST, CQ, Radio, Modern Electrics and Handbooks, any quantity. Buy; old radio gear and publications. Erv Kasumussen, 164 Lowell, Redwood City, Calif.

RTTY Gear for sale. List issued monthly. 88 or 44 mny toroids, five for \$1.75 postpaid. Elliott Buchanan, W6VPC, 106 7th Avenue Blvd., Oakland, Calif. 94610.

TELETYPES, parts. Fast service, Schmidt, W4NYF.

HAM Paradise for sale on beautiful Maine lake. Fully equipped station with Telrex Xmas Tree, 300 ft. lake frontage. 10 acres, boating, fishing, swimming. W1AUR, H. G. Riley, Fayette, Maine.

FM Equipment Schematic Digest: A comprehensive collection of Motorola equipment diagrams covering low-band, high band and 450 Mc equipment, manufactured between 1949 and 1954. Crystal formulas, alignment instructions and a wealth of technical data included in 92 pages. Price, \$3.95 ppd. Two-Way Engineers, Inc., 1100 Tremont St., Roxbury 20, Mass.

WANTED: Collins Parts, BC-610, GRC-27, Antodyne, Bethpage, L.I., N.Y.

We Buy all types of tubes for cash, especially Eimac, subject to our test, Maritime International Co., Box 516, Hempstead, N.Y.

ACT Now!! Barry pays cash for tubes (unused) and equipment. Barry Electronics, 512 Broadway, NYC 12. Call 212-Walker-5-7000.

WANTED: Tubes, all types, write or phone W2ONV. Bill Salermo, 243 Harrison Avenue, Garfield, N.J., Tel GARfield Area code 201-471-2020.

NOVICE Crystals 80-400, \$1.05 each. Also other freqs. Free list Nat Stinnette, W4AYU, Umatilla, Fla. 32784.

HAM Radio Counselor, male, for co-ed camp in the Berkshires, Mass. Able to instruct campers in fundamentals of ham radio. Fully equipped ham radio station. Write to Robert Kinoy, Camp Taconic, 451 West End Ave., N.Y.C., N.Y. 10024.

CERTIFICATE Hunters: Work five members, get free award. Tu-Boro Radio Club, Inc. W2BWM, 104-19 127 St., Richmond Hill, N.Y. 11419.

HAM's Market Newspaper, nothing like it before! Send today for your free copy. Ham's Market Newspaper, Box 13934, Atlanta 9, Georgia.

WANTED: 160-meter band kit for modifying Central Electronics 200-V transmitter to operate in the 1.7-2.5 Mc band. Highest price paid. WA0IOE, Francis Budavary, 285 Summit Avenue, Saint Paul, Minnesota 55102.

4X250B, \$10.00 pair; 4X150A, \$5.00 pair; 4CX250B, \$12.00 pair used; new \$20.00 pair, guaranteed. Homebrew kilowatt linear amplifier for SSB, \$49.00. 1 channel Masterphone 77 stereo tape recorder, needs motor, \$30.00. C. M. Pruett, Star Rte C, Flamingo Bay, Ft. Meyers, Fla. 33901.

KWM-2, 516F-2, and mobile supply, \$700.00; KWS-1, \$675.00, both in excellent condition. Inquiries answered, offers considered. Will ship. C. Jacobsen, 2001 W. Cone, Greensboro, N. C. (Tel: 288-1471).

HAM Discount House. Latest amateur equipment. Factory sealed cartons. Send self-addressed stamped envelope for lowest quotation on your needs. H D H Sales Co., 170 Lockwood Ave., Stamford, Conn. 06902.

AMATEUR Paradise Vacation: Livingstone Lodge, Mascoma Lake, Enfield, N.H. Cosy cabin for two weekly. \$50.00. Swimming, Fishing, Boats, Sports, Ham Radio, Dartmouth Golf, Tennis, Hot Spawners, Fireplaces, light housekeeping, children half Lake Shore Camp Sites, literature. Al. Q. Livingstone, W2QPN (Quarters, Pennies, Nickles).

FOR Sale: SB-100, SB-200, SB-300. Wanted: Any kit to wire and repair, preferably Heathkit. Most Heathkits in stock. Business ref. on request. Lan Richter, 131 Florence Dr., Harrisburg, Penna, 17112.

T-150A, assembled professionally. In perfect condition. Manual included. \$75.00. Postpaid. WA4LPQ.

PLATE Transformer: 120V, 60 cy, pri., Sec. 850V C.T. @ 200 Ma. New Sealed. Mfg. studs. Wt. 8 lbs. \$3.75. Free list of other transformers. A.R.C. Sales, P.O. Box 12, Worthington, Ohio 43085.

TROPICAL Holiday: Swap your SSB TX/RX, excellent condition, for two-three weeks' holiday in sunny Trinidad. Now, or next year for our unique carnival. QSO D. Gittens, "Carty Drive", Gordon Street, Curepe, Trinidad, W.I.

COLLINS KW-1 transmitter, like new condition: \$1100.00. Barnes, W9CFK, 765 Lincoln, Evansville, Ind.

FOR Sale: Heathkit Warrior linear, excellent condition: \$125.00. W9MRX.

WANTED: Johnson Kilowatt Matchbox. Cash. W0PKH, Quent Johnson, 9834 Old Warsaw Rd., St. Louis, Mo. 63124.

CHICAGO Area: Over 200 QST and CQ magazines, 1947 through 1966. \$25.00. John Flinn, W9QQG, tel: KE-9-0793.

WANTED: Johnson Matchbox 275 W. L. M. Stevenson, W8-WTC/2, 6315 Shimer Drive, Lockport, N.Y. 14094. Phone 716-433-5886.

WANTED: Any or all issues of DX Magazine, WIUOP, Roger Paulson, Box 4, Needham, Mass.

MOVING: Bargains. Must sell excess equipment and thousands of parts. No junk. Send for lists, stamp appreciated. W. B. Shepherd, 614 Sligo Ave., Silver Springs, Maryland 20910.

SELL: W2AU Triband quad ant. used two months. Perf. Condx. \$35.00. SX-101 Mark III E.C., \$200.00. Harvey-Wells TB550 D. w/pwr sup., \$50.00. incl. V.F.O. Pick up NYC area. Tel: 212-OL3-1039.

SWAN SW-240 xcvr with matching SW-117 A.C. p/s, only \$275.00. Both are in perfect electrical condition; not one scratch, mark or other defect. In original cartons. Call Dan Fine, tel: 914-WH8-7105, White Plains, N.Y.

SELL: NCX-3, NCX-A, \$295.00. WA2ODT, 5644 Mapleton Dr., Utica, N.Y.

HEATHKIT HQ-10 Monitor 'scope, with manual: \$35.00. Will ship. K1BVB, Arnold Gorevitz, 27 Quimby St., Haverhill, Mass.

SELL: Waters KW mobile ant. base and top 80-40-20-15-10. Kw coils. \$50. W3KRO, Rt. 3, Danville, Penna.

ALL in good condition: Hammarlund HQ-145AC, spkr, clock, calibrator, \$230. Eico 720, \$60. HK-1B keyer, \$25; Handbook F-R switch, \$15. 20-watt audio amplifier, \$30. 75 Ω KW low-pass filter, \$7.50. Vant: Drake 2B, \$80. HA-1 keyer, valiant 11, 18AV antenna. Rick Masters, WNSRNN, 1750 Schuman, Garden City, M. ch.

SELL: BC610-D, complete with 614-D speech amp., clean, in perfect wkg. condx. Will accept any reasonable offer. W3DCY, Nicktown, Penna. 15762.

FOR Sale: All in perfect condition: Drake 2B with 2BQ and calibrator, \$190.00; Ameco 6 & 2 transmitter, \$110.00; Gonset Communicator VFO 6-2 and 1/4 meters, \$45.00; Ameco CN-50W 6 meter converter 3 Nuvistor 14-18 Mc. output, \$27.00 and Ameco CN144W 2-meter 3 Nuvistor 14-18 Mc. Output \$27.00. Converters factory-wired. Will ship. Write to WA9EDG, John Christanson, 1425 Neiss Court, Glendale Hts., Ill. 60139.

SELLING: HW-12, \$100.00, Heath OP1 'scope, \$110.00; Hewlett-Packard 57M Monitor \$378. \$70.00; Daven Power output meter, OP961, \$35.00. All in good condition. Don Munger, WA1BSX, RR #1, New Milford, Conn. 203-354-3408.

CLEAN Gear: HC221AH frequency meter with power supply, \$60.00; Jones Micro-Match, \$20.00; Heath VTVM, \$12.00; Drake 2 multiplier spkr, \$12.00. Cash carry deal. Olson, 31 Jervis Road, Yonkers, N.Y.

QSTS: 1932-1962, 3 for \$1.25 postpaid. Stamp for list. J. Tate, 9 Diane Dr., Malvern, Penna. 19355.

COLLINS 75S-1 including 500 cycle filter, noise blanker, 32S-1 and 516F-2, excellent, all for \$800. W5EBC, 609 West 6th, Austin, Texas.

FOR Sale: Heathkit DX-60, HG-10, HR-10, all in mint condx. Write W7OUW, Box 286, Lakeside, Oregon.

JOHNSON Pacemaker SSB, AM, CW, \$125.00. Ship F.o.b. WASLLX, 928 Hillside Dr., Fort Smith, Arkansas.

SR-150 w/p.s., like new, \$400.00. Turner 454X SSB microphone, \$10.00. Bob Emfinger, 704 Vine, Lodi, Calif. 95240.

PANADAPTOR, Heath HO-13 Ham Scan, carefully assembled and aligned for 455 Kc. I. F. by engineer, parts for other I.F. frequencies, used less than four hours, perfect: \$60.00. W9OKB, Ken Bell, 8267 Wisner, Niles, Ill. 60648.

SELL: Drake R-4, \$250.00; WRL SB-175 plus AC power supply, \$60.00; Knight VFO, \$20.00; Heathkit HR-10, \$60.00; Astatic JI-30 mike, \$5.00; Heathkit HM-11 VSWR meter, \$10.00; Vibron Champio, \$10.00; Hallicrafters WR-600 communications receiver, \$35.00. Postal money-order only. SASE for misc. barain parts. Albert Martin DAC G-4, Eighth Army, APO San Francisco, Calif. 96301.

WANTED: Chippewa KLI, Harold Fox, W3ETA, 7219 Wayne Ave., Philadelphia, Penna.

DRAKE 2-B, 2BQ, 2AC, extra xtals, excellent condx, \$200. WAIDZL, 111 Lexington St., Bristol, Conn.

COLLINS 32S-1 (needs VOX relay), set of spare industrial rated tubes: \$275.00; R388 (5113) factory aligned, 1.4, 6.0 mech. filters (not installed), set of spare industrial rated tubes, manual: \$350.00. Will trade for VHF gear or SBE linear with power supply, all inquiries answered. K5UUN/4, 4 Myrtle Drive, Eglin AFB, Aux. #9, Florida 32544.

MUST Sell all gear: SB-200, \$160.00; T4X, \$300; R4A, \$300; Eico 460 'scope, \$30.00; Johnson KW Matchbox with meter, \$75; AC-3, \$55.00; Cliff Dweller CD 40-75, \$75; TA-33 beam, \$75. Ham-M rotor, \$75. All gear in exc'nt condition. Make offer on complete station if desired. Ken K9FSI, 18424 Oakley Ave., Lansing, Illinois 60438, Tel: 312-474-1646.

GONSET Twins: G66B, G77, perfect AC/DC, complete, \$150.00. Herb, K7CWO, 436 S. Yelm, Kennewick, Washington 99336.

RANGER, perfect condition, \$110.00. WA2SKY, 100 Vail Road, Apt. H-22, Parsippany, New Jersey.

WANTED: Used Vibroplex. Send Price, description, Eric Patch, RD #3, Doylstown, Penna.

BLUEBOOK Prices save money. Take 10% off these prices without trade-ins. Galaxy 3000, \$179.00; NCL-2000, \$479.00; NCX-3, \$209.00; Communicator III/6 M, \$149.00; HT-37, \$269.00; SX-117, \$259.00; SR-150, \$379.00; HW-12, \$119.00; DX-100, \$99.00; SR-46, \$159.00; AF-67, \$59.00; Valiant 1, \$169.00; Communicator IV/6M, \$189.00. Hundreds more. Free list. WRL, Leo, W2GFO, Box 919, Council Bluffs, Iowa.

HOUSECLEANING: Practically give away transceivers, test equipment, meters, tubes like 4-1000As, and more. SAE for list return mail. Cash or swap for older receiver HRO-5, SX-28A, etc. Carl E. King, 905 King St., Olean, New York 14760.

SELL: DX-40, \$35.00; SX-99, \$60.00; Vibroplex Original, \$12.00. Certified check for money-order. You pay shipping. WA2MTL, 21 Napoleon St., Newark, N.J. Tel: MI-2-1805.

NATIONAL NCX-3, NCX-A, A.C. supply, original owner. Like new condx \$250.00. Ray Peterson, K3TRK, 1611 Nathaniel Mitchell Rd., Dover, Del. 19901. Tel. 302-734-5049.

FOR Sale: Collins 62S-1 transverter, \$650.00, no modifications. Ken Carmichael, K2DHF, Box 169, Circleville, N.Y., 10919.

WANTED: Circuit and manual for the Band Scanner Model 44001-502. Model 44 as built of Radiophone. Will copy and return \$3.00. Call for technical Institute, 5440 Penn. Ave., Pittsburgh, Penna. 15206.

KWS-1, perfect condition, spotless, \$600. Collins SC-101 station control with speaker, clock, wattmeter, selsyns, \$100. John V. von Sneider, Jr., KJGTU, 43 Oriole Ave., Bronxville, N.Y., 10708.

DX-40, \$25.00; Heath HR-10 rcvr with a \$10 PM speaker, factory aligned, both for \$50.00. Or deal and u ship. WA9JFW, Chris, 426 Bellevue, Alton, Ill.

WHEATSTONE Tape perforator and associated equipment wanted. Describe and state price. J. Bradley Flippin, K6-HPR/4, 3011 Fairmont St., Falls Church, Va. 22042.

FOR Sale: Drake TR-3 with power supply, speaker, microphone, \$450.00. Dr. Marvin Hash, 319 North 26th St., Billings, Montana (WY)H S).

COMPLETE Hallicrafters SSB station, exclnt condition, extra gear, write: K5CCO, Bill Gierhart, Box 119, Sapulpa, Okla. 74066.

SELL: Central Electronics 100V, \$350.00; William Black, 182-B School St., South Acton, Mass. 01771 Tel: 263-4468.

QSTS since 1926, except the war years. Best offer. Also, NCX-3, excellent condition, \$198.00. Don Twining, 113 So. Elmwood, Aurora, Ill.

MOBILOCK! Incomparable theft protection exclusively for KWM-2 owners. Stop worrying! Write Transistocs Co., 4452 N. 20th Rd., Arlington, Va.

FOR Sale: HT-44 transmitter, 200 watts high quality AM, CW, SSB Solid State, "no heat" power supply and speaker in matching cabinet, with all necessary connecting cables. Bought in August 1965 and used less than 10 hours, perfect, \$300.00 or your best offer. WA0GCS, John Hasebrock, 9402 West Pine, St. Louis, Missouri 63144.

WANTED: Military, Commercial, Surplus, Airborne, Ground, Transmitters, Receivers, Test-sets, Accessories, Especially Collins. We pay cash and freight. Rifco, P.O.B. 156, Annandale, Virginia. Tel: (AC 703) 560-5480 Collect.

SELL: HW-12 and HW-32. Both in very good condition, \$150.00 each, plus postage. K3JML, 142 South St., Nanticoke, Penna.

WANTED: 75A-4, R388, or SP-600 Class receiver. Sell or trade: 38-1000 Mc. receiver. RDO AM-FM receiver with plug-in CV253/ALR tuning unit, also associated Panadaptor, W. O. Westlund, W0DNW, 2801 Wright Ave., North Platte, Nebraska.

FOR Sale: "Joystick" Antenna outdoor model with types 3 and 5. "Joymatch" units and 85 feet of feeder wire, complete instructions, \$20.00. Pick-up deal only, 879, Ed Abbott, 127-04 109th Ave., Queens, New York. Tel: (212) 641-0502.

NC-303, Calibrator, manual, \$250.00; Vibroplex DeLuxe Original, \$15.00, both like new. W22MOJ, 319 Summit, Mount Vernon, N.Y.

WARTIME Issues of Radio-Craft, 1939 through 1947 including de Forest 50th Anniversary issue, 104 copies. Face value for \$26.00. Norman Weiner, Box 249, White City, Oregon 97501.

WANTED: Tower 60-70 ft. heavy duty galvanized. Free standing, tilt-over crank-up or self-supporting type. M. Rothberg, 442 East Harrison St., Long Beach, N.Y. tel: (516) GE-1-4688.

KWM-2, DC supply, in 1964 Olds NR sports coupe. Will sell with or without Olds. Also PM (AC) supply and case. Robert Boas, Pinnacle Rd., Amherst, New Hampshire.

LATEST SBE-33 with DC supply and mounting plate, \$225.00. WA2FSD, Martin Siegel, 11 Burbury Lane, Great Neck, L.I., N.Y. Tel: 516-482-2737.

SELL: NC-109, Calibr. and speaker, \$75.00; DX-35, \$50.00. Both for \$110.00. In gud shape. Earl Mac Michael, WN2UEG, 505 Charleston Rd., Willingsboro, N.J. Tel: 609-877-8134.

HW-32 AC/DC supplies, \$150.00. HW-100C/xtal BFO, \$90.00. DX-100, \$60.00. WA2GVJ, James Crandall, Whitney Point, N.Y. 13862.

SELL: Apache, \$75.00; gud condx, SX-101, \$100. Gud condx. Ron Kuest, WA6CCC, 1220 S. Church St., Lodi, Calif. 95240.

GONSET GSB-100, \$165.00; GSB-101 Linear, \$150.00; SB-300 receiver, \$235.00. Steve Hoff, K0IDY, 2010 N. Elsie, Deavenport, Iowa.

COMPLETE SSB Station: Hallicrafters HT-44, Drake R-4, Ameco Bridge, Dow-Key relay. Mint condition. One package, \$575. WBZGYD, 2502 Cortelyou, Brooklyn, N.Y. 11226.

WANTED: 2000 PEP linear and also a NCXU-27 xtal calibrator. Solomon Hofer, Spencer, So. Dakota K0FOH.

URGENTLY Need cine-Kodak special 100 ft. or 200 ft. magazine (trade ham item) 2/W2KUW.

SELL: Johnson 250-23 Matchbox, \$30.00; Heathkit HM-11 power meter, \$10.00; Johnson 250-39 T-R switch, \$17.00; RCA VOM WV38AK with case, \$25.00; EV-911 mike with desk stand, \$17.00. All in good condition, with shipping costs extra. W0KCI, 512 Broadway, Alexandria, Minnesota 56308.

SALE: NCX-3 with AC/PS, 3 months old, in mint condx, with manuals: \$299. WA7DRM, Steve Hatisis, 627 "K" St., Salt Lake City, Utah.

BARRRRAIN: Like new Gonset G-43 receiver, \$75.00; Gonset Tribander, \$10.00; Elmac AF-67 transmitter, \$37.00; Model 15 teletype, \$75.00. 14 Tee-Dee, \$39.00; Clegg 99'er, \$85.00. W2-DLT, 3482 Essex, Stirling, N.H. 07980.

TR-3 and Husky AC supply: \$429.00. W5NGX, 208 Pat. Level-land, Texas.

SX-101A, \$200.00; PTT factory-wired Ranger, \$100.00; TBS-500 w/PS, \$35.00; all excellent. Consider Drake 2B or 2M Communicator in trade. WA6GKJ, 1430 W. Ave., Fullerton, Calif.

EICO 720 xmt, excellent condx, \$70; Eico 730 modulator w/cover, exclnt, \$40.00; pair, \$100.00. Eico code oscillator, #706, excellent, \$6.50; APX6, less 3E29, \$8.00; Heath visual-ocular Signal Tracer, \$10.00; Command rcvr 6-9 Mc., new, \$10.00; Command rcvr 3-6 Mc., good, \$8.00; BC344 150-1500 Kc. in 4 bands, good, \$30.00; Knight wireless broadcaster w/mike, \$10.00; R-48/TR-3 rcvr 230-250 Mc., new, but copy, to AM, \$22.00; Gardiner code machine w/14 tapes, excellent, \$25.00. Don Goodwell, K9UON, 204 Henley Rd., Richmond, Indiana 47374.

HT-37, \$250.00; Gonset GSB-201, \$190.00; Drake 2B, \$180.00. All in exclnt condx. W9HHA, 8019 Catherine, Chicago 31, Ill. Tel: 312-457-0812.

GUARANTEED Reconditioned equipment on approval. Terms. Collins KWM-1, \$229.00; 75S-1, \$299.00; 30L-1, \$349.00; 75A-4, \$395.00; Drake TR-3, \$395.00; TR-4, \$495.00; Hallicrafters SX-140, \$59.00; SX-101A, \$219.00; HT-37, \$269.00; Hammarlund HQ-10, \$119.00; HQ-170, \$179.00; HQ-180, \$249.00; Johnson Ranger, \$99.00; Valiant, \$159.00; Natio National NCL-2000, \$395.00; NCX-5, \$445.00. Swan SW-240, \$219.00. Other equipment. Write for lists. Henry Radio, Butler, Mo.

COLLINS 75S-1, with 500 cycle filter. Beautiful condx, with manual: \$250.00; NCX-3, NCX-A, NCX-D with E-V 600E mike. All in perf. condx with manuals and 2 extra final tubes, \$325.00. C. Boutell, Ex/W5YSK, 901 Nicholson Avenue, South Milwaukee, Wisconsin 53172.

WANTED: For personal collection. Original Edition of "200 Meters And Down." Bob Woodburn, K6SHX, 1234 Yuba Ave., San Pablo, Calif.

JOHNSON T-R switch, \$12.50, W9PIO.

SELLING: Eico #720 with Nopice crystals \$50.00; Gonset Super 12 converter, \$40.00. K1N1J, 217 Arthur, Springfield, Mass. 01104.

COLLINS S/Line 75S-3, 32S-3, -30-L, \$1250. Sell as a unit. Gonset IV 2-Meter with VFO, \$225.00. All units like new, un-used, 40 hours on air. H. P. Westler, W6OKQ, 848 University Ave., Palo Alto, Calif.

HT-33, Anyone in D.C. area with operating HT-33, please call CL-1042, W4ABK.

SELL: NCX-3 transceiver, home brew A.C. power supply with built-in speaker and Johnson Matchbox, (250 watts), \$250.00. package deal, perfect condition. Instructograph with 9 rolls of tape, \$20.00. George Gromm, 1625 Rockaway Parkway, Brooklyn, N.Y. 11236. Tel: CL-1-7147.

HO-170C. Like new! \$190.00. Firm. W5RKR, J. Wondersgem, 1009 Dale Brook Dr., Alexandria, Va.

WANTED: Antenna tuner, W2VZM, David Sachs, 2279 E. 22nd St., Brooklyn, N.Y. 11229. Tel: 212-SH-5636.

New York City: VHF 6 M. Gonset III, flawless, \$125.00; HE-35 xcvr, \$30.00; 80-meter ARC-5 w/heavy p/s, \$40.00. New Original Vbr, bug, \$19.00. Mossberg, 22 cal. (trade for ham equipment?) \$16. WA2OVG, Tel: (212) OX 1-4711.

KILOWATT Amplifier. B&W with matching power supply. Honest kilowatt DC input. In mint condition: \$200.00, Gonset G-30 Transceiver. In excellent condition, \$185.00. Jim Wempa, K3SY, 101 Big Horn Road, Pittsburgh, Penna. 15239. Phone: 412-795-0804.

COLLEGE Student selling HT-37, PIT and VOX, coax relay, Drake 2B and 2AC, HT-4 Tribander, 100 ft., RG8-U. Best offer. Min. \$500. K3CJH, Bob Beach, RD #7, Butler, Penna. 16002.

COLLECTORS' Item: 11 volumes Rider Trouble-Shooting Manuals. Schematics for hundreds of old radios beginning from 1900 on. Western, Atwater-Kent, United, Detrola, International, etc. \$44.00. Motorola 6 FM (52.525) coffin-box transmitter/receiver. Perfect 12VDC and 110VAC p/s, \$70.00; VOX, new printed circuit board w/all capacitors, sockets, resistors, \$11.00. All f.o.b. Richard M. Jacobs, W0ADY, 1015 Glenside Place, University City, Missouri 63130.

GONSET G-76 transceiver A.C. P.S. with speaker. Both in mint condition, \$190.00. Will ship. WIDBL, Vaughn, 371 Village St., Medway, Mass. 02053.

SELL: HT-44 w/p.s. Limited operating time. Only on air for forty days. Your best offer. WA3ADV, 18 Frederick's Court, Ashley, Penna. 18706.

DIGITAL Frequency counter bargain. Seven digit decimal readout, 10.5 megacycle range easily extended to 150 megacycles with simple heterodyne technique. First \$500 offer takes, with free delivery in SF Bay area. Send 25¢ and SASE for photo and data. W6VEP, 526 Victory Ave., Mountain View, Calif.

RATY Channel Filters, octal mounted, 2125/2975 cps, \$5.95 pair, 88 mhz, toroids, uncase, 5 for \$2.50. Herman Zachry, WA6IGI, 3232 Selby Ave., Los Angeles, Calif. 90034.

SX-101 MK III, \$150.00; Viking II, \$75. Gud condx, with manuals Will ship f.o.b. L.I. hams welcome to inspect. Many components, odds 'n ends cheap. Claude Kramer, W2AWBL, 11 Verbera Dr., Commack, N.Y. Tel: 516-543-237.

GALLUPS Island, resident radio school, wanted: Class 1989 information on obtaining one, R. Taylor, R 32, WIOCO.

ANTENNA Material, thin wall (.040-.050) aluminum tubing to 40 ft. length, audio generator, \$15.00. Heath (H)-1A, GDM, 1/4 swaged to take 1" for elements, \$2.50; swage and 3" inside 3" for booms, \$3.00/swage. Picco, 4410 Mission Blvd., P.O. Box 2346, Pomona, Calif. 91766. hPhone 714-628-8957. Over \$50 prepaid, frt 10% higher east of Mississippi.

MINT Condition: TR-3, RV-3, AC-3, \$475.00. New TR-4, \$475.00. WIPNM.

QST 1922 to 1958, inclusive, complete run; seventeen volumes 1922 to 1938 inclusive, bound in black buckram. Years 1939 to 1958 are not bound, but complete. Run totals 37 years. They go to best offer over \$111.00. No haggle, firm, P. W. Bartholomew, WÖGER, 1003 Riverside Drive, International Falls, Minn.

HC-348 with spare tubes, IF transformers, power supply, Q-multiplier, S-meter and speaker, \$60. Heath AG-7 sine and square wave audio generator, \$15.00. Heath (H)-1A, GDM, 0.4 to 250 mc \$15.00. All excellent condition with manuals. Local sale preferred, Herbert Ley (ex-W3VYN), One Catenacci Way, Apt. 48, Jamaica Plain, Mass. 02130.

CRYSTALS Airmail: Nets, SSB, Marine, MARS, Novice, etc. Custom finished etched stabilized FT-243 .01% any kilocycle 3500 to 8600 \$1.90. (Five or more same or mixed frequencies \$1.70) (Nets: Ten or more same frequency \$1.35.) (1700 to 3499 and 8601 to 20,000 \$2.50). Overtone supplied, above 10,000 to 100,000 \$3.50. Fundamentals \$1.95. Aud 50¢ each for .005%. HC-6/u metal miniatures above 2000 add 75¢ each. ARRL kits: FT-243; "DCS-50", "IMP" \$9.95. Many other filter and oscillator crystals and kits. Write for bulletin stating needs. Add 10¢/crystal airmail return, 5¢ surface. Crystals since 1933. C-W Crystals, Rt. 2, Box 22-B, Marshfield, Missouri, 65706.

SB-300 new, professional job, \$225.00. Xtra filters, \$18.00. Heath Q-mult., \$8.00. Want 75A4 vernier, filters, G. Zwick, 26 Ridge Road, Smithtown, N.Y. Tel: 516-263-7204.

GOING ORP. Must sell: KW linear, pair 4XC-300A, less h/w voltage, \$75.00. Pick up, WB6NWW, 5349 Abbeyfield St., Long Beach, phone 597-2631.

SELL Hallcrafters Novice transmitter, manual, excellent, crystals, \$75.00. W4BLX, 8907 Tolman Rd., Richmond, Va. 23229.

HOME Brew 6-meter grid with power supply and relay. New Drake 2000 LP filter. New Hy-Gain 4-element 6M beam. SWR Bridge xtal mike. Grid clean rig. \$64.00. F. Dal Modestit, 418 1/2 S. 5th St., Terre Haute, Ind. WA90VV.

COLLEGE Bound. Entire station, including DX-40, S-40, mobile Hustler 80M ant. and 80M converter, Speed-X bug, excellent FVO, etc., for sale. Please write for details! W8EOE, 6918 Westview, Brecksville, Ohio.

FOR Sale: SSB-HT37, \$250.00; SX-111, \$150.00; AM B&W 5100, \$150.00; SX-96, \$125.00, speakers included. Make offer either or both. Can't use here. W0FKP/6 "Doc" Wright, 369A Avenida Castilla, Laguna Hills, Calif.

LINEARS! Limited supply of new B&W LPA-1 linears and LPS-1 power supplies in factory-sealed cartons. While they last, \$375.00 for the matched pair. Phil Francke, 3103--78th St., Des Moines, Iowa 50322.

SELL: Collins vernier knob, excellent, \$7; Hallcrafters SX-28A receiver w/manual, good, \$60; Telrex beams, excellent, 10 mtr. 1-el., \$40.00; mtr. 3-el., \$50.00; 20 mtr. Supermini, 2-el., \$40.00; Motor/Generator PE-103, excellent, \$15.00; Tower, 5 ten-ft. sections, excellent, w/top plate, 3 anchors, turnbuckles, wire clamps, \$65.00. F.o.b. Jackson, N.H. Mack Beal, WIPNR.

PERFECT HW-22 with calibrator, \$130.00. Ben Ball, 5051 Yarrowell, Houston, Texas 77035.

HOUSE: Ranch-style OTH in quiet professional neighborhood near Bell Labs and Fort Monmouth. Trees and open area on 3/8 acre. Seven rooms, 1 1/2 baths, attached garage. Hamshack study and tower with beams. R. Silberstein, WA2UZO, 38 Hollywood Drive, New Shrewsbury, New Jersey 07224.

HALLCRAFTERS HT-41, grounded grid, linear plate power innit, low drive 1000 P.E.P. c.w. 600 watts, AM 300 watts--high drive 1200 P.E.P., c.w. 700 watts, AM 350 watts, \$225.00. George Snow, Box 105, Callery, Penna. 16024. Phone AC(412)-538-5481.

HEATH Keyer, \$30.00; Marauder, Mohawk, Ranger, \$65.00. HQ-180, \$175.00. WA4LIG, 306 E. Gilpin Ave., Norfolk, Va.

SELL: 32V-2, \$125; Valiant I much modified, excellent operating condx, \$125; Class B 811A modulator with PS and negative peak clamper, currently companion to Valiant for ultra modulation, \$50; SX-117/HA-10, mint, \$225; 49FD commercial RTTY receiver, four switchable xtal controlled frequencies in 24 mtr. range, \$50; W3DZZ Tribander, \$30; Jennings UCSX VVC 20-675 pfd with head, \$35. Will deliver within 100 miles radius or ship your expense. K2RMM, 1530 Glenwood Drive, Piscataway, N.J. Tel: 201-968-4003.

TR-4, \$480; AC-3, \$68; DC-3, \$108; RV-4, \$68; factory-sealed boxes, Warranty, naturally, and will sell separately. Mel Palmer, K4LGR, Box 10021, Greensboro, N.C. Tel AC (919) 293-8767.

NYC Area: Mint NC-303, \$225.00; Viking II w/122 VFO, \$200.00; 90T0, keyer, \$65.00; Misher Model EX Signal Shifter, \$20.00. Mark K. Kruberg, WB2HWB, 250 Sharpe Ave., Staten Island, N.Y. 10302. Phone (212) 442-1352.

MINT 200V, \$450.00; Good Viking II and VFO with times sequence keying, \$80; HQ-129-X and speaker, \$60; Heath SWR, \$10. All with manuals. Certified check or m.o. I crate, you pay shipping charges. W5KFN, Leo Kessinger, 2403 Rolland Ave., Alamogordo, New Mexico 88310.

SELLING DX-60A and HG-10 VFO. In gud condition; \$90.00. Carl Wolf offer. WA1CML, 60 Fire Station Road, Osterville, Mass., 02655.

CANADIANS: Collins 75A2 receiver complete with xtal calibrator, speaker, and speaker dnt. Excellent condition, \$275.00. Vc3YX, Box 183, Deep River, Ont., P. Canada.

62S1 for sale or trade, mint condition, never on the air; \$650.00 or will trade for mint condition 30S-1, Frank Juns, Jr., 31 Garrison Rd., Dover, New Hampshire. Tel: 603-742-9564.

WANTED: Telrex TM-30C or TB-320B, Henry 2 K linear; Eimac 3-1000Z, W2MVR, James Gerke, 108-12 227th St., Queens Village, N.Y. 11429.

DX-60 and VFO, new, excellent condition. For \$95.00. D. G. Steffens, K8YVO, 656 Cascade Rd., Cincinnati, Ohio 45240. Phone 825-8333.

SELL: Heath Warrior Linear, \$170.00; TR-44 antenna rotor, \$45.00; 40-ft. Rohn No. 6 tower, with hinge base plate and house bracket, \$80.00. All in excellent condition. WB2IZQ, Carl Zimmermann, 188 Ramblewood Rd., Moorestown, N.J.

DX-60, \$65.00; HG-10 VFO, \$27.50, both for \$90. KØFDL, Cook, 1501 Plass, Topoka, Kans.

SELL: Drake R-4 receiver, in excellent condition. Only used 4 months; \$290.00 firm. WAØÖFX, 405 C Kalen Dr., Overland, Mo.

SELL: Collins 75A-1, \$125.00. Lakeshore Phasemaster II-A, \$120.00. Both for \$230.00. John Logenstein, WB2CVH, 75-08 168 Street, Flushing, L.I., N.Y. 11366.

SX-96, speaker, manual, excellent condition, \$90.00; Galaxy 300, PSA300AC, w/lock, mobile mount, manuals, cables, mint, \$200. W0LWZ, 1030 So. Dudley, Denver, Colorado 80226.

HEATH SWR Bridge, Model AM-12, \$10.00; Heath GD-1B grid dip meter, \$12.00; set of four Millen grid dip oscillators, \$8.00; RCA volt/hyst VTM, \$18.00; electronics design 20,000 ohms per volt VOM, \$15.00; Elicdo SSB transceiver military version Model MIL-100F. Needs some work, \$50.00. Compact Triumph 77 oscilloscope, Model 830, \$25.00. Pilot FM tuner, old FM but \$10.00. OST-CO, Radio magazines, 25¢ each postpaid. Send \$4SE for list. Art Johnson, K2POA, 29 Boone St., Bethpage, L.I., N.Y.

SELL: Heath HW-32 transceiver with HP-23 AC pwr. supply; GH-12 PTT and VOX microphone, HRA-10-1 (100 kc. xtal calibr), and matching xpr, \$150.00; Knight T-150A transmitter, \$110.00; Heath 10-12 laboratory oscilloscope with EF-2 applications course, and PK-1 low capacitance probe, \$80.00; Lafayette KT-320 communications receiver, \$48.00. All manuals included. All units and accessories like new, hardly used, free of modifications and damages (including scratches). Each performs perfectly and meets specifications outlined in its respective manual. Ronald Maloney, 639 Madison St., Brooklyn, N.Y. 11221. Tel: GL 3-5509 (after 7 PM). WB2RZE.

RELAY High-speed Clare mercury-wetted contacts HG-1004, \$8; CREI math course, \$45; Heath IP-12, \$40; tubes 3E29, \$3; Eimac KT-320 communications receiver, \$48.00; dynamotor 6v or 12v, \$6; Sigma 4F relay \$8; Petersen 8 mc. stalk, \$2.00; aluminum 3 1/2" rack panel, \$8; MIT Waveforms book, \$8; 3GP1, \$5; 3BP1, \$5; W2RUK, 7 Charles St., Auburn, N.Y.

75A4 with 3 KC filter, serial 3852, mint condition, original carton, instruction book, will ship USA express charges collect. First money-order \$350.00. Tel: FR8-5972, U. C. Nolte, W6VRF, 5209 Paseo De Pablo, Torrance, Calif. 90505.

FOR Sale: Best offer over \$50. Westinghouse plate trans. 220/440 v. pri. 10 kv. 1400 Ma. sec., with 2 WL678 mercury vapor thyratron rectifiers, fil. trans. and bias supply. William Arndt, Box 6, Rural Ridge, Penna.

SELL: Hallcrafters S-120. As new. Beautiful condition. Less than year old. \$50 includes shipping. KØAPM, 1405 St. Christopher, Columbia, Missouri.

NOVICES! Conar 400 transmitter and Conar 500 receiver, \$50.00. W3DQAS, 425 Market St., Bloomsburg, Penna.

HAMS! We have Swan 350s, Mark I linears, SBE, R4A, TR-4, T-4X, etc. Will beat anyone's prices. Try us. Evansville Amateur Radio Supply, 1306 Division, Evansville, Ind. Tel: 812-422-4551.

HALLCRAFTERS HA-2, transverter converted to 220 Mc; Communicator I V, 220 Mc; Parker preamps 144, 220, 432 Mc; converter Hoth Two; Galaxy Weters, excess my needs, list. WA4PI, Box 4095, Arlington, Virginia 22204.

COLLINS KWM-2, 399 C-1 P10, 516 F2, all mint, \$800; 75S-3B, 200 cycle filter, barely used, \$500; 30L-1 mint, \$350.00; complete package; \$1,625. Also TH-4 beam/roof tower, \$85.00; Ham-M rotor, \$65.00; HA-1 keyer and Vibro-keyer, \$65.00; 10-D mike, DL-1 dummy load, VSWR Superex phones, \$75.00. The works; \$1,900, plus extras. W2FKD, 80 Sprain Valley Road, Scarsdale, N.Y. Phone (914)-GR2-4171.

SELL: Collins 2S-1, 75S1, 1.16 with mike, \$700. B. Green, 51 Elm St., Hicksville, L.I., N.Y. 11801.

SELL: HT-44 and PS-150-120 supply. Used ten hours, like new condx, and still in factory warranty; \$295.00 F.o.b. Also Lafayette HE-45B transceiver, \$35.00 F.o.b. Manual and cables included in factory boxes. Raymond Harrill, WA5GSC, 3508 East Broadway #26, North Little Rock, Arks.

EICO 753 transceiver with solid state VFO and Eico 751 AC supply, Heath HP-13 d.c. supply and Shure con. magnetic mike. New in carton. First check for \$325.00. Shipped collect, WA4TNX, Richard R. Graves, 1003 Hillcrest Dr. S.W., Vienna, Va. 22180.

RTTY Station for sale consisting of Model 19, Marauder, Mohawk, excellent professionally made motorized TU. Some provision for Autocrat. Pick up only after demonstration, \$550.00. K8KBF, George T. Henderson, 1703 Cedar Point Rd., Sandusky, Ohio.

COLLINS 32S-3, 75S-3, 312B-4, 316F-2 and Turner model 403 mike. Fifteen months old, used very little. No time for hamming, \$1,150.00 W5ASKJ, J. E. Harrison, 844 N.W. 1st, Hamlin, Texas SP 4-1797.

NEED Old Ordnance. Sig Corps or other supply catalogs to identify surplus. Write M. Beebe, Box 264, Bethayres, Penna. 19006.

SALE: KWS-1, s/n 1055, with relay, two sets spare final and complete set spare tubes, \$650.00. Telrex TM-30, \$150.00; 75A-4 filters 1.5 and 6.0, \$25.00 each, K5YVR, 356 Roosevelt 944-4508.

WANTED: Tube socket for 4CX1000A, State price, WAØIZS, 5826 South Lozan Court, Littleton, Colorado 80120.

COLLINS 75A-2, \$175.00; DX-40 with 6 Novice xtals and YFO, \$40.00; Super Pro with P/S, \$40; 80 mtr. Class C amplifier exactly as shown page 204 Handbook, \$30. Joe Harris, Box 162, Collins, Ga. 30421.

FOR Sale: Johnson Viking Ranger 1, factory-wired, good condition, \$110.00. Electro-Voice RME 4350-A receiver, excellent condition, \$100. Roger Parmenter, 326 Crowell's Road, Highland Park, N.J.

HAMMARLUND HQ-145XC. Good condition. Sell for \$150.00 plus shipping (or pick-up). Ewing, 301 Beechwood Terrace, Orange, New Jersey. Tel: 201-672-2153.

HALLICRAFTERS HT-37 \$225.00, in exlnt condx. Max Voelgin, K1QIP, 244 Haverhill St., Reading, Mass. Tel: (617) 944-4508.

WANTED: National SO-J-3 and NFM-83-50, WN8SXH, 2143 Pressler, Akron, Ohio 44312.

POSTI-CHECK Extra Class. Amateur Extra and General Class FCC type exams complete in detail and style even to the IBM type answer sheets! A must for checking before taking an exam. General Post-Check consists of 297 questions and explained answers for only \$2.98—Extra Class, 115 questions and diagrams with explained answers, \$2.00. A very good aid to learning and a must in preparation for FCC exams. 138 questions of the 297 in the General Post-Check apply directly to Extra Class also. Get both for only \$4.50 postpaid. Post-Check, P.O. Box 3364, Urbandale Station, Des Moines, Iowa 50322.

TRADE My 6 kc. mechanical filter for 75A-4. Excellent condition. Want 1.5 kc. mechanical filter for 75A-4. Charles Zieleski, 23-27 Public Square, Medina, Ohio 44256.

FABULOUS WRL/Galaxy Duo-Band 84 in stock. Immediate Delivery and priced at \$149 each. Drake T-4X, Drake T-4R, R-4A, TR-4, SB-34, SW-350. Galaxy V in stock. Reconditioned specials HQ-170C—\$189, HT-37—\$199, 2-B—\$189, 75S-1—\$259, TR-3—\$399, SW-140—\$119, SW-120—\$119. Send for complete listing. New 2 kw Gonset GSB-201—\$289, SW-350—\$349. Galaxy V—\$349, SB-34—\$349, TR-4—\$529, Demo Ham-M Rotator \$89. New Swan TCU-859, 2 kw Coax Antenna Switch, \$7.95 prepaid, new SB-33—\$239, 2 watt—\$129, NC-300—\$139, 32V-3, \$149, 20A priced at \$119, DX-100—\$69, DX-100B—\$89.00. Send for list—EDWARDS ELECTRONICS, 1320 19th Street, Lubbock, Texas, 806 PO-28759.

SB-33 Transceiver, mint, \$295.00 or trade for 75S3-B, 312B-4, or KWM-2, 312B-5, etc. WA4LXX, 251 Collier Ave., Nashville, Tenn. 37211.

NOVICE Station: Homebrew 75W c.w. transmitter in cabinet plus excellent BC-348-P receiver with built-in power supply \$120.00. WA9QHA, 134 Palm, Barrington, Ill.

ELECTRONICS Teacher, Ham Radio Operator. Two positions open in boys' camp in Berkshires, Mass. for electronics counselor and for ham radio operator. Camp has full equipment and going program. Long established camp, rich opportunity to work with highly talented staff. Camp Mah-Kee-Nac, 377 Irving Ave., South Orange, N.J. 07079.

HT-37 For sale: \$225.00, very good condition, f.o.b. Chicago. Wanted: 2nd Edition ARRL Mobile Manual, 5th Ed. Hints & Kinks, and Dec, 1940 QST. James H. Scott, W9CWE, 706 N. Elmhurst Ave., Mt. Prospect, Ill. 60056.

SELL: TH-3 beam, new, sealed carton, Leon Steinhenger, W2EVP, Phone 212-BU-24737.

SAN DIEGO Transmatch 600W, \$25.00, RME 4350A rec., \$80. T-R Switch, etc. Yarwood Apt. #8, 4111 Illinois St., San Diego, Calif. 92104, Tel: 281-0679.

SELL: Like new condx; Matchbox, 275 w. with coupler and SWR bridge, C-E MW2, \$75.00; Tuner, Carter, 2000 ft. band, \$21.00; B.F.O., Lafayette Grid Dipper, \$20.00; 2 Dow-Key coax relays, 110v., \$9 each. Comaire 6 M tuner, no bridge, \$15.00; good condx Qser with AC supply, \$16.50; never used. Hy-Gain band trap doublet model 5BDTQ, \$25.00; Steward K8HBR, Marine P.O., Detroit, Mich., 48222 c/o S. S. Schoemaker.

KWM-2, 516F-2, late serial numbers. Like new, one owner. \$795.00. E-V mic., w/stand, \$27.50. WA9DSY, Rinehart, Tel: 812-4-7620.

WGN at Hamvention, new Drake R4A, \$325.00; TX4, \$325.00; NCL 2000, \$500. Have SX-111, excellent condition, \$150.00. W8HDB, tel: 513-522-6310.

COLLINS 75S1, 3251, 516F-2 supply, \$700. Heath Warrior, \$100.00; first \$850 gets whole station, including monitor scope and D-104 mike. Frank Darke, 13C Hampton Arms, Hightstown, N.J. 609-448-4014.

WANTED: Gonset model #3024 (2 meter) VFO and audio pre-amplifier, mint condition only. W3TEC.

SELL: 75A-4 mint condition, serial 3228 with reduction knob, \$400. W0YMZ, 13512 Applewood Dr., Grandview, Mo.

HT-37, \$210.00, no shipping, sry. WB2OLN, 54 Dorchester Road, Rockville Centre, N.Y.

SELLING Tubes, capacitors, 4X150As, \$6.00; 813s, \$8.00; 813As, \$15.00; 4X500As, \$40.00. Send for list. Need vacuum variable capacitor 10-400 Pf/10 Kv. WA8FVD, Menominee, Mich.

SUMMER Specials: 75A3, \$249.00; 75A4, \$379.00; 75A-1, \$135.00; LPA-1 and LPS-1, \$275.00; P&H 400, \$79.00; SX-111 \$139.00; 2A, \$159.00; 2B, \$179.00; SW 350, \$325.00; SW240, \$225.00; Valiant, F.W. \$135.00; GSB100, \$205.00; LSA3 w/d.c., \$150.00. Many others, free list. Howard Radio, P.O. Box 1269, Abilene, Texas 79604.

HW-32 with AC/P/S, mint, \$125.00; new SB-34 factory carton, \$345.00 GSB201 linear, mint, \$195.00, new Ham-M rotor, \$100.00; 7111 M, Mt. Vernon Road, Evansville, Ind. Tel: 812-4A 2-115.

CENTRAL Electronics 100V, Sn 922, late model in perfect condition. Professionally packed in original crate, \$395.00. J. Jenitt, 600 E. 72nd, Kansas City, Mo.

HAM Musicians! Sell or trade for ham equipment; Hohner chromatic 64, WA2VZV, 2115 E. 27th St., Bklyn, N.Y. Tel: SH 3-3525.

A GOOD BUY: Hallicrafters HT-32B, in good condx. Asking \$300. W4YGX, Box 746, Melbourne Beach, Fla. 32951.

ANTIQUÉ Gear: Murdock rotary gap, Eico rotary variable condenser, Helix, 2 slide tuning coil and loose coupler made by Menominee Mfg. Co. in Michigan, Splitdorf one-inch spark coil, Eico coherer, Ferron detector, two homebrew loose couplers, catalogues from Duck, Eico, Clapp Eastman, and others. Also pair of Baldwin phones and pair of Brandes phones, also homebrew variable condenser. The above has been in my possession for nearly 60 years. Sell only as a group. No items sold separately. Price \$500 F.o.b. Joe Mullen 101 Ferncliff Drive, Williamsburg, Va. Phone 229-6071.

TELREX Beams wanted for 10 and 15 meters. Would buy model 313B or 518B for 10 meters and 317B or 525 for 15 meters. State price, age condition. Interested in 70 ft. tower, commercial rotator and indicator but no Ham-M acceptable. David Haymond, 61 Norwood Road, West Hartford, Conn.

SALE: Galaxy V, like new. AC power supply with speaker console, DC power supply and complete mobile installation, including Hustler antenna for 80, 40 and 20, \$525. Gerald Roles, 5305 North Drexel St., Oklahoma City, Okla. Tel: WI 2-3159.

GENERAL Coverage receiver, HQ-145X. Excellent, \$125.00. SP-44 Panadapter 455 kc., \$25.00, Par-Metal 42 inch cabinet with door, \$10.00, WA9NQM.

SELL: Gonset Linear 500 W, manual and power supply, \$89.00. Los Angeles area only. Phone 254-2344. William Hanberry, KoMoPT, 1340 Mountain View South, Pasadena, Calif. 91103.

"HOSS-TRADER" Ed Moory needs folding money to pay for the new Collins Communication Van just purchased to display at hamfests and conventions. Requests for Van welcomed. New equipment in factory-sealed cartons: cash only! SR-500, reg. price, \$395.00, special price: \$299.95; mobile package, new SR-160, P-150 D.C. supply and MR-160 mobile mount, reg. price, \$475.95, cash price: \$249.95; Eico model 754 Tri-Band transceiver, mint, \$159.95; 1000 ft. match, \$64.95. Factory warranty demonstrators: SB-34, \$329.00; TR-4, \$479.00; R-4A, \$339.00; NCX-5, \$519.00; NCL-2000; \$499.00; Ham-M rotor, \$89.95; Swan 350, \$339.00. No reasonable cash and no-trade offer refused on ham equipment. Ed Moory Wholesale Radio, Box 506, DeWitt, Arkansas. Tel: Whitney 6-2820.

WISH To buy: U.S. Transceiver or transmitter and receiver doing SSB AM for OM Domic. France. Send offers to F2UA, Boite Postale 5, Lille, RF, France.

QSTS: 1922 thru 1965, complete run. Make offer. K. N. Emerson, 862 Clear Ave., St. Paul, Minn. 55106.

SELL: 40W 40 mtr. xmt in professional steel cabinet, perfect for Novice. Will include manual, key, xtal for Novice, only \$20. New Lafayette HA-50 VFO, \$20.00. Confirmed QSOs with 11AZ, G3OFA others. Call 836-4589 New Milford, N.J. WB2PAR, "Tom", 1090 Arlington Road.

COLLINS 75A-4 S/N 3390 and KWS-1 S/N 1069 and power supply, all factory updated late 1958. Excellent condition and new appearance. Complete with antenna relay and factory shipping cartons. Receiver, \$375. Transmitter, \$650.00. Both for \$1000. No trades! W0LJS, 2001 W. 97th, Leawood, Kans.

FOR SALE: KWM-2 with 516F-2 p/s and 312B-4. Also 75S-3B. All in mint condition and used only about 8 hours. Practically still under warranty (12-7-65) with original cartons, manuals, covers, etc. Will accept 20% off list prices. Jack Flott, K1FVG, Ferndale Farm, Woodbury, Conn. Tel: 203-263-2341.

SELLING: Apache, \$143.00; SB-100 with H.B. A.C. power supply, \$380.00. Prefer pick-up deal. K1FRG, Charles Voboril, R. 1, West Willington, Conn. 06279.

SELL: Pair 813s, in grounded grid with heavy-duty power supply. Needs some work. All parts present, \$100 or your best offer. WA4QNM, R. A. Smeds, WA4QNM, Rte. 3, Box 417, Williamsburg, Va. 23185.

WANTED: KWM-2 and 312-B2, late serial number, in excellent condx. from the L.A. area. K0PXB, P.O. Box 974, Rosamond, Calif. 93560.

SELL: LA-400C linear, \$90.00; Viking Navigator, \$100.00; Gonset G-50, \$200.00; Drake T2, \$215.00; Motorola 80D 6M 6 volt w/ control knob and cables, \$60.00; Northern 115 Master osc. \$100.00; M-P 200B audio oscillator \$75.00; RC-5 VFO, \$20.00; Heath SB-10 partly wired, less tubes, \$40.00. Larry Aikoff, K2DXV, 1660 Topping Ave., Bronx, N.Y. Tel: 212-878-1893.

SELL: R-100A receiver with S-meter, xtal calibrator and spkr. In superb condx: \$75.00. Ron Cline, Box 387, Orday, Colorado.

DRAKE TR-3 transceiver w/AC-3 power supply and RV-3 remote VFO, \$550 or best offer. WIYCH, 33 Brookdale Road, Natick, Mass. 01760. Tel: 655-1592.

DRAKE 2B, 2AC and 2BQ; like new. \$200.00. Vibroplex Champion bus, \$10.00. All with original cartons and manuals. WA2NSJ, Raymond Stern, 200 Cabrini Blvd., Apt. 96, New York, N.Y. 10033.

WANTED: Heath SB-10, manual, State price. Self; Eico 723, \$205.00; HG-1 VFO, \$25.00, WB2QAL, 147 Valley Run, Cherry Hill, N.J. 08034.

WANTED: Collins 310B3 or B-1. Cash or 4-400 plus. W2LPZ. SELL OST 1925 to 1950. Also few CQs, R-9s and Radio Magazines and old ARRL Handbooks. Sell all or part. Write: Charles Leins, WA2VX, 89 Oak Ave., Westport, N.J.

SELLING Out: Hammarlund HQ-170C, HX-50, HXL-One, packages, deal. \$100.00. All perfect condx and like new condition. Dr. J. L. Windeck, 1125 Miles St., Chippewa Falls, Wis.

75A4 Wanted: State serial No., what accessories, and price. Charles W. Rogers, Manassas, N.J.

BRAND NEW: SR-160 with DC PW supply, Hustler ant. with 20-40-75 sections. Turner hand mike, \$329.00. List for over \$500. Used DX-100B, perf. condx, \$120.00. HQ-110C with spkr, \$125.00 and both for \$210.00. John Harlin, 944 E. Normal, Springfield, Ohio.

50 Ft. Rohn H/D/G Tower, W3DZZ, Trib-Band beam, CDR rotator w/brake, cables, suys, \$200.00, PRM-7 with power supply, Viking I, Eldico keyer, Xclnt condition. WIUZR, Tel: 617-528-1810.

RARE Find! First edition, 1926 ARRL Radio Amateur Handbook. Recently discovered. Superb mint condition. Best offer accepted. Write K9BBK, Vergne Peterson, 225 Greenwood, Evanston, Ill.

GALAXY 300. AC supply, PSA300 console w/clock, mint condition, \$250.00 postpaid. WA8MLK, 1937 Middle Bellville Rd., Mansfield, Ohio 44904.

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HALLICRAFTERS SR-46 with HA-26 VFO, mobile kit and halo, new, factory warranty. In A-1 condition. \$225.00. Craig Pitcher, WA9HRN, 580 Crooked Lane, Barrington, Ill.

CLEGG Climaster Zeus 331 complete, perfect condition. Finest high power transmitter 6 and 2, \$395.00. T. S. Valpey, Mellen St., 87 Holliston, Mass. 01746.

TR-4, AC-3, MS-4 350 Turner 4246 B&W filter; Heath reflectometer 40-20 dipole, complete, new, December. All for \$525.00. F.o.b. W. Simonson, K6JVT, 1247 Encinitas Road, D-3 San Marcos, California 92069.

CHECK my two-meter standing (16S0)! For sale: Johnson 6&2, Eico modulator, Heath supply, Viking VFO, \$200.00; NC-303, \$225.00; Ameco 2M Navigator converter, \$30.00 and Ameco 6M converter, \$20.00, both 30.5-35.5 Mc. I. F.: Johnson 6 & 2 converter, \$40.00. WAZRAT, 3110 Kingsbridge Terrace, Bronx, N.Y. Tel: 212-543-5716.

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COLLINS 75S-1 receiver, \$275.00. Wait Williams, W5YUO, 4928 Cockrell, Ft. Worth, Texas.

SELL: Heath DX-100B, Johnson filter, Astatic microphone; National, NC-300 w/xtal calibrator, matching speaker; Solar, 6 meter transceiver (fixed or mobile); best offer. Leonard Friedman, 108-45 63rd Road, Forest Hills 75, L.I., N.Y. Tel. (Evenings) 212-IL9-3098.

BRAND New (still in carton) Model #460, factory wired Eico CW Wide Band Oscilloscope, also Heath EF2 book and practice chassis, also book "Oscilloscope Techniques". Value \$143.00. Best offer over half. WIKLIG.

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FREE Valiant with the purchase of Heath Model OM-3 oscilloscope, \$235.00. W2RUK, 7 Charles St. Auburn, New York.

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HEATH Warrior Linear with 811A's, \$150; with VE572Bs, \$175.00. With VE572Bs and separate 2 Kw, 1.2 amp. power supply for 2 kw, PEP, \$260. Take your choice. HO-13 spectrum monitor, \$55.00. Bob Strasser, W6KWU, 1332 Paloma, Belmont, Calif. Tel: (415)591-7550.

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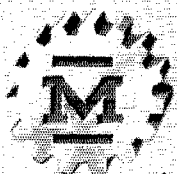
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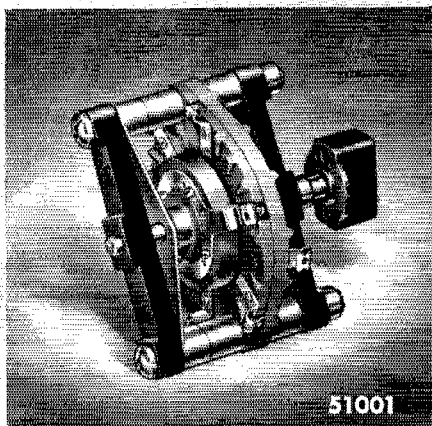
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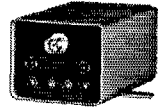
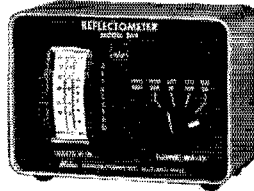
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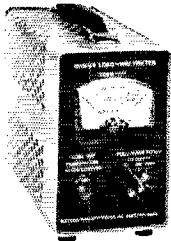
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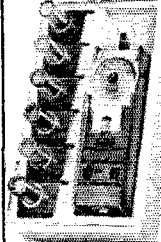


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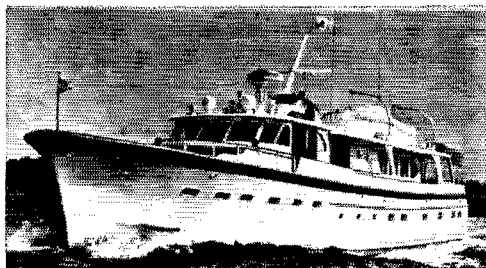
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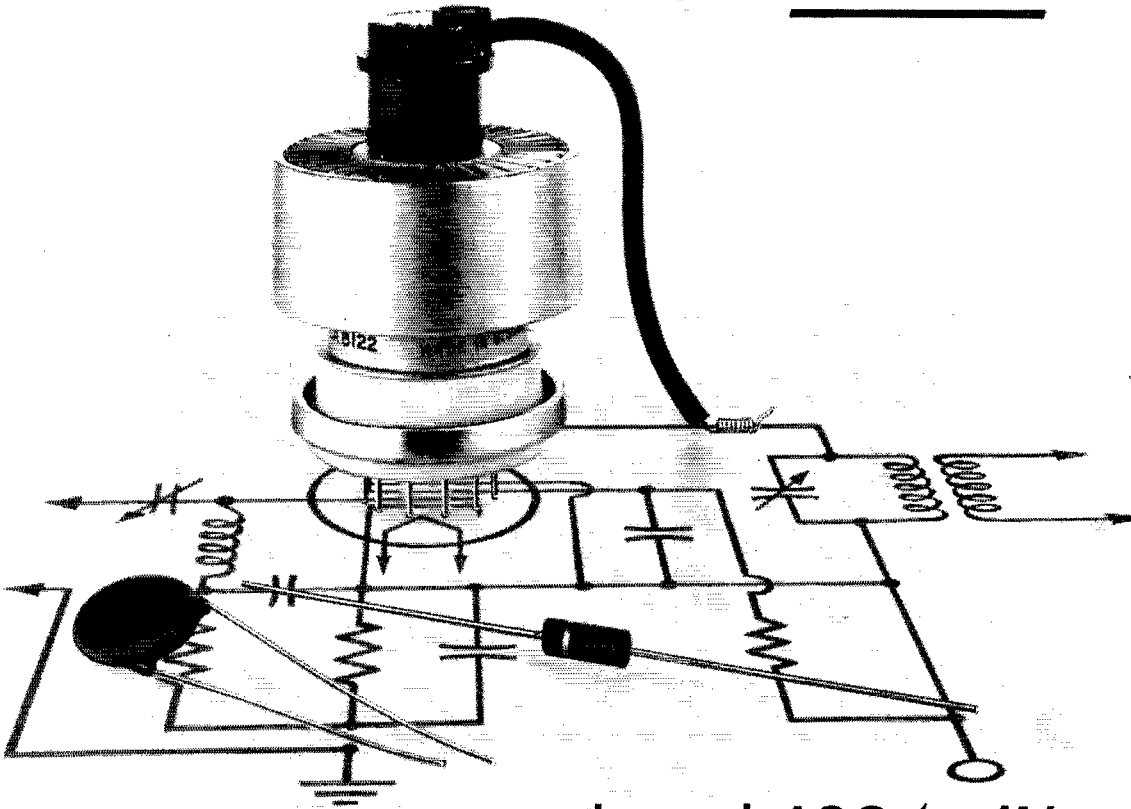
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