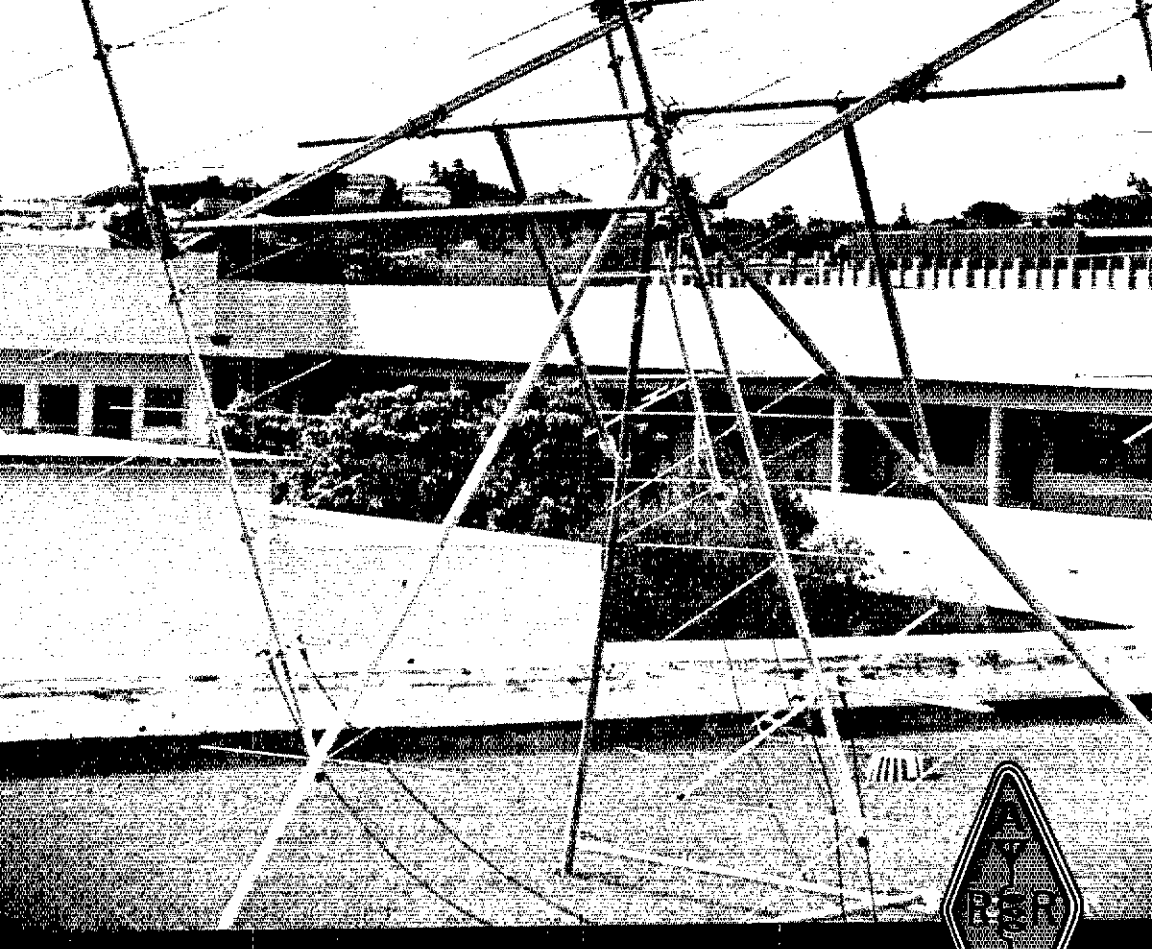


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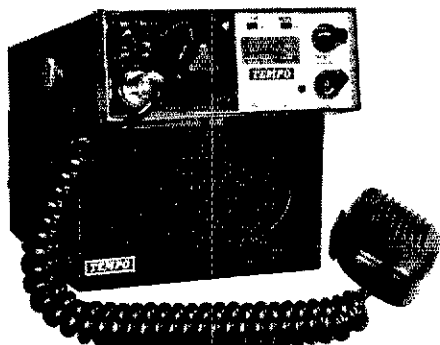
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Amateur FM Comes of Age



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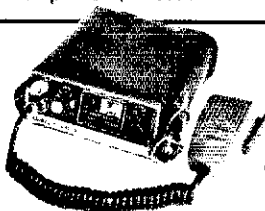
As new as tomorrow! The Tempo Commercial Line VHF transceivers offer commercial performance at amateur prices. Both units include an audio limiter to assure constant deviation at all times and an instantaneous impulse squelch. Microphone, power cord, mounting bracket and one pair of crystals is included.

- Frequency Range: 220-225 MHz (2 MHz operating range)

- Number of Channels: 12 channel capability for transmit and receive
- RF Power Output: 10 Watts or 3 Watts.
- Audio Output: 2 Watts minimum w/internal speaker (at less than 10% distortion)
- The price: \$329.00 w/out power supply

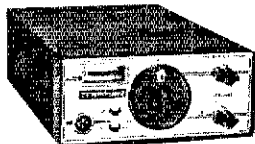
TEMPO/CL 146

- Frequency Range: 146-148 MHz
- Same general specifications as CL 220
- The price: \$279.00



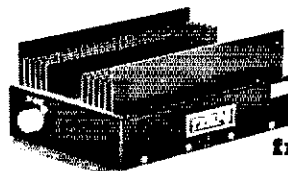
TEMPO/fmp

Truly mobile, the Tempo/fmp 2 meter 3 watt portable gives amateurs 3 watts, or a battery saving 1/2 watt. FM talk power anyplace at anytime. With a leather carrying case included, this little transceiver will operate in the field, in a car, or at home with an accessory AC power supply. The battery pack is included. The price: \$225.00 (Accessory rechargeable battery available: \$22.00)



TEMPO/fmv 2

So much for so little! This little 10 Watt VHF FM transceiver offers high quality performance and features usually found only on more expensive units. Features such as AFC on receive and separate switchable Transmit/Receive sections. Includes mounting bracket, heavy duty power cord and provisions for accessory AC power supply. Frequency: 146-148 MHz, 11 channels, 25 KHz channel spacing, 13.8 VDC $\pm 10\%$ operation (standby -100 ma, receive -150 ma, transmit -3.0 amp.) \$199.00



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TPL 252-A2	1W	25W	2M	\$ 85.00
TPL 445-10	1 to 2.5W	12W	440MHz	\$125.00
TPL 445-30	4W	30W	440MHz	\$215.00
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TCP 12A Control Head ...				\$32.00



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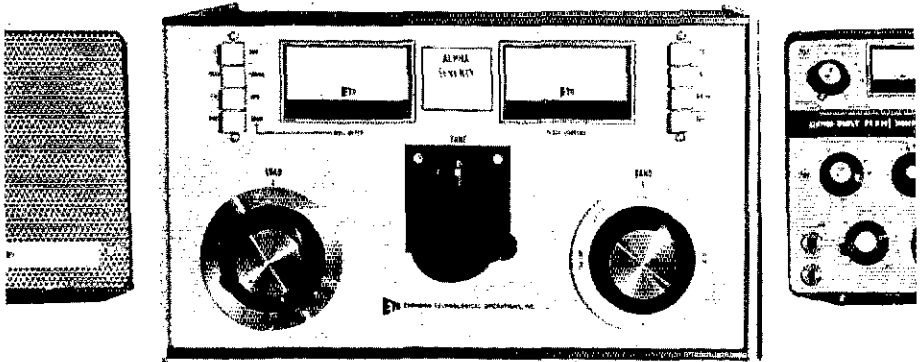
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OUR COVER
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QST

JANUARY 1973

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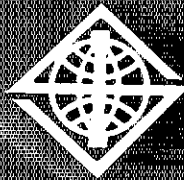
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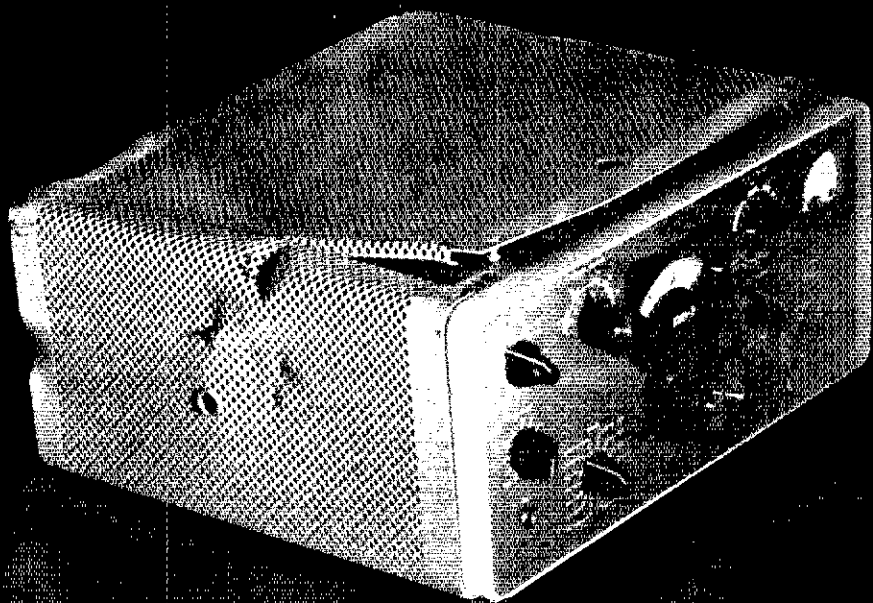
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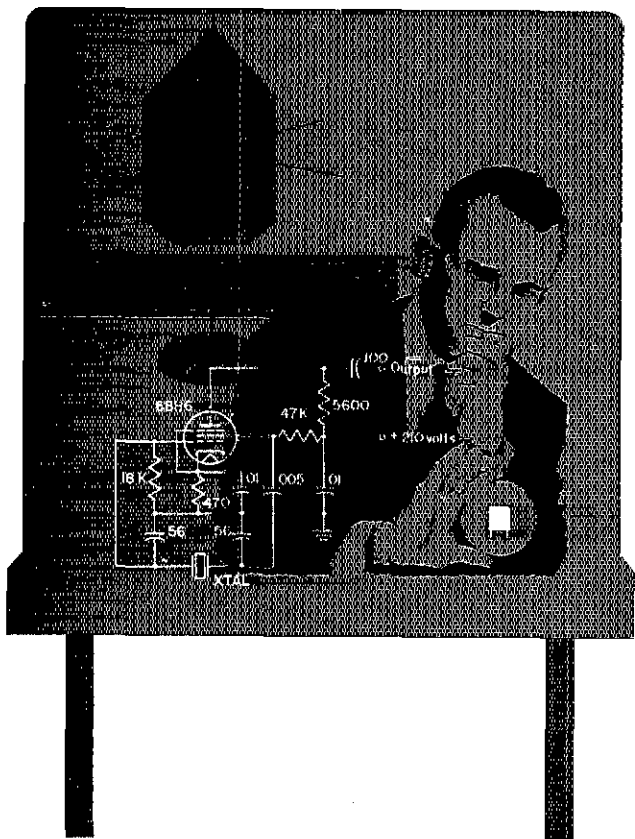
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925 N. Trezevant St., Memphis, TN 38108
Great Lakes Division
ALBAN A. MICHEL W3RWC
859 Ronham Rd., Cincinnati, OH 45215
Vice-Director: Richard A. Egbert W8ETU
6479 Red Fox Rd., Reynoldsburg, OH 43068
Hudson Division
STAN ZAK K2SJO
13 Jennifer Lane, Port Chester, NY 10573
Vice-Director: George A. Diehl W2IHA
30 Wilson Ave., Uxaham, NJ 07928
Midwest Division
RALPH V. ANDERSON K0NL
528 Montana Ave., Holton, KS 66436
Vice-Director: Paul Grauer WA0LLC
Box 180, Wilson, KS 67490
New England Division
ROBERT YORK CHAPMAN W1QV
28 South Road, Groton, CT 06340
Vice-Director: John C. Sullivan W1HHR
Whitney Road, Columbia, CT 06237
Northwestern Division
ROBERT B. THURSTON* W7PGY
7700 31st Ave., N.E., Seattle, WA 98115
Vice-Director: Dale T. Justice K7WWR
1369 NE Sunrise Lane, Hillsboro, OR 97123
Pacific Division
S.A. "DOC" GMELIN W8ZBJ
10836 Willowbrook Way, Cupertino, CA 95014
Vice-Director: Albert F. Gaetano W6VZT
115 Old Adobe Road, Los Gatos, CA 95030
Roanoke Division
VICTOR C. CLARK* W4KFC
12927 Popes Head Road, Clifton, VA 22024
Vice-Director: I. Phil Wiker W4ACY
4821 Hill Top Road, Greensboro, NC 27407
Rocky Mountain Division
CHARLES M. GOTTERELL W0SIN
430 S. Swadley St., Lakewood, CO 80228
Vice-Director: Allen C. Auten W0ECN
6722 West 87th Ave., Arvada, CO 80003
Southeastern Division
LARRY E. PRICE W4DQD
928 Trinidad, Cocoa Beach, FL 32931
Vice-Director:
Southwestern Division
JOHN R. GRIGGS* W6KW
1273 13th St., Baywood Park, San Luis Obispo
CA 93401
Vice-Director: Gary A. Stillwell W6NJU
7164 Rock Ridge Terrace, Canoga Park, CA 91304
West Gulf Division
ROY L. ALBRIGHT W5EYB
107 Rosemary, San Antonio, TX 78209
Vice-Director: Jack D. Gant W5GM
521 Monroe, N.W., Ardmore, OK 73401

* Member Executive Committee

"It Seems to Us..."



1972 — RETROSPECT

FOR THE CHINESE, the year just finishing is the Year of the Rat. For radio amateurs, it might be called, "The Year of the Regulations." Matters fallow in the Docket Room at FCC for months and years were dusted off by an Amateur and Citizens Division once again at full strength and were laid on waiting hamdom.

In magnitude the first was the "Repeater Docket," number 18803 — but which should also be called the "mobile docket" and the "logging docket" and the "which-call-to-sign" docket, for it touched on all these things and more. In short, it affects every amateur no matter where he operates or by what mode. To cover the matter again here thoroughly would call for a repeat of the dozen pages spent on the subject in October *QST*. But highlights were these: For Technicians — use of the 2-meter band was extended to 145-148 MHz. For everyone — rules for logging, especially for mobiles, and for unlicensed people sitting in at an amateur station were eased; and a fixed station's call sign will be used whether it is being operated by the licensee or a visitor.

The docket also gave recognition to repeaters as part of the amateur scene. The rules were far closer to our desires than the original offerings of Docket 18803; nevertheless, there were some bony points (and a couple dozen petitions for reconsideration are awaiting FCC action as we write). By July 1, 1973, all repeaters will have distinctive calls beginning WR. Their effective radiated power will range from 25 to 800 watts, depending upon the height of the antenna above average terrain and the frequency in use.

Then there was the "Eyebank Matter," resulting from a Notice of Inquiry (Docket 19245) into amateur handling of traffic for such organizations as the Eyebank and the Red Cross. The Report and Order here removed the ambiguously-interpreted phrase, "nor for its use," from section 97.39; added new definitions of third-party and emergency communications to 97.3; and added new 97.114 prohibiting international third-party traffic (except where there are agreements), traffic involving material compensation to anyone, and communications which facilitate the business or commercial affairs of any party. FCC's action did little to clarify the situation or to please the traffic-handling contingent. And a suit has been brought in the U. S. Circuit Court at New York against FCC for its handling of this subject!

Another new interpretation goes along with the changes: FCC says a station such as W1AW needs a waiver of these rules in order to continue using paid control operators (waiver granted!). Accordingly, a new Notice of Proposed Rulemaking (Docket 19605) was issued, looking toward permanent rules for such special stations.

Phone expansion (or the lack thereof!) was another topic handled in 1972 by FCC — Docket 19162, which gave voice operators generally more space on 80 and 40 — but no actual expansion on the 10-, 15-, or 20-meter bands. The docket actually did more for "Novice lib" than for phones — the Novice band shifted downward on 40, becoming 7100-7150; shrunk a bit on 15, to 21,100-21,200 kHz; the remaining privileges on 145-147 MHz were lost to Novices — but what made it all worthwhile was gaining a new segment at 28.1-28.2 MHz and getting the right to use VFO control rather than crystals. This Report and Order, too, was challenged — the League asked for partial reconsideration, feeling that the frequencies 3825-4000 kHz ought to be available for Conditionals and up, since these frequencies bear the brunt of amateur message handling and emergency preparation.

Another action lowered the "prior service" requirement for Extra Class from two years to one; granted code-test credit to former holders of old Extra First licenses, to current holders of First Class radiotelegraph tickets and those carrying aircraft radiotelegraph endorsement. All other suggestions embodying some form of "grandfathering" (examination credits based on age or license tenure) were dismissed either in the Report and Order on Docket 19163 or shortly thereafter. Other denials of requests for rulemaking included one waiving fees in cases of financial hardship; splitting the restricted segment of 50 MHz into phone and cw sections; changing the name of the service from "amateur" to "radioman"; prohibiting collect phone calls as a means of delivering traffic; and separating ssb and SSTV; in the last of these it is worth noting that FCC felt that frequency planning and coordination can best be accomplished by amateurs themselves.

Three matters past the "Notice of Proposed Rulemaking" stage awaited final action — Docket 19605, on paid operators, mentioned above; Docket 19572, which

(Continued on page 73)

League Lines . . .

The Technical Symposium which will be held in the Washington, D.C. area during 1973 under ARRL sponsorship is tentatively scheduled for September 14, a day prior to the planned Roanoke Division Convention at Reston, Virginia. The theme will be "Space Communications," which can involve, in addition to direct satellite matters, receiving circuits for narrower bandwidth, vhf (and higher) antennas of all kinds, moonbounce, pulse techniques, and so on. This is a preliminary call for papers. If you have a specialty in this or an allied area, share your experience and skills with others. Or if you know of someone in that category, urge him to apply. In addition to the specific subject we'd like a brief summary of the ground to be covered. Address the Secretary at Hq., please.

Now and then a radio club, wishing to disseminate more information about amateur radio, wants to provide a complete set of League publications for the local library, and propositions us for a special deal. One has now been approved by the Executive Committee. It is half price (\$13.50) for a complete set, provided the request comes from an affiliated club, and it is intended for a local library who will agree in writing to add the manuals to their shelves.

This month we've tried a slightly different approach in the "Recent Equipment" section, in particular a much more complete listing of specifications and ARRL lab measurements. Please let us know your reactions, pro or con.

An excellent movie on ham radio, "Fine Business," has been produced by Ted Sparrow, VE3BQN, as a personal project -- but rated such an excellent job that ARRL purchased copies for loan to Canadian clubs. VE2MS is handling Quebec and the Atlantic Provinces; VE3SU, Ontario; and VE6PK, points west. Hq. Training Aids can supply U.S. clubs.

Demand for "The Ham's Wide World," and its youth-oriented shorter version, "This Is Ham Radio," remains so heavy that bookings are in some cases as much as five months ahead. We are ordering more prints, to ease the pressure. Meanwhile, if you have a more immediate need, try your division director (address page 8) who may be able to fill your need. Remember, please, that the film was produced for general use in public relations, not so much to show at ham club meetings.

Neatest trick of the month. A certain ham magazine editor tells readers that roughly half his circulation is via newsstands. The same person, as publisher, certifies to the Post Office Department that his circulation is by mail subscription and leaves blank the space for entering newsstand figures.

We recently received an inquiry from an upset member checking on the truth of an item in that FB news sheet, "Florida Skip," stating that QST was being discontinued. Have faith! Editor W4IYT had simply reprinted a 1917 announcement, and was offering a prize to anyone who could guess the exact date of mailing.

Want to register your handle? An outfit calling itself International Handle Registry in California offers this service -- to avoid confusion through duplication, of course! -- for four bucks. What will CBers think of next?

FCC Docket 18803, which requires continuous monitoring and control of amateur repeaters, was published in the Federal Register of September 13. Ironically, it immediately followed another FCC announcement of action concerning unattended TV transmitters -- requiring shutdown within 30 minutes in the event of difficulty!

W7IO Newsletter: The Texas State Highway Department has posted many signs along their highways admonishing drivers to "Drive Friendly." Perhaps we can paraphrase that motto to be appropriate to hams all over the country -- Let's always, "Operate Friendly."

A 40-Meter CW Receiver

Designing for Simplicity and High Performance

BY DOUG DEMAW,* W1CER

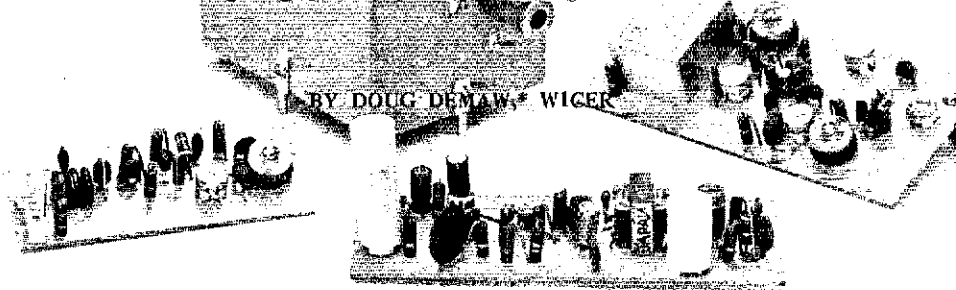


Photo of the four assemblies used in the receiver.

IF ONE is willing to settle for a minimum number of equipment frills but desires good receiver performance, a few corners can be shaved to keep cost and complexity low. The design example shown here is the result of a self-imposed assignment to construct a solid-state 40-meter cw receiver capable of single-signal reception, a high degree of i-f selectivity (500 Hz), low current drain, and good frequency stability. Another requirement was that the smallest number of stages consistent with good performance be employed. Additionally, the receiver must not have spurious responses, should exhibit excellent immunity to cross modulation and overloading, and should have a minimum number of operating controls. Finally, the equipment should be capable of operation from batteries or an ac-operated dc power supply (12 volts dc), and should be packaged in a compact manner.

Some earlier receivers of simple design developed by this writer¹ were of the direct-conversion type. The primary shortcoming in operation was the inability of the circuit to provide single-signal reception. Furthermore, cw selectivity was obtained through the use of peak filters (passive type) in the af circuitry which caused a considerable monotony in operating, brought about by the need to listen to a single-frequency audio tone. At least for this operator, the monotony leads to mental fatigue during long periods of listening.

Having been a long-term QRP enthusiast, the writer has learned that all of the tricks available must be used to assure a maximum number of contacts. Being limited in station effectiveness by very low transmitter power output, the odds need to be improved in every manner possible. Certainly a good receiver can help! But QRP operation often dictates the need for low current drain from the

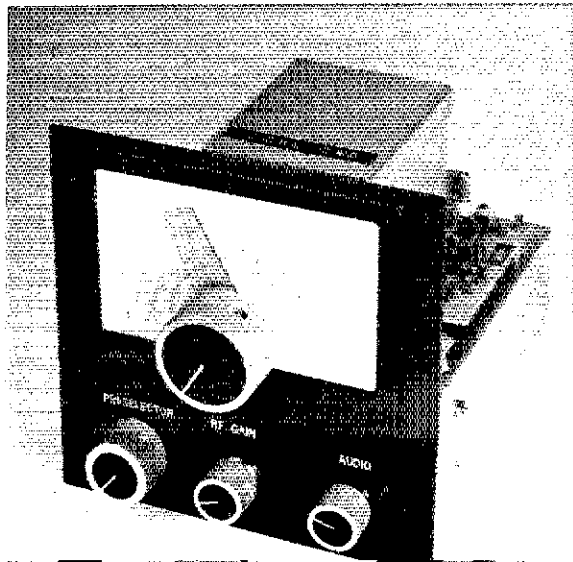
power supply when batteries are used. So it becomes desirable to design for the least number of stages practical. The circuit of Fig. 2 satisfies the requirements discussed in the foregoing.

Design Philosophy

Though the circuit of Fig. 2 is designed solely for cw reception on 40 meters there is no reason why it cannot be modified to provide ssb reception instead. One need only to use a 2.4-kHz bandwidth filter at FL1, retune the local oscillator for operation higher in the band, and use an appropriate BFO crystal at Y1.

Examination of the block diagram (Fig. 2) will show that no i-f amplifiers are employed. Also, a "brute-force" method of rf-gain control is used at the input to i-f amplifier Q3. A conventional agc technique is not applied in the receiver because there are no i-f amplifiers to control. Rather,

Front view of the assembled unit.



* Technical Editor, *QST*

¹ DeMaw, "The D.C. 80-10 Receiver," *QST* for May 1969, page 11. DeMaw, "Once More With QRP," *QST* for August 1970, page 17.

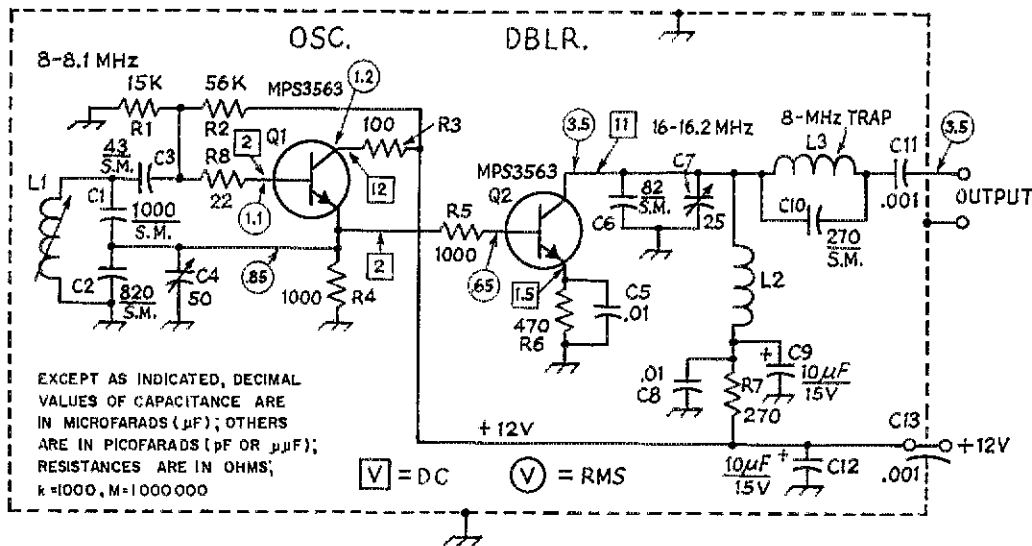


Fig. 1 — Schematic diagram of the local oscillator. Numbered components not appearing in the parts list are so identified for pc-board layout purposes. This rule applies in all succeeding schematic diagrams of this article. Dashed lines indicate shielding. Resistors are 1/2-watt composition. Fixed-value capacitors are disk ceramic unless otherwise indicated. C12 is electrolytic. C13 is a feedthrough type.

C4 — Miniature double-bearing variable. Millen 23050MK used here. (This and other Millen parts specified are available factory-direct by ordering from James Millen Mfg. Co., 150

Exchange Street, Malden, MA 01108.)

C7 — Subminiature ceramic trimmer, 7 to 25 pF (Erie 538-002B-7-25 or equivalent).

L1 — 0.6- to 1.06- μH variable inductor. Q (unloaded Q) = 100 or greater (Millen 69054-0.82 or equivalent).

L2 — Inductor, 0.9 μH , 10-1/2 turns No. 26 enam. wire on Amidon T-50-2 toroid core. $Q = 100$. (Amidon Associates, 12033 Otsego St., N. Hollywood, CA 91607.)

L3 — Inductor, 1.46 μH , 15 turns No. 26 enam. wire on Amidon T-50-2 toroid core. $Q = 150$.

Q1, Q2 — Motorola MPS3563 npn uhf transistor.

provision is made to limit audio-amplitude peaks by rectifying part of the output from U2 and using the resultant dc voltage to reverse bias the audio preamplifier, Q5. Though this system does not provide the dynamic range possible with the more conventional age methods (controlling the gain of an rf amplifier and one or more i-f stages), it does prevent ear-shattering audio-output levels when a strong signal suddenly appears on the frequency being listened to, or when one tunes across the band. The operator can disable the audio limiter by means of S1.

All of the tuned circuits except that of the local oscillator, U1-C1-C2-C4, use toroidal inductors. This eliminates the need for shield cans because of the self-shielding properties of toroids. Greater compactness of the sub-assemblies results from the use of toroids, and hand-wound toroidal inductors are generally less expensive than high- Q slug-tuned coils.

Top view of the receiver. The cover for the local-oscillator box is made from a U-shaped piece of aluminum. It is formed to assure a tight fit, thus remaining in place without the need for screws. The cover makes contact with thin strips of shim brass bent over the edges of the box wall. (See interior view of the oscillator assembly for details.)

Local Oscillator

In the interest of frequency stability the local oscillator (Fig. 1) is operated at 8 rather than 16 MHz. It is followed by Q2, a doubler, that provides a mixer injection frequency of 16.0 to 16.2 MHz. L3-C10 is an 8-MHz trap which helps keep the injection voltage free of unwanted 8-MHz energy. Gate 2 of mixer Q4 is supplied with 1.2 V rms from the oscillator chain. The 40673 FET used at Q4 provides sufficient isolation between the oscillator chain and the preselector tuned circuits to prevent oscillator pulling when the receiver front end is peaked.

The Front-End Circuit

A 500-ohm control is used as a resistive-divider rf-gain control (Fig. 3). A 9-MHz trap is used immediately after the rf-gain control to reduce the possibility of unwanted 9-MHz signals reaching the product detector. The measured rejection is on the order of 50 dB.

A common-gate rf amplifier is used (Q3 of Fig. 3) to provide approximately 15 dB of gain. Source bias is used (R9) to prevent the stage from overloading in the presence of strong signals. Vhf-parasitic suppression is assured by the use of R10 in the drain circuit. Adequate front-end selectivity is provided by the tuned circuits of the rf amplifier. The unloaded Q of each circuit was measured as 160.

A dual-gate MOSFET, Q4, serves as the mixer. The device was chosen because of its excellent IMD characteristics, high conversion gain, and good isolation characteristics between gates 2 and 3. The tuned circuit at the output of Q4 is designed to look into the 500-ohm impedance of i-f filter FL1. A 500-ohm resistor can be obtained for use at R17 by filing away some of the carbon in a 470-ohm resistor. However, performance when using a 470-ohm termination at R17 will be quite acceptable.

Spectrum International recommends that a 7- to 35-pF trimmer be used at each port of their KVG filter to minimize passband ripple. The trimmers were omitted in the author's receiver, and no apparent deterioration in passband characteristics has been observed. There is room on the foil side of the front-end pc board to permit the purist to mount the two trimmers, should he desire them. R18 serves as a parasitic suppressor for Q4. Overall gain of Q3 and Q4, combined, was measured at 33 dB.

Detector and AF Amplifier

There are two advantages in not using i-f amplification: The possibility of IMD and overloading of the i-f stages is eliminated. Also, the cost and complexity pictures become somewhat brighter. Those who are proponents of rf/i-f agc circuits with large values of dynamic range will no doubt disagree with the concept used here, but in the interest of trouble-free performance, low cost, and compactness of assembly, the circuit of Fig. 2 is fine.

The product detector, U1 of Fig. 4, uses a CA3028A differential amplifier which is connected for balanced-detector service. An active detector was chosen so that conversion gain could be obtained, thus helping to make up for the gain that an i-f amplifier strip would have provided. Since the CA3028A operates efficiently into the vhf region, parasitic suppression has been added (R21).

BFO injection at pin 2 of U1 should be set for approximately 2.5 V rms - a value that provides high conversion gain and low IMD characteristics. An rf probe and VTVM can be used to measure the injection voltage at pin 2.

A 10,000-ohm to 2000-ohm (ct secondary) transformer, T1, couples the audio output of U1 to preamplifier Q5. One half of the secondary winding is used. A 0.22- μ F capacitor, C30, is used to remove unwanted high-frequency components

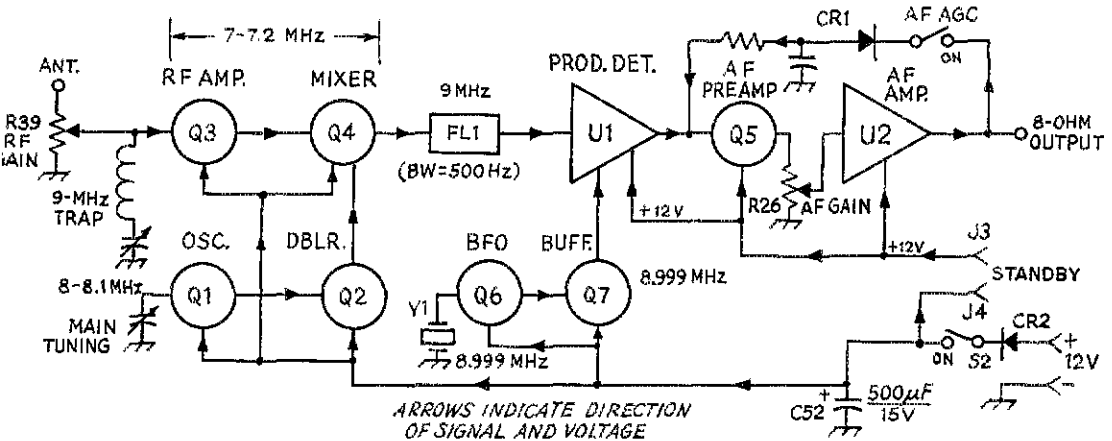
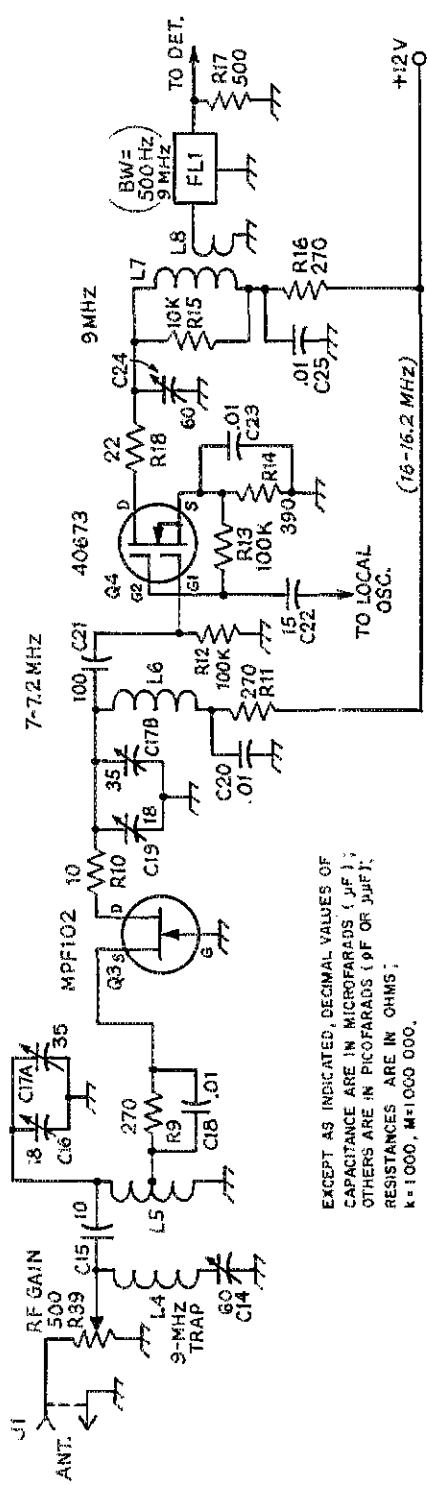


Fig. 2 - Block diagram of the 40-meter cw receiver. CR2 is a 50-PRV, 1-A diode. S1 is part of R26.

MIXER

RF AMP.

7-7.2 MHz



EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS (μF); OTHERS ARE IN PICOFARADS (pF OR pJFT); RESISTANCES ARE IN OHMS; k = 1000, M = 1000 000.

Fig. 3 - Diagram of the receiver front end. Resistors are 1/2-watt composition. Fixed-value capacitors are disk ceramic unless otherwise noted. C14, C24 - Subminiature ceramic trimmer, 15 to 60 pF (Erie 538-002F-15-60 or equivalent). C16, C18 - 5.5-18 pF subminiature ceramic trimmer (Erie 538-002A-5.5-18 or equivalent). C17 - Dual-section 35-pF air variable (Millen 2635RM or equivalent). FL1 - 9-MHz, 500-Hz bandwidth lattice filter (KVG XF-9M, Spectrum International, Box 1094, Concord, MA 01742). J1 - RCA phono jack, single-hole mount. L4 - inductor, 6.5 μH, 30 turns No. 26 enam. wire on Amidon T-50-2 toroid core, Q = 160. L5-L7, incl. - inductor, 9 μH, 40 turns No. 26 enam. wire on Amidon T-50-2 toroid core, Q = 150. L8 - 10 turns No. 26 enam. wire, close wound over Low-Z end of L7. Q3 - Motorola JFET. Q4 - RCA dual-gate MOSFET. R39 - Linear-taper carbon control.

Bottom view of the receiver. The dual-section variable capacitor shown here has been replaced by one with 35 pF of capacitance per section since the photo was made.

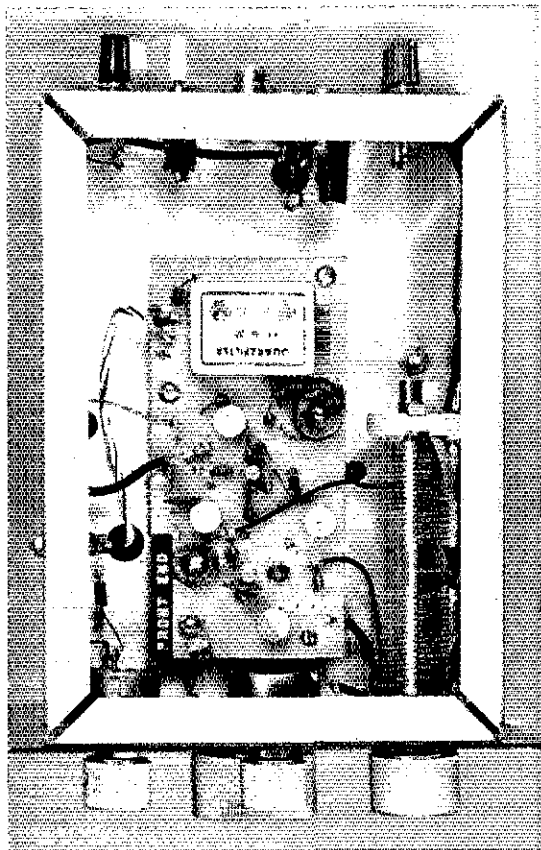
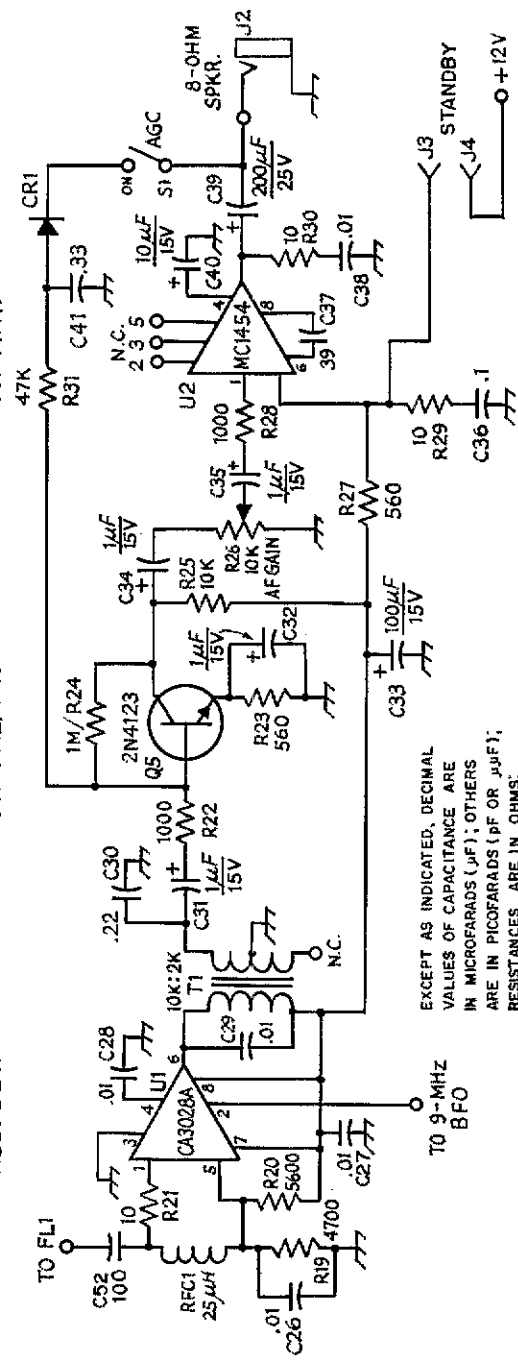
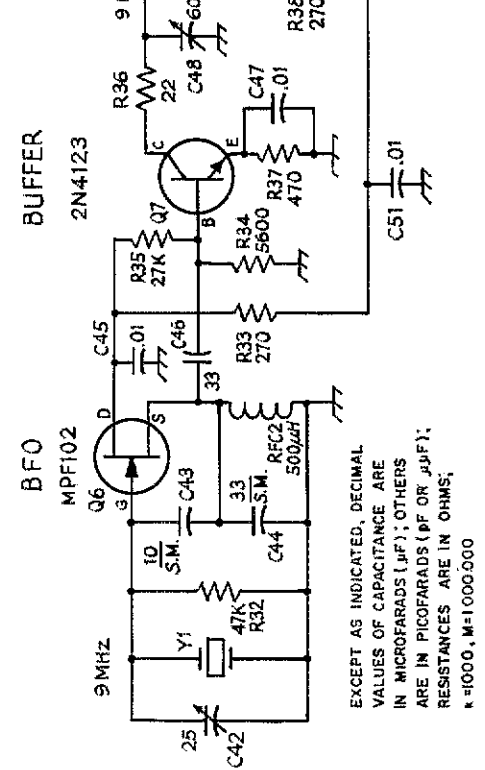


Fig. 5 — Circuit of the receiver BFO section. Resistors are 1/2-watt composition. Fixed-value capacitors are disk ceramic except those marked "S.M.", which are silver mica. C42 — Subminiature ceramic trimmer (Erie 538-002B-7-25 or equivalent) C48 — Subminiature ceramic trimmer (Erie 538-002E-15-60 or equivalent). L9 — Inductor, 9 μ H, 40 turns on Amidon T-50-2 toroid core. Q6 — Motorola FET. Q7 — Motorola npn transistor. RFC2 — 500- μ H rf choke (Millen J300-500 or equivalent). Y1 — 8.999-MHz crystal (available from Spectrum International)

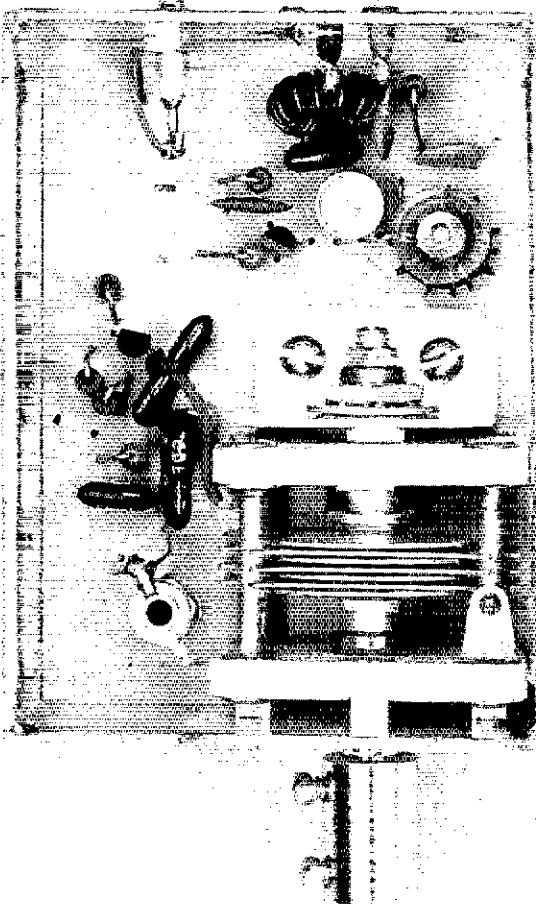


EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS (μ F); OTHERS ARE IN PICO FARADS (PF OR μ PF); RESISTANCES ARE IN OHMS; k=1000, M=1000000

Fig. 4 — Circuit of the detector and audio sections of the receiver. Fixed-value resistors are 1/2 watt composition. Capacitors are disk ceramic or Mylar except those with polarity indicated, which are electrolytic. CR1 — Silicon diode, 1N914 or top-hat rectifier suitable. J2 — Two-circuit phone jack. J3, J4 — Miniature binding post. Q5 — Motorola npn transistor. Any audio type with similar ratings will be suitable. RFC1 — 25- μ H rf choke (Millen J300-25 or equivalent). R26 — 10,000-ohm audio-taper control with spst switch for power on/off control. S1 — Miniature spst toggle or slide switch. T1 — Miniature 10,000-ohm to 2000-ohm (ct) audio transformer (available from Allied/Radio Shack). U1 — RCA differential amplifier IC. U2 — Motorola op-amp IC.



EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS (μ F); OTHERS ARE IN PICO FARADS (PF OR μ PF); RESISTANCES ARE IN OHMS; k=1000, M=1000000



Interior view of the local oscillator. Note shim-brass contact surfaces on left and right upper edges of box walls. The shim stock is soldered to the foil sides of the box walls to hold it in place and to assure good electrical contact.

from the audio output of the receiver. Those desiring greater audio gain may obtain it by increasing the value of capacitance at C32, though plenty of gain should be available with the value shown if a 2N4123 is used at Q5.

The low-cost version of the MC1554 transformerless af-output IC (U2) is used in this circuit. An HEP593 (more costly) can be used in place of the MC1554 without any circuit modifications. Though the IC is designed to deliver up to 1 watt of output into an 8-ohm load, more than enough output is available when using high-impedance phones at J2. Current drain will be considerably less when a mismatch is introduced by the use of high-impedance phones . . . a good feature during portable operation with batteries.

The time constant for the audio-ago circuit can be varied by selecting specific values of capacitance for use at C41. The greater the capacitance value, the slower the decay time. A compromise value of 0.33 μ F is shown in Fig. 4. Good results can be had with no capacitor in the circuit. The age will *not* function correctly unless U2 is terminated by an 8-

or 16-ohm load. If age action is desired when high-impedance phones are being used it will be necessary to connect an 8 to 2500-ohm step-up transformer between J2 and the headset.

BFO Circuit

A rather ordinary circuit is used for the BFO of Fig. 5. The JFET oscillator, Q6, is adjusted to 8999 kHz by means of trimmer C42. Adjustment can be done without test equipment by tuning in a strong signal, rocking the tunable local oscillator (main tuning) back and forth across zero beat, and adjusting C42 for minimum beat-note response on the high frequency side of zero beat. Suppression of the unwanted response is excellent with this circuit.

Buffer amplifier Q7 is used to assure good isolation between the BFO and product detector U1. A single-stage BFO was tried during the development of this receiver, but with sufficient coupling between the BFO and detector to provide 2.5 V rms of injection there was evidence of pulling when strong signals were being received. The condition caused a slight chirp on the detected signal. The impedance at pin 2 of the product detector changes somewhat with respect to the strength of the i-c signal, thereby pulling the BFO. With the circuit shown in Fig. 5 no shift in BFO frequency could be measured with a counter when varying the r-f input signal at J1 from zero to 10,000 μ V. Similar tests were performed on the local oscillator. The latter showed a maximum shift of 5 Hz over the same signal-level excursion.

Construction Features

A more compact assembly could result from the use of a single pc-board assembly. The local oscillator could have been built on the common board without the shield box shown in the photos. The builder may want to try this approach. However, modular construction permits the experimenter to change parts of the circuit without uprooting other sections of the receiver. It was felt that some readers might be interested only in specific parts of the circuit, so individual pc boards were developed for their convenience.²

A 5 x 7 x 2-inch aluminum chassis is used as the foundation for the receiver. A homemade aluminum panel is attached to one end of the chassis by means of the operating controls. The panel is 7 inches high, 6 inches wide, and 1/16 inch thick. A J.W. Miller MD-4 dial mechanism is shown in the photos. It was learned after the project was completed that the dial is no longer listed in Miller's catalog.* A more compact dial of the same general type can be purchased directly from the James Millen Mfg. Company.³ Whatever the mech-

* It was learned just prior to going to press that a dial mechanism identical to the MD-4 is available from Barry Electronics, 512 Broadway, New York, NY 10012. Order a Jackson Brothers No. 4103 dial.

² Scale templates and parts layout are available by sending 50 cents and a self-addressed, stamped envelope (large) to ARRL Hq.

³ See parts list for address.

anism used, it should be smooth running, free of backlash, and should provide a tuning ratio of 5:1 or greater. The Millen dial, No. 10039, measures 4 × 3-9/32 inches and has a tuning ratio of 8:1. A model 10039-D is also available in the same size, but with a 20:1 ratio.

The local oscillator is housed in a shield box fashioned from single-sided, copper-clad, glass-epoxy pc-board material. The dimensions, HWD, are 2-5/8 × 2-5/8 × 3-9/16 inches. The inside corners of the box are soldered together from top to bottom. The VFO circuit board is soldered in place inside the box after all of the holes are drilled in the compartment walls. The completed assembly is secured to the main chassis by means of four No. 6 spade bolts.

The standby terminals, antenna jack, audio-output jack, and operating-voltage jacks are all mounted on the rear apron of the chassis. The af-gain/on-off assembly, rf-gain control, front-end peaking control, and main-tuning dial are located on the front panel.

The panel was abraded lightly with medium-grade sandpaper prior to spraying it dark green. Make sure that the scratches all run in the same direction. By roughing the aluminum in this manner the paint has a better surface to adhere to, thus helping to prevent chipping of the finished surface when the panel is bumped or scratched. Kurz-Kasch S-series knobs are used on the panel controls. Dry transfers are added to identify the controls, and are applied to an aluminum strip (painted dull black) which is cemented to the front panel.

Adjustment and Operation

After the pc-board assemblies are mounted in place on metal standoff posts and the inter-assembly wiring is done, testing can begin. Careful checks should be made for shorted or open circuits before application of the operating voltage — 11 to 14 volts dc.

Calibration of the tunable oscillator is the first order of business. A well-calibrated general-coverage receiver can be used for the purpose while listening to the output from the oscillator or doubler (8 or 16 MHz). Alternatively, a frequency counter can be connected to the output end of C11 and the operating frequency observed on the counter display. Adjust the slug of L1 for 8.0-MHz VFO output with the plates of C4 not quite fully meshed. (The dial pointer should be at 9 o'clock when C4 is completely meshed, and at 3 o'clock when it is unmeshed.) The 40-meter tuning range of the receiver is 6975 to 7225 kHz with the values given in Fig. 2.

The next step is to tune in a moderately strong 40-meter signal (signal generator preferred) and adjust preselector control C17 (Fig. 3) to approximately half capacitance. Then adjust trimmers C16, C19, and C24 for maximum af output at the speaker. The mixer injection should now be adjusted to 1.2 V rms. This can be done by connecting an rf probe to gate 2 of Q4. Adjust C7 of doubler Q2 to get the desired amount of

voltage. Adjustment of the BFO was discussed earlier in the text.

Performance

The receiver has been subjected to critical performance tests by the writer and W1F8Y. Sensitivity tests indicate that the minimum output from a model 80 signal generator (Less than 0.1 μ V) produces a plainly audible cw note at the receiver output. Frequency stability of the local oscillator is excellent. From a cold start to complete stabilization, approximately 5 minutes, total drift is 90 Hz. Drift after that period is somewhat random — 5 to 10 Hz above and below center frequency during operation.

No spurious responses appear in any part of the tuning range, even when W1AW is operating on 40-meter cw a few hundred feet away with high power. This test was performed with a 30-foot vertical antenna connected to the receiver. The signal from W1AW read 8 V rms at the antenna jack of the receiver. W1AW did, of course, completely desense the receiver during key-down conditions. Tests were made under similar conditions, but two blocks away from W1AW. It was possible to copy weak cw signals as close to W1AW's frequency as 10 kHz, and no evidence of W1AW's presence could be detected. W1F8Y, a hard-nosed cw DX and contest operator, put the receiver through its paces at his mountain-top QTH while using a two-element 40-meter beam. His comments were, "I couldn't find anything in the band that didn't normally belong there (spurious responses, images, etc.). As soon as you can give me the pc-board patterns I intend to build one of these for myself!"

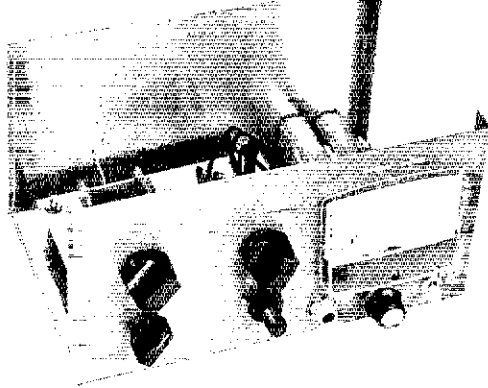
Some Final Comments

It is suggested that the operator use the rf gain control to regulate the signal level. This will prevent overloading of the audio amplifier stages when strong signals are being received. The af-gain control can be set at midrange. A slight circuit change will alleviate overloading of the af preamplifier. Simply move the af gain control from its present location to the secondary side of T1. If this is done, install a 10,000-ohm fixed-value resistor at R26 of Fig. 4.

It is hoped that this article will inspire others to experiment with simple receiver circuits, and that applications will be found for some of the modules described here. Reception of other amateur bands should be a simple matter by using an outdoor converter ahead of the unit. QST

**SWITCH
TO SAFETY!**





The control at the upper left is for C1 and the one to the right for C3. At the lower left is the band switch. The zero-center control for M1 is directly below the meter.



Inside view of the field-strength meter. At the upper right is C1 and to the left, C3. The dark leads from the circuit board to the front panel are the shielded leads described in the text.

A Linear Field-Strength Meter

BY LEW McCOY,* WHICP

ACCURATE INSTRUMENTS for checking antenna performance can be expensive devices. Most amateurs use a simple wavemeter for making antenna tests. The unit described in this article is considerably better than a wavemeter. In order to check antenna patterns and gain with any degree of accuracy, the test instrument must be positioned many wavelengths from the antenna. The simple wavemeter lacks the sensitivity to meet these requirements, and such a device has a serious fault because its linearity leaves much to be desired.

The field-strength meter described in this article takes care of these problems. Additionally, it is small, measuring only 4 x 5 x 8 inches. The power supply consists of two 9-volt batteries. Sensitivity can be set for practically any amount desired. However, from a usefulness standpoint, the circuit should not be too sensitive; otherwise it would respond to unwanted signals. Also, this unit has excellent linearity. The frequency range includes the 80- through 2-meter bands, with band-switched circuits, thus avoiding the use of plug-in inductors. All in all, we feel it is a useful instrument for anyone interested in checking antenna gain, front-to-back ratios or field patterns.

Circuit Details

Fig. 1 shows the circuit of the unit. The heart of the instrument is a μ A741 integrated circuit. This is an operational amplifier that can provide signal gains on the order of 60 dB. A pickup

* Novice Editor.

antenna is connected to J1 and a signal is coupled (from the antenna under test) to a tuned circuit. Energy from the tuned circuit is rectified by CR1 and CR2 and fed into the op amp. The rectified and amplified output from the '741 is then read on M1. Sensitivity of the op amp is controlled by inserting resistors R3 through R6 in the circuit by means of S2.

With the circuit shown, and in its most sensitive setting, M1 will detect a signal from the pickup antenna on the order of 100 μ V. Linearity is poor for approximately the first 1/5 range of M1, but then is almost straight line from there to full-scale deflection. The reason for the poor linearity at the start of the readings is because of nonlinearity of the diodes at the point of first conduction. However, this is of no real importance because accurate gain measurements can be made in the linear portion of the meter readings.

The '741 requires both a positive and negative voltage source. This is obtained by connecting two 9-volt batteries in series with the center connection grounded. One other feature of the instrument is that it can be used remotely by connecting an external meter at J2. This is handy if one wants to adjust an antenna and observe the results without having to leave the antenna site.

L1 is the 80/40-meter coil and is tuned by C1. The coil is wound on a toroid form. For 20, 15, or 10 meters, L2 is switched in parallel with L1 to provide the correct amount of inductance to cover the three bands. L5 and C2 cover approximately 40 to 60 MHz and L7 and C2 from 130 MHz to approximately 180 MHz. The two vhf coils are also wound on toroid forms.

Construction Notes

The majority of the components are mounted on an etched-circuit board. Fig. 2 is a full-size template for the board. No problems are involved in wiring the board with the possible exception of a need to use shielded leads between pin 4 of the 741 and S2. The same is true for the leads from R3 through R6 to the switch. This precaution was observed because in the breadboard version the IC had a nasty habit of "taking off." With the amount of gain in the $\mu A741$ (some 60 dB) good shielding and bypassing techniques are required.

In order for the unit to reach the 2-meter band, L6 and L7 should be mounted directly across the appropriate terminals of S1. We found the circuit wouldn't hit 144 MHz when the coil was mounted on the circuit board because of the inductance in the relatively long lead lengths to the switch. It isn't necessary to use toroid forms for the 6- and 2-meter coils. We used them because they were available, but air-wound coils of the appropriate inductance can be substituted.

Calibration

The field-strength meter can be used "as is" for a relative-reading device. However, it would be more useful if the instrument were calibrated in decibels. If one has access to a calibrated signal

generator it can be connected to the field-strength meter, and different signal levels can be fed to the device so that a calibration chart can be made. Table 1 is a chart of voltage ratio-to-decibel conversion.

Let's assume that M1 is calibrated evenly from 0 to 10. Next, assume we set the signal generator to provide a reading of 1 on M1, and that the generator is feeding a $100\text{-}\mu\text{V}$ signal into the device. Now we increase the generator output to $200\text{ }\mu\text{V}$, giving us a voltage ratio of 2 to 1. Also let's assume M1 reads 5 with the $200\text{-}\mu\text{V}$ input. By referring to Table 1 we find that a voltage ratio of 2 equals 6.02 dB, which means that we have a range of 6.02 dB between 1 and 5 on M1. M1 can be calibrated more accurately between 1 and 5 on its scale by adjusting the generator and figuring the ratio. For example, a ratio of 100 to $140\text{ }\mu\text{V}$ is 1.4 and Table 1 shows this as 2.92 dB. Using this method all of the settings of S2 can be calibrated. In the instrument shown here, the most sensitive setting of S2 with R3, 1 megohm, provided a range of approximately 6 dB for M1. Keep in mind that the meter scale for each setting of S1 must be calibrated as well as for each band. The degree of coupling of the tuned circuits for the various bands will vary, so each band must be calibrated separately.

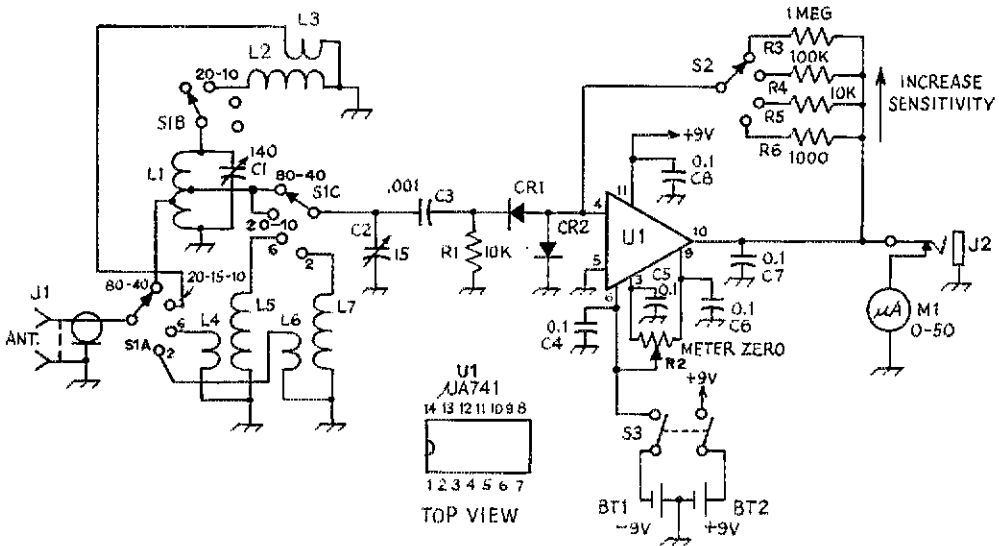


Fig. 1 - Circuit diagram of the linear field-strength meter. All resistors are 1/2- or 1/4-watt composition.

C1 - 140-pF variable.

C2 - 15-pF variable.

CR1, CR2 - 1N914 or equiv.

L1 - 34 turns No. 24 enam. wound on an Amidon* T-68-2 core, tapped 4 turns from ground end.

L2 - 12 turns No. 24 enam. wound on T-68-2 core.

L3 - 2 turns No. 24 wound at ground end of L2.

L4 - 1 turn No. 26 enam. wound at ground end of L5.

L5 - 12 turns No. 26 enam. wound on T-25-12 core.

L6 - 1 turn No. 26 enam.

L7 - 1 turn No. 18 enam. wound on T-25-12 core.

M1 - 50 or 100 μA dc.

R2 - 10,000-ohm control, linear taper.

S1 - Rotary switch, 3 poles, 5 positions, 3 sections.

S2 - Rotary switch, 1 pole, 4 positions.

S3 - Dpst Toggle.

U1 - $\mu A741$.

*Amidon Associates, 12033 Otsego St. North Hollywood, CA 91607.

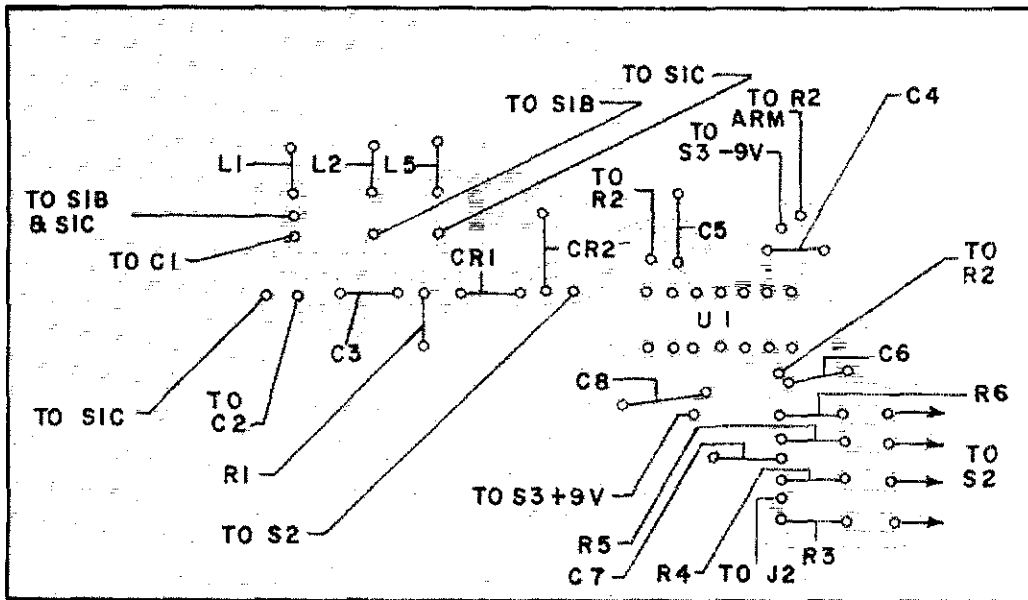


Fig. 2 -- Full scale template.

VOLTAGE RATIO TO DECIBEL CONVERSION										
Ratio	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
1	0.00	0.83	1.58	2.28	2.92	3.52	4.08	4.61	5.11	5.58
2	6.02	6.44	6.85	7.23	7.60	7.96	8.30	8.63	8.94	9.25
3	9.54	9.83	10.10	10.37	10.63	10.88	11.13	11.36	11.60	11.82
4	12.04	12.27	12.46	12.67	12.87	13.06	13.26	13.44	13.62	13.80
5	13.98	14.15	14.32	14.49	14.65	14.81	14.96	15.12	15.27	15.42
6	15.56	15.71	15.85	15.99	16.12	16.26	16.39	16.52	16.65	16.78
7	16.90	17.03	17.15	17.27	17.38	17.50	17.62	17.73	17.84	17.95
8	18.06	18.17	18.28	18.38	18.49	18.59	18.69	18.79	18.89	18.99
9	19.08	19.18	19.28	19.37	19.46	19.55	19.65	19.74	19.82	19.91
10	20.00	20.09	20.17	20.26	20.34	20.42	20.51	20.59	20.67	20.75
x10		+20								
x100		+40								
x1000		+60								
x10,000		+80								
x100,000		+100								

TABLE I

TABLE II

POWER RATIO TO DECIBEL CONVERSION										
Ratio	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
1	0.00	0.41	0.79	1.14	1.46	1.76	2.04	2.30	2.55	2.79
2	3.01	3.22	3.42	3.62	3.80	3.98	4.15	4.31	4.47	4.62
3	4.77	4.91	5.05	5.19	5.32	5.44	5.56	5.68	5.80	5.91
4	6.02	6.13	6.23	6.34	6.44	6.53	6.63	6.72	6.81	6.90
5	6.99	7.08	7.16	7.24	7.32	7.40	7.48	7.56	7.63	7.71
6	7.78	7.85	7.92	7.99	8.06	8.13	8.19	8.26	8.33	8.39
7	8.45	8.51	8.57	8.63	8.69	8.75	8.81	8.87	8.92	8.98
8	9.03	9.09	9.14	9.19	9.24	9.29	9.35	9.40	9.45	9.49
9	9.54	9.59	9.64	9.69	9.73	9.78	9.82	9.87	9.91	9.96
10	10.00	10.04	10.09	10.13	10.17	10.21	10.25	10.29	10.33	10.37
x10		+10								
x100		+20								
x1000		+30								
x10,000		+40								
x100,000		+50								

(continued on page 35)

Crossed Yagi Antennas for Circular Polarization

BY KATASHI NOSE,* KH6JJ

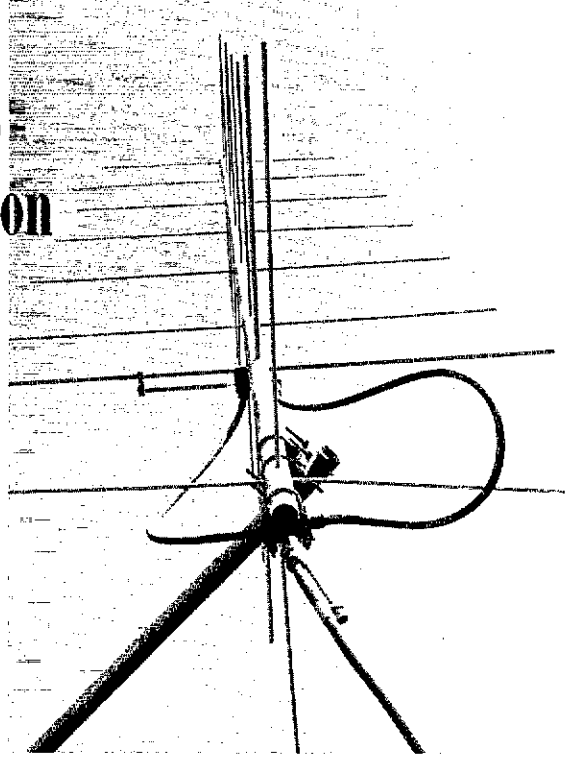
WITH THE ADVENT of space and satellite communications, amateurs should consider the effects of polarization and angle of elevation, along with the azimuth of either a transmitted or received signal. Normally, provisions for polarization are unnecessary on the hf bands, since the original polarization direction is lost after the signal passes through the ionosphere. A vertical antenna will receive a signal emanating from a horizontal one, and the converse is true when transmitting and receiving antennas are interchanged. Neither is it worth the effort to make provisions for tilting the antenna, since the elevation angle is so unpredictable. However, with satellite communications, the polarization changes and a signal that would disappear into the noise on a normal antenna, might be S9 on one that is insensitive to polarization direction. Angle of elevation is also important from the standpoint of tracking, and avoiding indiscriminate ground reflections which might cause nulls in signal strength.

Circular Polarization

The ideal antenna for random polarization, would be one with a circularly polarized radiation pattern. Two commonly used methods for obtaining circular polarization are the crossed Yagi and the helical antenna. The crossed Yagi is mechanically simpler to construct, but harder to adjust than its helical counterpart.

Polarization sense may also be a factor, especially if the satellite uses a circularly polarized antenna. In physics, clockwise rotation of an approaching wave is called "right circular polarization," but the IEEE standard uses the term "clockwise circular polarization" for a receding wave. Either clockwise or a counter-clockwise sense can be selected by reversing the phasing sense which will be mentioned in a later section.

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Crossed-Yagi antenna used in ten satellite transponder stations which the author has built.

Mathematically, linear and circular polarization are special cases of elliptical polarization. Consider two electric-field vectors at right angles to each other. The frequencies are the same, but the magnitudes and phase angles can vary. If either one or the other of the magnitudes is zero, linear polarization results. If the magnitudes are the same and the phase angle between the two vectors (in time) is 90 degrees, then the polarization is circular. Any combination between these two limits gives elliptical polarization.

Crossed Linear Antennas

A dipole radiates a linearly polarized signal whose direction depends upon the orientation of the antenna. Fig. 1A and Fig. 1B are the electric field patterns of horizontal and vertical dipoles. If the two outputs are combined with the correct phasing (90 degrees), a circularly polarized wave results, and the electric field pattern is shown in Fig. 1C. Notice that since the electric fields must be identical in magnitude, the power from the transmitter must equally divide between the two

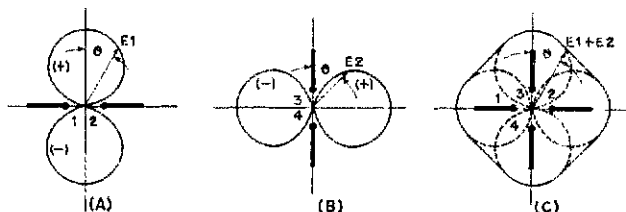


Fig. 1 — Radiation patterns looking head-on at dipoles.

A Practical Antenna

After trying out various kinds of matching sections for high-power use (one kilowatt), it was found that the simplest one worked the best. It is shown in Fig. 2 as part of the final design for an antenna used in ten satellite transponder stations which the author has built.¹ The 90-degree phase shift is realized by making section "A" a quarter wave longer electrically, than section "B." The characteristic impedance of these sections should be such that, when paralleled, they match the main feed line.

RG-133/U (95 ohms), made by Consolidated Wire Co., is ideal but is a hard item to find. More commonly found in stock is RG-63/U (125 ohms). There was some mismatch when using RG-63/U with a 50-ohm main feed line, but it was not serious enough to warrant additional matching networks. Care should be taken when other types of coax are considered, especially if one is unfamiliar with them. For example, RG-111/U which has an impedance of 95 ohms might sound like a good one to use, but since it is a twin cable, it would be unsuitable.

Fig. 3 shows the electrical-network equivalent of a 3-element array, with a gamma-match feed system. L_g is the equivalent circuit of the gamma rod, which is resonated at the operating frequency by C_g , the gamma capacitor. The individual antenna elements can be represented by parallel L-C circuits. L_a-C_a , the equivalent circuit for the driven element, must resonate slightly higher than the operating frequency. L_r-C_r (reflector) should resonate lower than L_a-C_a , and L_d-C_d (director) should be higher than L_a-C_a .

Another factor that complicates the network is the mutual coupling among elements. This is shown in Fig. 3 as M_{ra} , M_{rd} , and M_{ad} . Also, antenna current (I_r) and gamma current (I_g) flow through a common section, making analysis even more difficult in a practical application. Unless a systematic approach is taken, one is liable to spend frustrating weeks trying to find the combination which will give the proper impedance (Z_{in}) to match that of the phasing harness.

¹ Nose, "Using the ATS-1 Weather Satellite for Communications," *QST*, December, 1971.

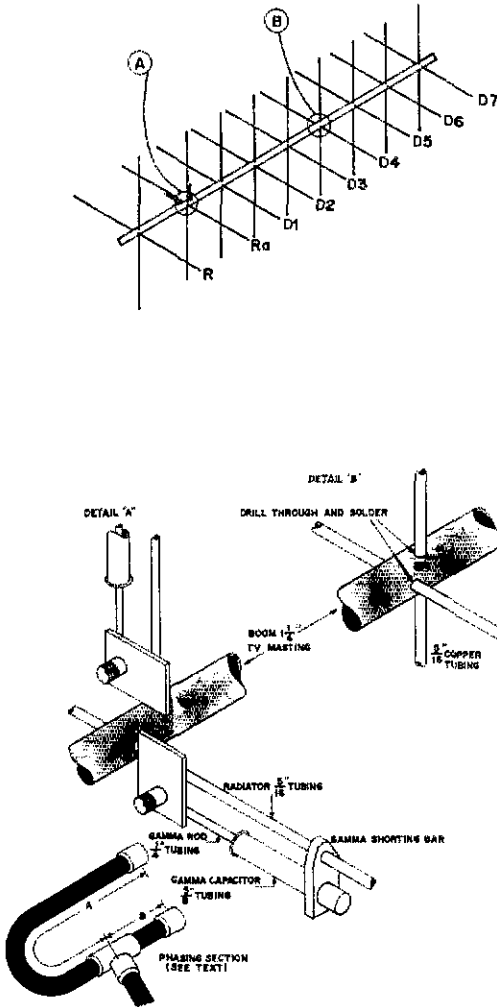


Fig. 2 — Construction details of a crossed Yagi antenna.

antennas, hence the gain of each one is decreased by 3 db, when taken alone in the plane of its orientation.

As previously mentioned, a 90-degree phase shift must exist between the two antennas. The simplest way to obtain the shift is to use two feed lines with one section a quarter wavelength longer than the other one. These two separate feed lines are then paralleled to a common transmission line which goes to either the transmitter or receiver. Therein lies one of the headaches of this system, since the impedance presented to the common transmission line by the parallel combination of the other two sections is one half that of either one of them taken alone (normally not true when there is interaction between loads, as in phased arrays). Another factor to consider is the attenuation of the cables used in the harness, along with the connectors. Good low-loss coaxial line should be used, and connectors such as type N are preferable to the uhf variety.

Radiator length (R_a) in feet is given by:
 $R_a = 460/f$ (MHz)

Reflector length (R) equals:
 $R_a + 0.1 R_a$

First director length (D_1) is given by:
 $R_a - .05 R_a$

Successive director lengths ($D_2...D_n$) equal:
 $D_2 = D_1 - .01 D_1$

$D_n = (D_n - 1) - .01 (D_n - 1)$

Spacing between reflector and radiator — 0.2λ
 Spacings between first director, radiator, and between all other directors — 0.15λ

Table I. Crossed-Yagi antenna element lengths and spacings.

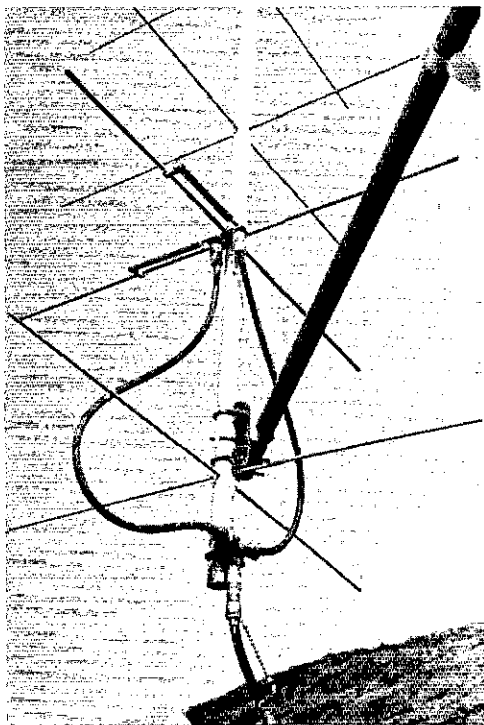
Gamma-Match Tune-Up Procedure

The following method has proven useful in simplifying tune-up of the gamma match and antenna elements. One parameter should be kept fixed, while the rest of the adjustments are made, rather than varying all of them simultaneously. It was found convenient to use the length of the driven element as the fixed parameter. Its approximate dimensions can be found in Table I (along with those of the other elements), and the length should be slightly shorter than that given by the formula. Do not change the length, except for some minor pruning which will be mentioned later.

Once the antenna is assembled, the next step is to adjust the gamma rod and capacitor for minimum SWR. Table II shows some approximate settings and lengths for the gamma rod, capacitor, and shorting bar (see Fig. 4). The correct procedure in tuning would be to select an appropriate length for the gamma rod and capacitor sections from the Table, and then adjust the shorting bar and capacitor for a minimum SWR indication, with the capacitor adjusted last.

No matter how far off either the reflector or director lengths happen to be, the last few steps should at least get the SWR into the ball park. If not, then look for the following problems:

- 1) Poor rf source; use a signal generator or low power transmitter, *not* a grid-dip oscillator. Make sure that harmonic content is kept as low as possible in order to avoid erroneous readings on the SWR indicator.
- 2) Radiator length too far off, usually too long.
- 3) Poor Q of the gamma-match system. Use a coaxial-capacitor type (preferably one with as much air dielectric as possible) such as that shown in Fig. 4.



Placement of phasing harness and T-connector is shown in lower half of photograph. Note that gamma match is mounted somewhat off-center for better balance of rf voltages on elements.

Finally adjust the director and reflector for maximum front-to-back ratio. This can be done by looking for minimum pickup with the back of the beam aligned with a test dipole as far away as practical. Final touch-up of the SWR can be accomplished by adjusting the length of the radiator, but by no more than one percent.

Unequal antenna currents can be equalized by offsetting the gamma section in the direction of the desired increase in antenna current. For more details, see previous articles by the author.^{2,3}

Some authors have come up with various dimensions and formulas for the element lengths, gamma sections and spacings. Also, many amateurs have their own favorite designs. With so many

² Nose, "Adjustment of Gamma-Matched Parasitic Beams," *QST*, March, 1958.

³ Nose, "Notes on Parasitic Beams," *QST*, March, 1960.

Frequency (MHz)	Dimensions in inches (Fig. 4)			
	W	X	Y	Z
135.6 (ATS-1 out)	6	4	6	1
146 (OSCAR 6 in)	5-3/4	3-3/4	5	1-1/2
149.2 (ATS-1 in)	5-1/2	3-1/2	4-3/4	2

Table 2. Approximate gamma-match dimensions.

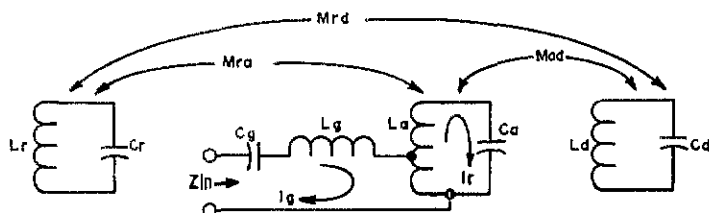


Fig. 3 — The equivalent circuit of a three-element gamma-matched array.

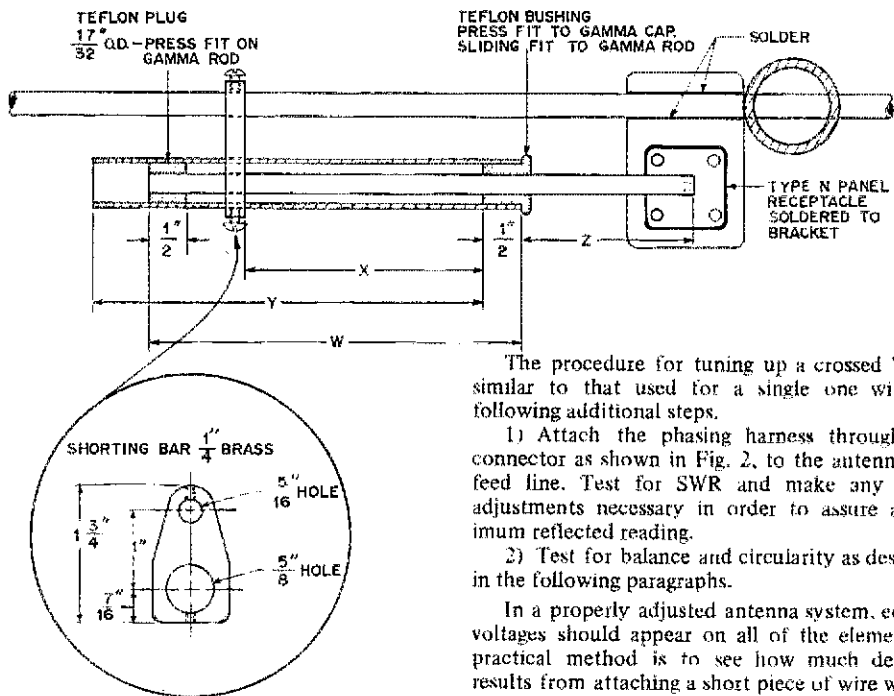


Fig. 4 - Gamma-match construction details.

variables, the problem becomes complex, and can have more than one satisfactory solution. When confronted with such a situation, a scientist often says that he will have to resort to a heuristic approach. What he really means is that he is going to use the old amateur cut-and-try method.

Final Tune-Up

The procedures used for tune-up and matching at vhf are similar to those for hf antennas, except that more care is necessary in the selection of test instruments. For example, a Monimatch designed for hf may burn out a diode if used on vhf, since the rf pickup may be much greater with the same line dimensions. A Bird wattmeter is ideal, but if unavailable, a homemade impedance bridge or SWR indicator could be used.⁴

⁴ McMullen, "The Line Sampler," *QST*, April, 1972, p. 21. Swan, "Impedance Bridge," *Ham Radio*, February, 1970.

The procedure for tuning up a crossed Yagi is similar to that used for a single one with the following additional steps.

1) Attach the phasing harness through a T connector as shown in Fig. 2, to the antennas and feed line. Test for SWR and make any minor adjustments necessary in order to assure a minimum reflected reading.

2) Test for balance and circularity as described in the following paragraphs.

In a properly adjusted antenna system, equal rf voltages should appear on all of the elements. A practical method is to see how much detuning results from attaching a short piece of wire with an alligator clip to the ends of each element. A properly balanced element will show the same amount of detuning (SWR goes up or bridge null is upset) regardless of which end has the clip.

To test for coupling between the Yagi sections (there should be none), feed power into the horizontal Yagi alone, and see how much detuning results by attaching the wire-and-clip combination to the vertical Yagi. Repeat this procedure for each element. If there are no interactions, feed power into the vertical Yagi and see if there is any coupling from the horizontal one. In making any of these tests, while near the antenna, make sure that the power is off to avoid possible injury!

As a final test, tune in on a linearly polarized signal from a satellite such as the ATS-1, or even a repeater. Rotate the crossed Yagi on its axis and note if there is any signal variation. A good circularly polarized antenna should have no more than 1 dB variation, as one rotates the antenna.

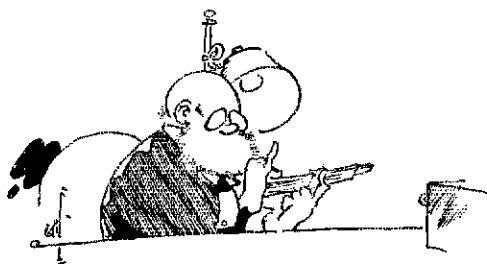
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Sometimes a heuristic approach is necessary . . .

The F2TU for VHF FM RTTY

With Modification Information for RCA's Carfone Transceiver

BY HARRY E. LEGLER,* WØPB

MANY GOOD DEMODULATORS or terminal units for radioteletype have been described in *QST* and other magazines. Some were simple and easily constructed. Others were rather complicated and sophisticated, and their designers claimed unusual capabilities, such as producing copy from shifts of only a few hertz, from signals buried in noise or selective fading, and so on. The designers often seem to be designing demodulators for only the worst conditions.

Operation in the vhf bands offers good reliable communication at short range without interference from distant areas. The stronger of two fm stations on the same channel will capture the channel with little or no heterodyne. Precise control of the carrier frequency is not required for RTTY operation when the intelligence is contained in a frequency-shifted audio tone. Together, these factors add up to a mode of operation that is reliable and adaptable to unattended operation.

The F2TU is not intended to copy signals from Antarctica or compete in a BARTG contest or win a WAS award by RTTY. It is intended for everyday communication such as in a local club network where news items or announcements can be sent to all members at the same time, even though the members may not all be at home. No need to wait for the information to appear in the monthly club bulletin. Official bulletins can be relayed as soon as any club member receives them from W1AW. Memos from one member to another can be sent and be waiting on the receiving machine when the addressee returns home.

The main functions provided in the F2TU are:

- 1) Decoding of 170-Hz shift audio tones.
- 2) Transistor keying of the selector magnets.
- 3) Autostart of the machine motor and loop power supply.
- 4) Audio tone generator for modulating an fm transmitter (F2 emission) with provision for decoding the tones for monitoring outgoing transmissions. Provision is also made for checking and adjusting the tones before going on the air.

- 5) Built-in loop power supply which is energized only when the autostart circuit switches it and the motor on.
- 6) Near-normal F3 voice operation on the circuit with push-to-talk switching.

The Circuit

The F2TU decoding circuit uses the popular and plentiful 88-mH toroidal loading coils.¹ They are resonated at or near 2295 Hz and 2125 Hz by capacitor values to be discussed later. There is no hard and fast rule that 2125 Hz and 2295 Hz must be used for the mark and space tones, respectively, or that a precise shift of 170 Hz must be used. Other combinations can be used as long as all the stations in the same local network use the same frequencies and the shift is sufficient to be recognized by the decoder. We chose to use 2295 Hz for mark and 2125 Hz for space. Another thing — a narrow shift is easier to generate than the standard 850-Hz shift. More on that later.

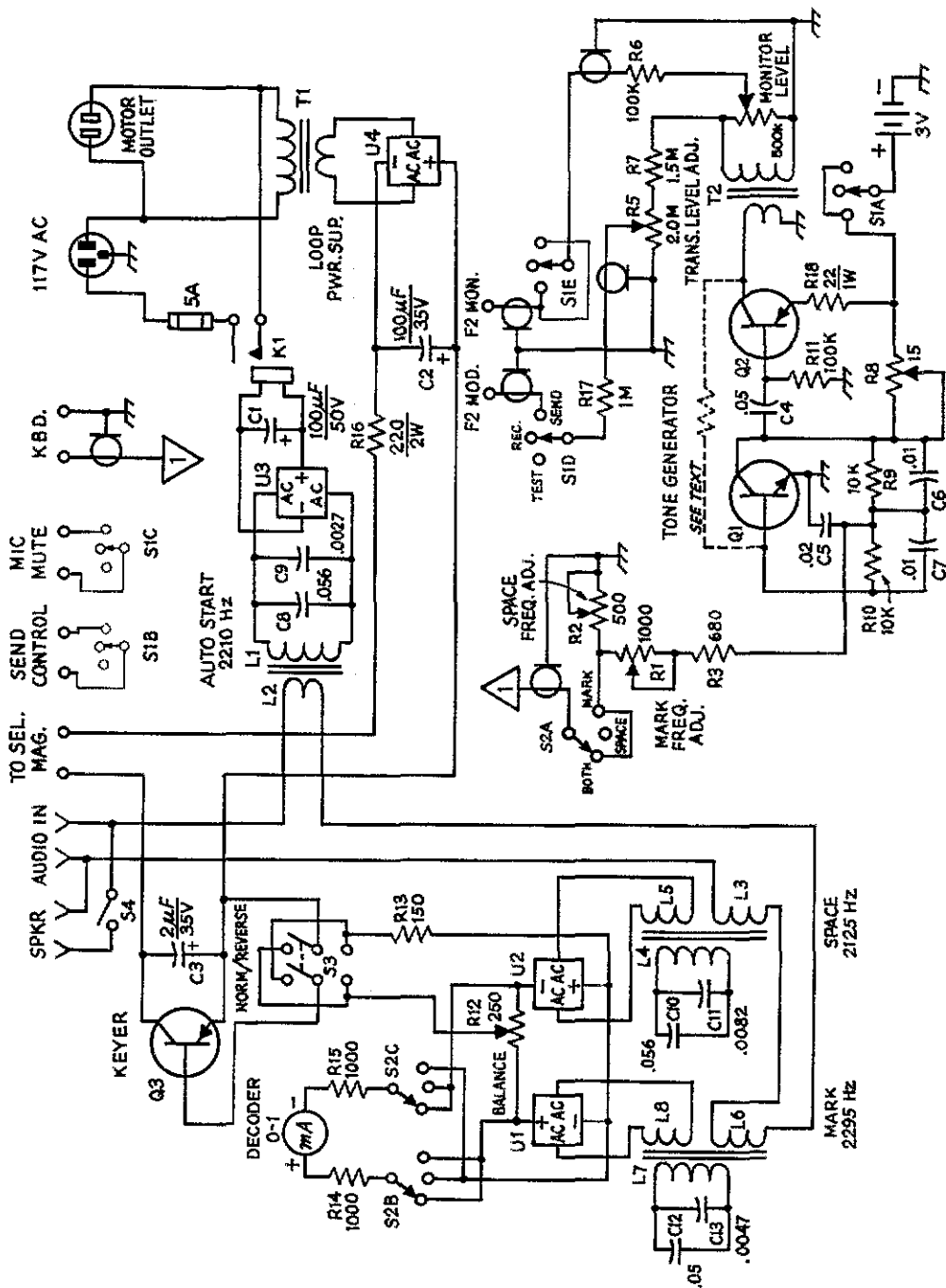
The schematic diagram of the decoding circuit is given in Fig. 1. Audio is fed directly to the 5-turn primaries, L3 and L6, from the voice-coil output of the receiver. The measured input impedance is 5 ohms. The outputs are also of low impedance from the 30-turn secondaries, L5 and L8. No attempt is made to adjust the high impedances of the original 88-mH resonating windings, such as by inserting resistors in their circuit.

Most receiver outputs have enough audio power so that, when rectified, it will directly trigger the power transistor keyer, Q3. As little as 25 mW of audio power will still produce solid copy. No further amplification is needed in the decoding circuit. Limiting or clipping in the decoder is also unnecessary. We expect only to operate from fm receivers that have their own efficient limiting systems and provide near-constant audio output. We can expect wide variations of signal levels between stations but normally no rapid fading of the signal from any one station.

The selector-magnet keyer, Q3, can be almost any low-leakage pnp power transistor similar to the

¹ Wetherhold, "Inductance and *Q* of Modified Surplus Toroidal Inductors," *QST* for September, 1968.

* 304 Miami St., Hiawatha, KS 66434.



- L5, L8 — 30 turns No. 22 wire wound over L4 and L7, respectively.
- Q1 — Germanium npn audio transistor (SK3010, GE8, or similar).
- Q2, Q3 — Germanium pnp af power amp. transistor (SK3009, GE3, or similar).
- R1, R2, R8, R12 — Wirewound, linear taper.
- R4, R5 — Carbon composition, audio taper.
- S1 — Rotary switch, 5-pole, 3-position, non-shorting.
- S2 — Rotary switch, 3-pole, 3-position, non-shorting.
- S3 — Dpdt toggle.
- S4 — Spst toggle.
- T1 — Primary 117 V ac, secondary 12.6 V at 1 A.
- T2 — Single plate to voice coil audio output, 5000 to 4 ohms.
- U1-U4, incl. — Full-wave bridge rectifier, molded case (Mallory No. FW100 or similar) or make your own bridge for U1, U2 and U3 from low-current germanium diodes and for U4 from 1-A silicon diodes.

- Fig. 1 — Circuit of F2TU. Resistances are in ohms, k=1000 and M=1,000,000. All fixed resistors are 1/2-watt 10-percent composition except R18 is 1-watt and R16 is 2-watt. Capacitance values are all in microfarads (μ F).
- C1, C2 — Electrolytic.
 - C3 — Paper or other low dissipation type, non-polarized.
 - C4, C5, C6, C7 — Disk ceramic, values as shown.
 - C8-C13, incl. — Dipped Mylar, polyester, or mica, values as shown in Table I.
 - K1 — Miniature sensitive dc relay, 10,000-ohm coil, spring weakened to close at less than 2 mA.
 - L1, L4, L7 — 88-mH toroid loading coils (available from M. Weinschenker Box 353, Irwin, PA 15642, and Typetronics, Box 8873, Ft. Lauderdale, FL 33310).
 - L2 — 10 turns No. 22 wire wound over L1.
 - L3, L6 — 5 turns No. 22 wire wound over L4 and L7, respectively.

GE3, SK3009, or 2N176. It switches the 60-mA loop current and does so with little heating. The base is driven by the full reversal of output currents supplied by the encapsulated bridge rectifiers, U1 and U2. The discriminator response curve compares favorably with curves of other well designed filters.²

The selector magnets of the teleprinter operate on 60 mA of loop current. The $2\text{-}\mu\text{F}$ capacitor across the output of Q3 reduces reactance in the loop, to provide improved copy. A standard type 255 polar relay was first used as a keyer with excellent results, but after we used the transistor, which requires less drive and is cheaper, the polar relay was taken out.

The autostart function makes use of a third toroid-capacitor circuit, resonated midway be-

tween the mark and space frequencies. Part of the audio power is diverted by the 10-turn primary winding, L2, to this circuit, rectified by another bridge rectifier, U3, to energize the high-resistance relay, K1. This relay was made sensitive enough to close at 2 mA current by weakening its spring. The contacts switch the 117-V ac power to both the machine motor and to the loop-supply power transformer. Therefore, no ac power is on until either a mark or space tone is received of a level sufficient to charge the 100- μF capacitor and pull in the relay. The same charge holds the relay closed for a few seconds after the tone stops or during momentary drop-out of signal. The 10,000-ohm relay winding, being directly across the full toroid winding, broadens the resonance curve and helps maintain relay current on either mark or space.

The relay contacts are heavy enough to carry the 75 watts (approximate) pulled by the machine motor plus the less-than-2-watt input to the loop-supply transformer, which, of course, varies according to whether a mark or space signal is being received. Glass-enclosed reed-relay switching was tried, but it was found that for some reason the contacts remained closed after the ac power had passed through the reeds, and a small blow or tap was required to open them. It was not determined what caused the reeds to stick but possibly they were temporarily magnetized.

The tone generator started out as a 95-cent code-oscillator module. It was voltage sensitive and had a distorted wave form with unwanted harmonics. The two transistors were rewired to use the Twin-T circuit, which has a much better wave form.³ Its frequency is shifted simply by keying part of the resistance in and out of the circuit. For a 170-Hz shift, a resistance reduction of about 300 ohms from a total of 1450 ohms is sufficient. Keying transients are minimal since a very small amount of current in the circuit is being keyed. Here is where the narrow shift of 170 Hz is an advantage.

Q1 generates the tone while Q2 amplifies it to give up to five volts for driving the grid of the receiver audio-output stage. The receiver provides the audio power to drive the demodulators for monitoring outgoing transmissions, as well as for checking the tone frequencies before going on the air. When the tone generator is first turned on after a period of no use, there is a frequency drift of some 20 Hz during the first minute after turn-on. If left alone, the tones will return to where you corrected them previously. The tones are readily corrected by front-panel adjustment with R1 and R2. The drain on the two C-size battery cells is about 3 mA, but only during actual on-the-air time or testing.

A 2-pole, 3-position rotary switch, S2, switches the panel meter to indicate, in position 1, both mark and space tone levels during operation. In position 2, the keyboard circuit is opened for the space condition and the meter reads only the space tone level. In position 3, the keyboard circuit is

² Hoff, "High-Performance RTTY Filters," in two parts, *QST* for August and September, 1966.

³ Check, "A Simple Two-Tone Test Generator," *QST* for August, 1966.

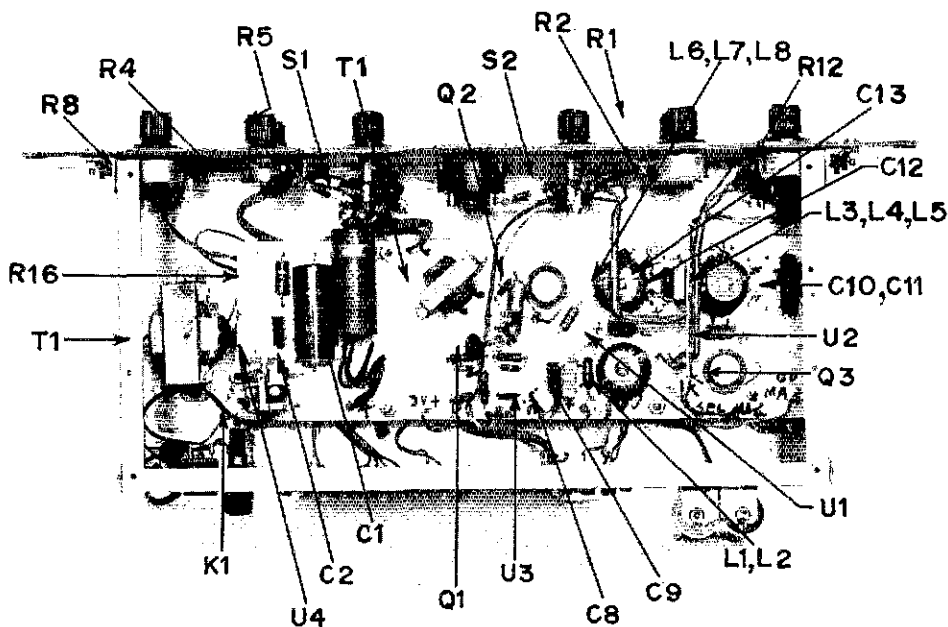


Fig. 2 — F2TU interior showing placement of components. Those not identified near the center are associated with the Q1 and Q2 tone generator.

closed again for the mark condition, same as position 1, but the meter reads only the mark signal. The meter switching is done primarily to set the tone-generator frequencies to match the resonant toroid circuits. The meter switch could have a fourth position to check the two-cell battery supply, if the builder desires, but the switch we had on hand had only 3 positions, so this feature is not shown in the diagram.

The loop power supply consists of a small 12-V transformer, an encapsulated bridge rectifier (the same as used in the demodulator and autostart circuits), and filter components. This supply, along with the machine motor, is switched on by K1 only when mark or space tones are received. The rectified output measures 18 volts dc on space. The 220-ohm resistor, plus the magnet resistance and internal resistance of the power supply, limits the current in the loop to about 60 mA. The model 28 machine copies accurately on as little as 40 mA in this circuit. Much has been written about the need for loop supply potentials to be 120 volts or more and the need supported by mathematics. However, with just one machine in use with the TU, a loop voltage of 18 was found sufficient.

Voice operation is available any time the microphone PTT button is pressed and the operate switch, S1, is in the receive position. Station identification, before and after an RTTY transmission, can be made by voice in lieu of identification by Morse code.

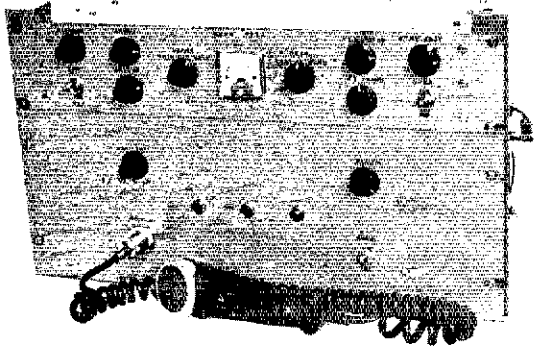
When the loudspeaker is switched across the demodulator input circuit, the level in that circuit is dropped considerably. Also, the audio quality of the received voice is degraded, but it is still readable. Our operating preference is that the speaker only be switched in or out of the circuit, rather than the demodulator. We have intended that this be an RTTY circuit, and any chance of inadvertently leaving it disconnected should be avoided. We do not want to miss any teleprinter messages during unattended operation.

Construction

Our units are mounted on rack panels, 3-1/2 inches high. The housing was fashioned from .060-inch aluminum sheet and self-tapping screws. The aluminum sheet was scrap material from a mobile-home factory. All components are enclosed in the 3 × 7 × 15-inch housing, except the two dry cells, which are mounted on the rear for easy replacement.

Our first unit made use of terminal-strip tie points for mounting most of the components. The second and third units used a 4 × 12-inch subpanel of 1/16-inch formica table-top material. This permits resistors and capacitors to be mounted by their wire leads through holes drilled in the insulating material and connections made on the bottom side. Predrilled Vectorboards could also be used. Push-through terminals were used for some connections, such as the toroid coil windings.

Front view of the F2TU with the RCA Carfone CMV-1A transceiver, modified for rack mounting.



These terminals permit connections to be made above or below the subpanel, which is raised about an inch above the bottom of the housing on spacers. Because it is the largest component, the ac power transformer is the only component mounted directly on the inside bottom surface of the housing.

Fig. 2 shows the inside of the housing. It can be seen that the toroids and their associated capacitors, rectifiers, and Q3 are grouped at one end of the subpanel. The tone-generator group, Q1, Q2, T2, and associated resistors and capacitors are grouped at the center area. The loop power supply components and K1 are at the other end of the subpanel, which is about 3 inches short of covering the bottom. This leaves room for mounting the power transformer on the bottom. Mounted on the rear side of the housing is the dual-cell battery holder, the fuse holder, and all the various connectors. The front panel contains the 0-1 milliammeter and all of the controls and switches. The photos show our arrangement of the panels.

There is nothing critical about placement of parts, although to reduce the possibility of hum pickup the ac power transformer ought to be mounted at the far end from the toroids, just in case the self-shielding property of the toroids is inadequate. The meter switch, S2, should be on the side nearest the toroids, their associated bridge rectifiers, and the tone-adjust controls. Likewise, the operate switch, S1, should be grouped with the tone-level controls, R4 and R5.

The toroid input windings, L2, L3, L6, and output windings, L5 and L8, are hand wound over the original toroid enameled turns. Ordinary plastic insulated hookup wire of about 22 gauge can be used. Enameled wire can also be used for the outside windings as long as there are no shorted turns. Be sure to wind in the same direction as the original windings. The toroids can be mounted with one screw through their center openings and

an ordinary water-faucet plastic cone-shaped washer.

We are interested in three frequencies: mark tone at 2295 Hz, the space tone at 2125 Hz, and the autostart crossover at 2210 Hz.⁴ Assuming that the 88-mH toroids are actually 88 mH, the 2295-Hz tone would require .0546 μF of capacitance across the toroid, the 2125-Hz tone would require .0637 μF , and the crossover autostart circuit would require .0588 μF . One can save much time looking for these specific values by settling for combinations of standard values in the 10-percent tolerance lists for capacitors. By using paralleled values of .056 and .0082 μF for space and .050 and .0047 μF paralleled for mark, the actual shift will be near 178 Hz. A combination of .056 and .0027 μF will work for the autostart circuit. Stay with Mylar, polyester, or mica-dielectric capacitors of the epoxy dipped types. Avoid lossy, paraffin-coated tubulars or those that are war surplus or salvage.

We noticed that catalogs of three mail-order suppliers would not have the full or same listings of

⁴ [EDITOR'S NOTE: With afsk it is customary to use the lower audio frequency for mark and the higher frequency for space. However, as the author stated earlier, other arrangements may be used as long as all stations in the network are in conformance.]

Optimum Frequency	2295 Hz	2210 Hz	2125 Hz	Shift
Optimum Capacitance	.0546 μF	.0588 μF	.0637 μF	170
Combination using .033 μF	.033/.022 (2285)	.033/.027 (2190)	.033/.033 (2085)	200
.047 μF	.047/.0068 (2313)	.047/.010 (2247)	.047/.020 (2070)	243
.050 μF	.050/.0047 (2293)	.050/.0082 (2224)	.050/.015 (2100)	193
.056 μF	.056/ (2270)	.056/.0027 (2205)	.056/.0082 (2115)	155
Recommended Combination	.050/.0047 (2293)	.056/.0027 (2205)	.056/.0082 (2115)	178

Table 1 -- Combinations of capacitor values from 10-percent tolerance lists to resonate the 88-mH toroids at or near optimum frequencies (shown in parentheses).

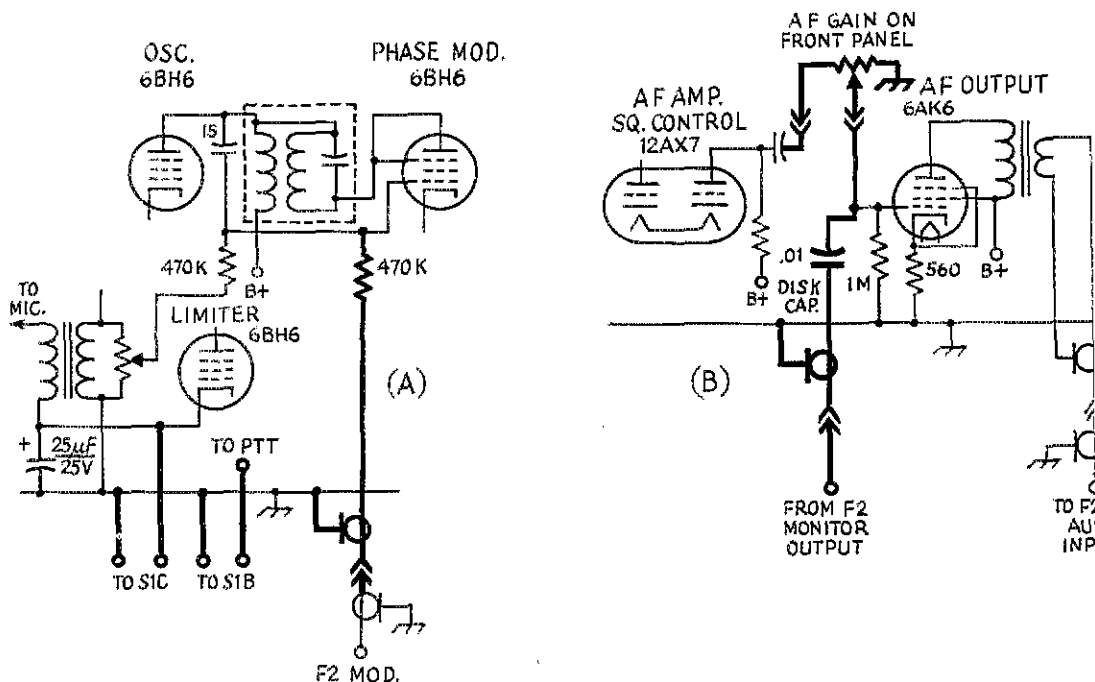


Fig. 3 - Circuit changes made to a RCA Carfone model CMV-1A to adapt it for use with the F2TU. The modifications to the transmitter section are shown at A, and to the receiver section at B. Added or rewired components and connections are shown in heavy lines.

standard 10-percent values in some brands of capacitors. If you run into trouble locating preferred values, use Table 1, a chart of combinations of other values that can be used and the shifts which will result. As long as the other stations in the net use the same values, there should be no great problems.

There is the possibility that for a given frequency one station's total capacitance is actually 10-percent under the nominal value and at another station the value is 10-percent over nominal. Such a worst case would need some reconciling by trying different capacitors. Removing or adding turns on the resonating windings, L1, L4 and L7, is another way of making corrections.⁵ It is highly recommended that one station in the net be used as the reference and all others adjust their circuits to the reference. Adjustments are easily observed on the panel meters of the units. Feed the audio tones of the reference tone generator through the other units, using the TEST mode. Vary the tone to find where the circuits actually resonate. When they are in agreement with one another, they will not require further adjustment. Only the tone generators need be corrected to agree with their toroids.

We found that some transistors used for Q1, salvaged from circuit boards, were reluctant to give good clear tones or even to oscillate. A resistance of from 1 to 5 megohms from the collector of Q2 to base of Q1 will encourage oscillation. Adjusting the battery voltage with R8 will also help. The

feedback resistance is shown in dashed lines in Fig. 1.

Our F2TU units have worked excellently with either model 15 or model 28 Teletype machines. It is essential that only the selector magnets and the keyboard contacts be in the circuit. This means that any and all of the original machine wiring through cables, terminal boards, disconnect jacks and plugs, capacitors, chokes, send-receive-break contacts, and so on, should be isolated. By removing the selector-magnet connections from the wiring, the rest of the circuitry can be left intact and, if needed, can be restored to the original condition again. Run your line from the F2TU directly to the selector-magnet terminal strip. In the model 28, for parallel connection, strap terminals 2 and 3 together for one connection and terminals 1 and 4 together for the other connection.⁶ Connecting directly to the coils eliminates the unwanted reactance and resistance in the rest of the machine circuitry.

The same is true for the keyboard circuit. We want zero resistance in the mark condition and infinite resistance with zero reactance in space condition. Connect the F2TU keyboard circuit directly to the solder lugs on the model 15 keyboard-contact assembly. Clean and polish those contacts. They must all give zero resistance on closing. Verify each contact resistance with an ohmmeter. The audio tone shift will not be accurate otherwise.

⁵ Hoff, "Checking RFTY Shifts," *QST*, May, 1966, p. 35.

⁶ Craig, "Teletypewriter Selector Magnets," Technical Correspondence, *QST* for September, 1971, p. 49.

In the model 28, there is a noise-suppressor assembly inside the keyboard-contact assembly housing. Open the housing, disconnect that choke-diode-capacitor circuitry, and make your connection directly to the mark contact terminals. There is only one keying contact there, and it is in a metal can, so it is less troublesome than the six contacts in the model 15.

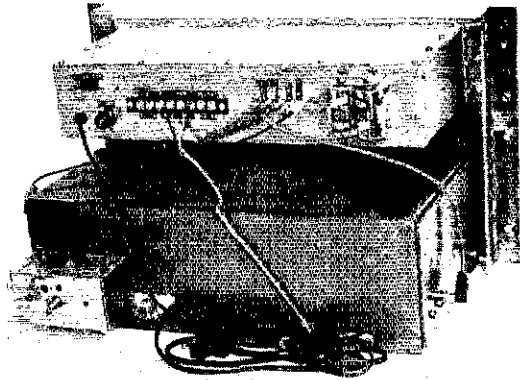
If you find some stray ac hum in the keyboard line, reverse the leads or run them through a grounded shield. We want no 60-Hz modulation on the space tone when the keying circuit is open. There are too many warbling RTTY signals on the air already.

In the model 15, the ac power drives only the motor, with sometimes a toggle switch to turn the motor on and off. No need to make any changes here. Plug the power cord into the switched power outlet on the back of the F2TU and leave the switch on.

The model 28 is a different story. Besides the motor, ac powers a line shunt relay, copy lights, margin indicator lamp, signal bell magnet, and motor start and stop magnets, plus a convenience outlet. Only the lights and signal bell are useful. For autostart operation it is easiest to isolate the motor from all that circuitry. Terminals 3 and 4 of motor-terminal-block 101 are vacant. Move the motor connections from terminals 1 and 2 over to 3 and 4, and connect another ac line cord with plug to terminals 3 and 4. Plug the line cord into the switched outlet on the back of the F2TU. The lights and bell are still served by the original power cord and can be switched off when you are not home. The line shunt relay serves no purpose and may be disconnected. We had to go inside the relay cover to do that.

Regarding K1, the 10,000-ohm autostart relay, we used bargain relays which were available at \$1.69.⁷ After we adjusted the spring tension, they would close at 15 volts across the coil terminals and open at about 5 volts. The relay frame and armature carries the switched ac power and will have to be mounted on insulation. Other bargain relays have also been used successfully.

Fig. 3 shows the modifications we made on our RCA Carfone CMV-1A transceivers to accommodate the F2TU. In the receiver, the audio gain-control connection was moved from between the discriminator and first audio-amplifier grid input to the point between the first audio output and the grid of the 6AK6 output stage. Plate and suppressor power to that stage is normally removed during transmit. We need it on during transmit for monitoring purposes. We bypassed the plate-voltage switching relay to keep the 6AK6 on, while the rest of the receiver is disabled during transmit. Feeding audio tones at about 3 V ac to the grid of the 6AK5 overrides hum pickup from the transmitter. The audio tone level is adjusted by R4 independently of levels coming in from the receiver during reception. The tones are switched in on either the TEST or SEND position of S1.



This rear view of the F2TU with the Carfone CMV-1A shows the interconnecting arrangement used by the author. Connections to the teleprinter keyboard, selector magnets, and power cord to the motor complete the installation. The "outboard" unit on the rear panel of the Carfone is a Nuvistor preamplifier for the receiver input.

The F2TU tone levels for modulation are likewise controlled independently of voice levels by R5. The tones are fed through R17 directly to the grid of the phase-modulator tube. A very low level of tone, about 0.3 V ac, was sufficient and was obtained by considerable attenuation through the resistors associated with R5. Too much tone caused over-deviation and resulted in disappearance of demodulated tones at the receiving station. The level can be adjusted while monitoring with another receiver. The tone is switched in by S1D only in the SEND position.

The microphone circuit is muted by S1C, which grounds the cathode of the modulator limiter, preventing any room noise from being transmitted during F2 operation. S1B bridges the PTT circuit to hold the transmitter on the air during SEND.

Single-hole-mount phono jacks were mounted on the Carfone for inputs to the monitor and modulator circuits and voice-coil output. The modulator jack was located as near as possible to that circuit to avoid stray pickup.

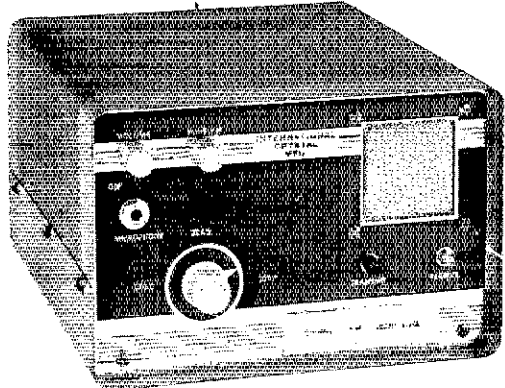
Shielded audio cables with pin plugs connect the audio circuits with the F2TU. The mic mute and PTT circuits were soldered directly into the under-chassis wiring but a plug and jack arrangement is recommended for easier disconnect.

Operation

Set the operate switch, S1, to RECEIVE and the meter switch, S2, to BOTH. Reception of F2 signals is almost automatic. Listen to the circuit with the speaker on to verify that there is modulation on the incoming carrier. Adjust the squelch for normal operation and advance the receiver audio gain control. The autostart relay should pull in with about half-scale reading of signal on the panel meter. The motor should start and the local loop supply should be switched on.

⁷ Stock No. 18A1368, Burstein-Applebee, 3199 Mercier St., Kansas City, MO 64111.

(continued on page 35)



A CB Rig for 220 MHz

— Amateur Service, that is!

The recent growth of interest in fm and repeaters on 220-225 MHz has created a demand for compact portable and mobile equipment for this band. A secondhand citizens-band transceiver provided the foundation for the authors' 220-MHz rig. While this is not strictly a nuts-and-bolts type of construction article, the authors present here some ideas that should be helpful to those amateurs who decide to follow this route to 220 fm.

BY ROBERT M. MYERS,* W1FBY,
AND EDWARD B. KALIN** WA1JZC

The converter and limiter/discriminator are mounted on the rear panel. The transmitter is built on a subchassis and is contained within the original cabinet.

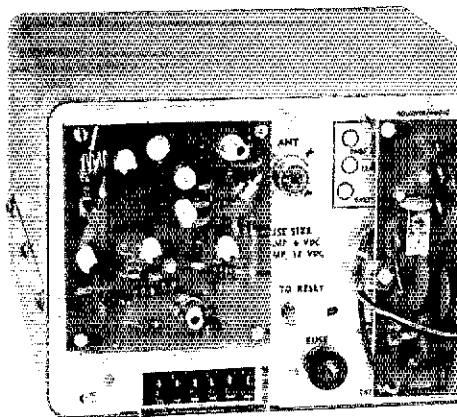
THE ACQUISITION of a discarded citizens-band transceiver sparked the evolution of this light-weight portable transceiver for the 220-MHz band. The project turned out to be more than an attempt at poetic justice — it developed into a practical, workable system. Secondhand CB transceivers are both abundant and inexpensive, and incorporate several basic features that make them desirable for such a conversion. Because of the great diversity in circuit design and packaging of CB equipment available on the used market, it is impractical to suggest a general method to be followed when converting specific units. Rather, it is intended by the authors that this article serve only as a guide. The individual builder is encouraged to innovate freely.

The first step in the conversion is, of course, to obtain a suitable transceiver to modify. Factors which govern this choice include receiver sensitivity and selectivity, immunity from cross modulation and image problems, its physical size, power requirements, as well as its price. It is nice to have the option of using a tunable or crystal-controlled receiver. The transmitter specifications are not important because with this conversion the transmitting portion of the CB rig is removed completely and replaced by a homemade transmitter assembly. It might be prudent, however, to assure that the power supply built into the transceiver is capable of powering the new transmitter. The modification of hand-held walkie-talkies or ultra-compact transceivers is not encouraged unless the builder is experienced at building miniaturized circuits and working with a magnifying glass in one hand and a soldering iron in the other. The essential features of the conversion are outlined in the block diagram, Fig. 1.

As seen in the photographs, the crystal-controlled 220-MHz converter is mounted inside a homemade Minibox on the rear panel of the transceiver. In its normal configuration, a relay inside the transceiver provides the transmit-receive switching functions by changing the antenna between the receiver input and transmitter. The receiver input is removed from the relay and is

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** 75 Tumblebrook Ln., West Hartford, CT 06117.



connected instead, directly to the output of the converter, while the converter antenna input is connected to the relay terminal formerly occupied by the receiver input. The receiver then serves as a tunable i-f. The choice of a crystal frequency to use in the converter depends on the frequency range covered by the receiver, the frequency range that is to be covered in the 220-MHz band, as well as image-reduction considerations. The International Crystal Model 50AN transceiver that the authors modified had already been realigned to cover part of the 10-meter amateur band.¹ The tunable receiver in the unit covered a 400-kHz range between 29.3 and 29.7 MHz. Oscillator injection to the mixer in the converter at a frequency of 195 MHz results in a tuning range from 224.3 to 224.7 MHz which includes a local repeater output frequency.² The converter circuit by McMullen³ was used, with a 32.5-MHz crystal which, when tripled and doubled, gives output at 195 MHz. If the same range is to be covered on a receiver tuning from 26.9 to 27.3 MHz (as most CB receivers do) the oscillator injection should be at 197.4 MHz. If the transceiver is crystal-controlled and has no provision for continuous tuning, or if channelized operation is desired, the oscillator injection frequency can be calculated by subtracting the i-f from the desired frequency on the 220-MHz band. Additional information about vhf converters as well as other suitable converter circuits may be found in the *Handbook* and the *VHF Manual*.^{4,5}

Most of the inexpensive Class-D citizens-band transceivers that can be found on the used market are designed for reception of amplitude-modulated signals. While it is true that it is possible to slope detect fm signals with an a-m receiver, it is desirable to include provisions for true fm detection, especially when crystal-controlled operation is anticipated. Modification of the

¹ This and all other references are found in the appendix at the end of this article.

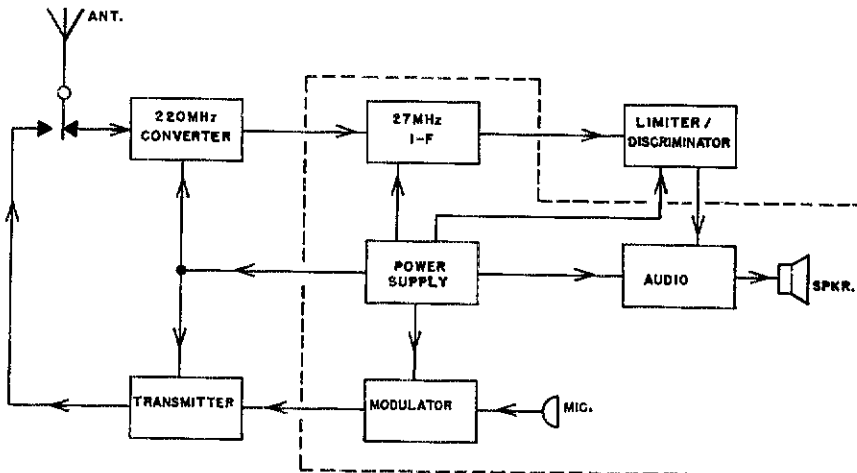
receiver for fm reception involves disabling the a-m detector and the avc, and then adding a limiter and discriminator. A tuning meter (zero center) may be used with the discriminator to aid in receiver adjustment. The lack of adequate behind-the-panel space, however, precluded this modification in our unit. The printed-circuit board containing the limiter and discriminator is mounted on the rear panel of the transceiver cabinet, opposite the converter. A suitable circuit which may be used with receivers having a 455-kHz i-f has been described earlier.⁶ If possible, it is desirable to mount the converter and the limiter/discriminator boards inside the transceiver, to reduce the possibility of damaging any components. This transceiver uses tubes in both the transmitter and receiver circuits. Operating voltages for the converter and the limiter/discriminator are "borrowed" from the filament supply (12 V ac) through an add-on rectifier and filter. The input to the limiter is taken from the secondary of the 455 kHz i-f transformer. The output from the discriminator is connected to the input of the first audio stage. If the transceiver is completely solid state, the required voltages for the limiter/discriminator and the converter will, no doubt, be present already. At this point, the modification of the receiver is complete.

Transmitter Changes

While it is feasible to design a heterodyne transmitting mixer (possibly in conjunction with the receiving converter) that will convert a 27-MHz signal to the 220-MHz band, this approach has not been tried by the authors. It would probably make the converted CB rig bulky and cumbersome. The 27-MHz transmitter would have to be changed from a-m to fm and it may be difficult to obtain sufficient deviation. The complications that this approach would cause led the authors to the decision of building the transmitter from scratch, instead.

(Continued on page 43)

Fig. 1 — Block diagram of the converted transceiver. Portions located within the dashed lines are parts of the original transceiver circuit.



• *Beginner and Novice*

A Simple Keying Monitor

BY KI NEGORO,* WN6QJP

WE NOVICES should want to improve our "fists" on our way to that higher-class license. Described in this article is a simple monitor, or sidetone oscillator, that is easy to build and costs about five dollars. All of the parts are stock items available from most local plastic-pack parts stores.

Let's make one point clear about this unit: It can be used to monitor your sending for the formation of characters and spacing between words but it does not monitor your signal. Many Novices think in terms of monitoring their signal when they see the term "keying monitor." Different techniques are required for signal monitoring and these are described in detail in *The Radio Amateur's Handbook*.

Circuit Details

The monitor will function with any cathode-keyed transmitter running from 20- to 75-watts dc input. It will not work with grid-block-keyed rigs.

Fig. 1 shows the circuit of the unit. Power for operating the tone generator is picked off as a voltage drop across resistor R1 which is in series with the cathode or cathodes of the transmitter. The operating voltage required for the tone generator runs from 1 volt minimum to 3 volts maximum. Now is a good time to show an example

* 325 E. Madison St., Montebello, CA 90640.



One doesn't see stations like this very often. WN6QJP is shown at the operating position of his completely home-built installation.

of Ohm's law, that question they asked you in the Novice exam. Assume that for a 20-watt rig the total cathode current is 75 mA and for a 75-watt transmitter, 200 mA, and that R1 is 15 ohms. $E = IR$, so .075 times 15 equals 1.125 volts, and 0.200 times 15 equals 3 volts, so a 15-ohm resistor would provide the necessary value for the required operating voltages.

CR2 provides protection for the transistor in case the leads are reversed accidentally. R2 can be adjusted to change the pitch of the audio note. Output from the tone generator is adequate to drive the loudspeaker.

When the key is up, no current flows in the circuit. Since $E = 0 \times 15$, that equals zero volts and no voltage is present, hence no audio tone.

Construction Information

The unit is enclosed in a "Pre-Perf" box, but any suitable enclosure will suffice. I could have described the construction of this device in a step-by-step procedure but I feel that the Novice doesn't learn a great deal by such a method. Study the circuit diagram and the photographs and make it a do-it-yourself project. However, a few construction hints should be mentioned.

Bend the tabs on the terminal strips and install the transformer before mounting the strips into the "p" box. Complete the soldering, leaving the transistor last. When installing the transistor, hold each lead with a pair of long-nosed pliers, and solder each in place. Maintain the hold on the lead for about 15 seconds after the soldering iron is removed from the connection point. Repeat the above with each of the transistor leads. It is easy to ruin a transistor by letting too much heat reach the body of the component.

The code monitor has been in use at WN6QJP for some time now, and it has been an extremely useful addition to the station.

This is the completed monitor showing the parts placement.

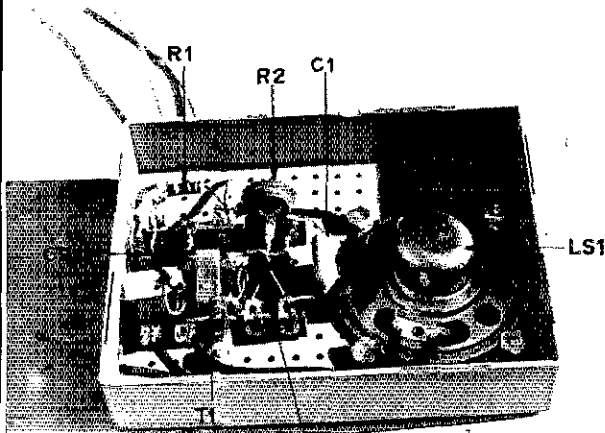


Fig. 1 - Circuit diagram of the code monitor.
 C1 - 0.22 μ F, 250 volts (Allied Radio Shack 2721058).
 CR1 - 50-volt PRV, 600 mA (Allied Radio Shack 2761135).
 Q1 - TIS97 or equiv. (Allied Radio Shack 2762013).
 R1 - 15 ohms, 1/2 watt.
 R2 - 50,000-ohm control (Allied Radio Shack 271219).
 T1 - 500-ohm center-tapped primary, 3.2-ohm secondary (Allied Radio Shack 2731379).
 LS1 - 2-1/4 inch dia., 8 ohms (Allied Radio Shack 40246).
 Also, you'll need some 5-terminal tie points and the enclosure. The Pre-Perf box used here is an Allied Radio Shack, No. 270105 part.

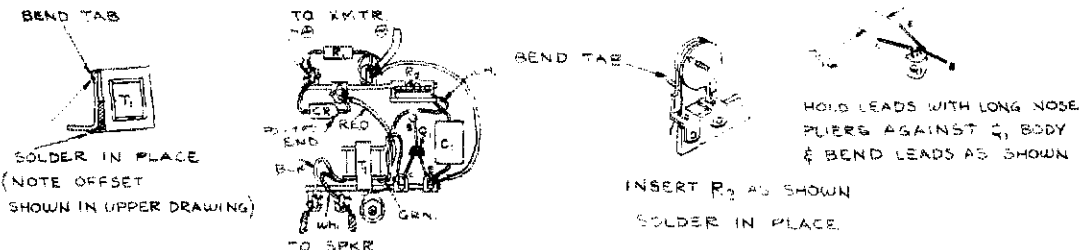
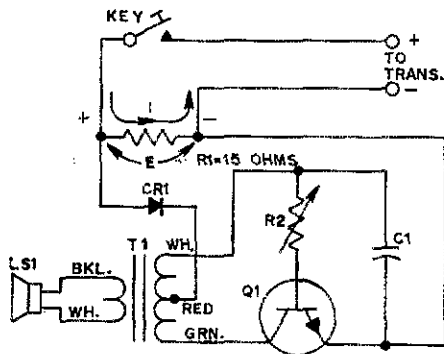


Fig. 2 - These drawings show some of the construction details of the monitor.

The F2TU

(Continued from page 31)

There are no tuning or other adjustments. Switch off the speaker and watch your machine do the work for you.

To transmit, first verify that your F2TU tones are correct. Set S1 to TEST. Set S2 to MARK first. Adjust R1 for the correct mark tone (2295 Hz) as shown by maximum meter reading, raising the monitor level with R4 if necessary. Do not try to set the space tone first. Also, be sure the circuit through the keyboard is closed and that the reversing switch, S3, is set to hold on mark.

After setting the mark tone, switch the meter to the SPACE position (2125 Hz). Adjust R2 for maximum reading on the meter. The machine should be "running open." Do not worry if there is some difference between the mark and space meter readings. This can happen because of overall nonlinear amplitude response of the audio system and because of loudspeaker loading, if you have it turned on. Adjust R12 to balance the Q3 input, shown by minimum difference between mark and space meter readings. Return the meter switch to the BOTH position. The readings will be lower but as long as you have a half- to full-scale reading, the system should function. Check it out with RY or THE QUICK BROWN FOX tests on the keyboard.

If you have previously determined the correct modulator input level, you are ready to transmit. Set operation switch, S1, to the SEND position. The tone-generator battery is switched on, F2TU tones are fed to the monitor and modulator, the microphone is muted, and the transmitter is switched on. You are in business.

With the operate switch, S1, in the RECEIVE position, you are also ready for near-normal F3 voice operation for station identification or operators' remarks. Just press your mic button to talk.

We wish to thank KØNL, WAØEKR, WAØKDC, and WAØOZP for helping to "field test" this project; also WAØYPA for the photography. **QST**

Field-Strength Meter

(Continued from page 20)

Another method for calibrating the instrument is using a transmitter and measuring its output power with a Bird Thru-Line wattmeter or similar device. In this case we are dealing with power rather than voltage ratios, so Table II should be used. With most transmitters the power output can be varied, so calibration of the test instrument is rather easy. Attach a pickup antenna to the field-strength meter (a short wire a foot or so long will do) and position the device in the transmitter antenna field. Let's assume we set the transmitter output for 10 watts and get a reading on M1. We note the reading and then increase the output to 20 watts, a power ratio of 2. Note the reading on M1 and then refer to Table II. A ratio of 2 in power is 3.01 dB. By using this method the instrument can be calibrated on all bands and ranges.

With the tuned circuits and coupling links specified in Fig. 1, this instrument has an "average" range of 6 dB for the two most sensitive positions of S2, and 15 dB and 30 dB for the next two successive ranges. The last scale is handy for making front-to-back measurements without having to switch S2. **QST**

● Technical Topics

FREQUENCY STABILITY AND THE MK-II PIP-SQUEAK

SOME BUILDERS of the MK-II Pip-Squeak 2-meter fm transmitter described in September 1972 *QST*, page 37, reported difficulty in getting the crystals on frequency. Additionally, there have been reports of significant frequency drift. Some constructors said that problems arose in trying to keep the spurious output from the transmitter down to 25 dB or greater.

A model of the transmitter was assembled at ARRL Hq. by WINTH, and the situation was studied. Indeed, the new unit exhibited some of the ailments reported. Apparently the particular 2N3866 transistor used at Q1 in the original *QST* version had somewhat lower beta than is typical, thereby permitting the oscillator to operate cooler, and with a value of junction capacitance unlike that which is present in models built by other amateurs. The output frequency of the transmitter was approximately 20 kHz too high! Drift from a cold start to stabilization was 5 kHz. Improper tuning of the oscillator tank could cause spurious output resulting from unwanted multiples of the crystal frequency.

Here are some simple cures for the faults:

1) **CURING THE DRIFT.** Remove feedback capacitors C3 and C4. Install them on the foil side of the pc board. Place a heat sink on Q1 (about half the height of the sink specified for Q3). Insert a 100-pF silver-mica capacitor between the arm of S1 and the base of Q1, as shown in Fig. 1.

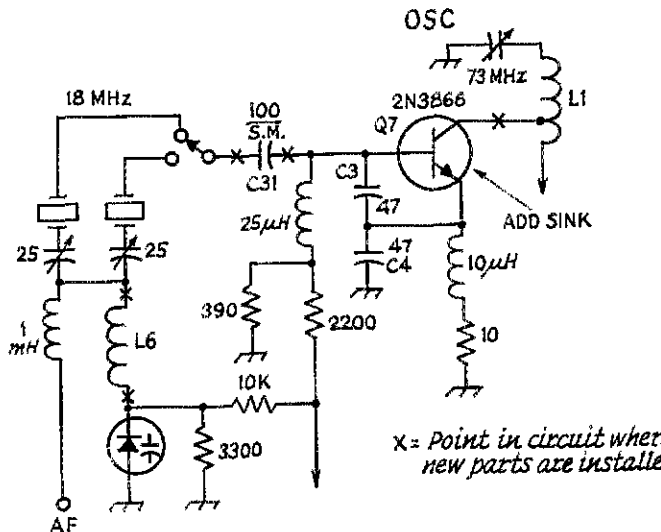
2) **PROPER NETTING.** Install an inductor (1 to 3 μ H) between the low side of trimmers C1 and C2 and varactor diode CR1. Approximately 20 turns of No. 30 enamel wire, close-wound on the body of a 100,000-ohm, 1-watt carbon resistor will suffice. The amount needed will depend on the particular brand and type of crystals used for Y1 and Y2. Use no more inductance than is needed to lower the operating frequency.

3) **SPURIOUS OUTPUT.** Move the collector tap on L1 to 1-1/2 turns from the low-impedance end of the coil. This will lessen loading on L1, thereby increasing the *Q* of the tuned circuit. The improved selectivity will greatly reduce the amplitude of unwanted harmonic currents in the oscillator output. No reduction in rf output from Q3 should result from the change.

With the changes discussed here all of the problems cited were resolved. The trimming range of the transmitter frequency, using a crystal for 146.940 MHz, was 146.910 to 146.970 MHz after the circuit was modified. Drift from a cold start to full stabilization (approximately 1 minute) was 300 Hz, the greater part of the change occurring during the first few seconds the circuit was keyed. All spurious products were down by 25 dB or greater after moving the tap on L1.

Difficulties of the kind described here are not uncommon when working at vhf with run-of-the-mill bipolar transistors. The lack of uniformity in the operating characteristics for a given run of transistors is very difficult for a manufacturer to control or predict. A look at the data sheets will illustrate this rather dramatically; the specifications list *minimum*, *typical*, and *maximum* values for beta, noise figure, and such, and the device purchased by an amateur can exhibit characteristics anywhere in that broad range. Because of the lack of uniformity nearly every completed circuit requires a bit of touching up to obtain results comparable to those of the circuit designer. ~ WICER

Fig. 1 - Circuit changes for the Pip-Squeak, MK-II. C31 and L6 are new parts. Capacitors C3 and C4 are moved to the foil side of the pc board. A heat sink is installed on Q1, and the tap on L1 is moved down one turn.



160, 75, and 40 Meter Inverted Dipole Delta Loop

BY F. N. VAN ZANT,* W2EGH

NOW THAT THE sunspot cycle is rapidly declining to a minimum, nocturnal activity on 10, 15, and 20 meters is curtailed proportionately and daytime activity on 10 meters is sporadic at best. Many amateurs are migrating back to the lower-frequency bands through necessity, if not by choice. Because of the sad state of 40 meters at night, with high-power broadcast stations every few kilohertz, the band that bears the burden of activity is 75 meters. Another amateur band that could shoulder some of the increased activity, but doesn't to any great extent, is 160 meters. Several factors are responsible for this:

- 1) Most amateur equipment covers 80 through 10 meters only.
- 2) Antenna size and efficiency becomes a major stumbling block.
- 3) High atmospheric noise levels prevail in the tropical latitudes.

Factor 1 is easy to solve. One can modify existing equipment or resort to home construction. Factor 3 is not a major one to most U.S. amateurs. Item 2 poses the major problem since many residential lots cannot accommodate a conventional full-size 160-meter antenna. Generally, a full-size 75-meter doublet or inverted V is possible. This article presents a practical solution for the operator who wants a full-size 160-meter antenna which occupies no more space than a 75-meter inverted V. No complicated counterpoises, antenna tuners, or open-wire feed lines are needed. As a bonus, efficient operation on 75/80 and 40 meters is possible. Only one 50- or 75-ohm feed line is used.

* 101 Somers Place N., Moorestown, NJ 08057.

Presented here is a description of an efficient, full-size 160-meter antenna that fits in the same space as an inverted V, 75-meter dipole, with the capability of functioning as a full-wave triangle loop on 75 or 80 meters, as well as two full waves on 40 meters.

Antenna Development

For a number of years the author listened to 160 meters with envy while marveling at the uncrowded conditions existing in that relatively narrow allocation. In the prime evening hours of the winter months, it was not unusual to listen to uninterrupted QSOs between East Coast and Midwest stations that were running only 25 or 50 watts. These stations had one thing in common — a good antenna.

A full-size doublet on 1800 kHz is approximately 260-feet long and will not fit on a typical suburban lot (unless you build your home on an old railroad right-of-way!). An 80-meter folded dipole has a total of 260 feet of wire, yet fits in 130 feet of space. It can be erected on even less property if it is an inverted V as shown in Fig. 1A. If the long second wire of the inverted-V folded dipole were dropped to horizontal, and the ends or top of the inverted V were adjusted to take up slack, a triangle would be formed as in Fig. 1B.

The height was adjusted to accommodate the same ground dimensions as the dipole of Fig. 1A;

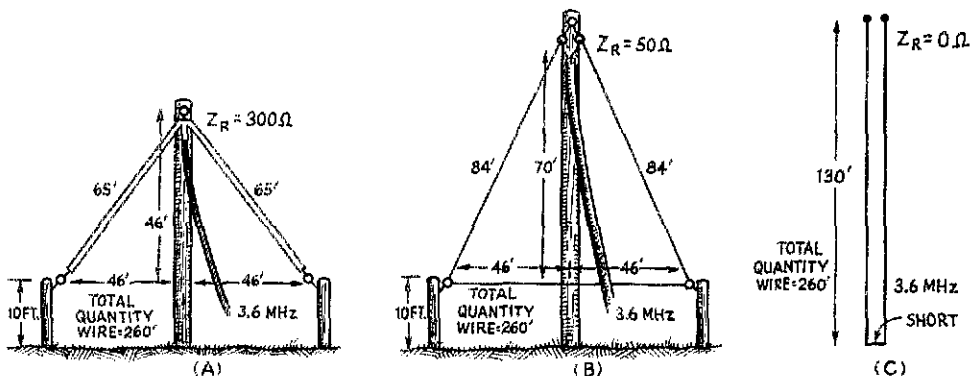


Fig. 1 — (A) A folded dipole for 75 meters, (B) a triangle with dimensions for a full-wave loop on 80 meters, (C) a quarter-wave section of transmission line.

Switch Position	Calculated Freq. (kHz)	Measured Freq. (kHz)	Impedance	SWR 50-ohm Feed	SWR 70-ohm Feed
Open	1800	1825	50	1:1	1.4:1
80 Meters (without added dipoles)	3600	3700	100	2:1	1.4:1
80 Meters (with dipoles added)	3600 & 3900	3700 & 3900	50	1:1	1.4:1
40 Meters (with loading coil)		7250 (or any desired)	50	1:1	1.4:1

however, the example shown requires an 80-foot mast. As indicated in Table I, the radiation resistance of the triangle has lowered to the 50- or 100-ohm region. If it were possible to keep raising the top of the triangle, pulling in the sides, the end result would be an 80-meter, half-wave, two-wire transmission line with the end opposite the feed point shorted, as shown in Fig. 1C. The feed point of the half-wave transmission line would have an impedance of zero ohms. This fact should be kept in mind, since it illustrates how the 80-meter impedance of the antenna may be adjusted by those who are fortunate enough to have a sufficiently high mast.

Figure 1B illustrates a full-wave triangle antenna for 80 meters. On 160 meters, however, it will be a half-wave triangle (total length of wire) having an extremely high impedance at the feed point. By simply opening the base wire at the

center, the configuration becomes a 160-meter half-wave inverted-V dipole with the ends folded back toward the center mast. The antenna may be resonant at a slightly higher frequency than its calculated half-wave resonance. Operation on 160 or 80 meters can be accomplished by either opening or shorting the center point of the base of the triangle with a switch.

Since the author does not have an 80-foot mast, the base ends of the triangle had to be pulled out to take up the slack. As shown in Fig. 2, the dimensions of the actual antenna approaches a more realistic value for many installations. The problem with lowering the height and pulling out the ends is that the impedance on 75 meters increases, mostly because of the antenna geometry, *approaching* that of a folded dipole again. With the dimensions shown in Fig. 2, the impedance on 80 meters is approximately 150 ohms. Two additional

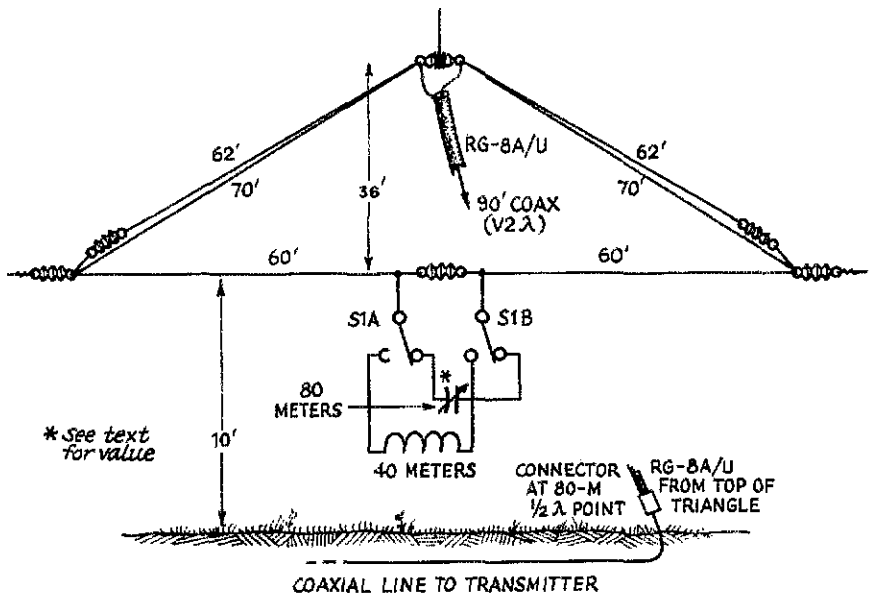


Fig. 2 -- Suitable dimensions and switching arrangement for the three-band antenna. S1 is a dpdt knife switch. The switch is left in the open position for 160-meter operation.

wires were added at the feed point to form a half-wave inverted V for 75 meters. The dipole elements illustrated in Fig. 2 resonate at 3900 kHz. A bonus feature of the triangle loop is it operates as a 2 wavelength resonance, with a 50-ohm impedance, at 7400 kHz. By adding a small loading coil to the center of the base wire, the resonance can be centered in the 40-meter band. To accommodate all three bands a dpdt knife switch can be mounted on the mast at the center of the horizontal wire. With the switch open, the 160-meter inverted V is active. With the switch in the 75-meter position, the full-wave triangle and the 75-meter dipole elements are active. With the switch set for 40 meters, the loading coil is activated. The inductor for 40 meters should be about 20 turns of No. 12 or No. 14 bus wire, 2-1/2 inches in diameter, 7 turns per inch, with taps and a clip lead for adjustment. Approximately 10 turns are needed to obtain resonance at the high end of 40 meters.

Table I presents measurements made with the 260-foot triangle antenna shown in Fig. 2. Since the antenna is fed at the top, measurements were made at the end of a 90-foot RG-8A/u feed line which represents a half wavelength at 3.6 MHz and two half waves at 7.2 MHz. With this arrangement, the antenna feed-point impedance will be repeated at the far end of the feed line. On 160 meters, the line is flat and the resonant frequency is easy to determine. If the additional dipole elements are not desired on 75 meters, the antenna could be fed with 70-ohm coax.

Bottom Feed

A major advantage of the antenna configuration shown in Fig. 2 is the convenient access to the center of the triangle base for making adjustments. If it is desired to feed the triangle at the center of the base, some method would have to be devised to open and close the triangle at the top. An automatic passive switch at the top of the triangle can be fashioned from half-wave and quarter-wave transformers. A 90-foot piece of coax cable (1/4 wavelength long at 160 meters) shorted at the far end will present a very high impedance between the two elements of the antenna at the apex. The triangle then will look like a dipole on 160 meters. The same length of coax at 80 meters is a one-half wavelength shorted transmission line with the short being reflected to the apex of the triangle. On 80 meters the triangle will look like a continuous loop. Two half waves shorted provides a similar function for the 40-meter triangle. The same switch arrangement can be retained at the center of the triangle base where the feed line attaches for switching in either the capacitor or inductor.

Beam Arrangements

The possibility of erecting two triangle antennas, appropriately spaced and parallel to each other has been considered. By tuning one of the triangles higher (or lower) than the band in use, a director (or reflector) is formed, thereby providing a beam pattern.

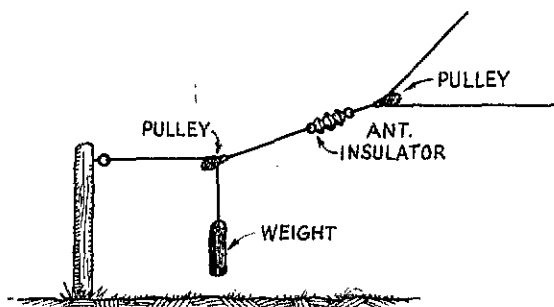


Fig. 3 — Pulley and counterweight arrangement to allow easy adjustment of the triangle size.

Construction

The antenna builder should consider a rope-and-pulley arrangement both at the top and at the ends of the triangle in order to adjust the height-to-base ratio to make impedance adjustments. The counterweight arrangement shown in Fig. 3 will keep tension on the base and top wires.

Soft-drawn solid enameled or stranded No. 12- to 16-gauge copper wire is recommended in preference to Copperweld, which is quite stiff. The author's installation uses 16-gauge stranded, teflon-insulated wire purchased from a surplus dealer. A mast is the preferred center support, however, a tall tree will suffice. A bow, arrow, and light monofilament fishline can be used to shoot a pull line over a high limb.

Operation

Results with the antenna have been most gratifying. CW contacts as far as 400 miles were made using a 5-watt, 160-meter VFO for a transmitter. A-m contacts using a 5-watt transmitter were made as far as 300 miles in the 1825- to 1850-kHz segment. Performance on 75 meters has been consistently equal to that with any dipole antenna previously used over a 20-year period. Performance on 40 meters, at night, was a pleasant surprise. The 2-wavelength triangular loop seems to exhibit gain over a dipole, with low-angle radiation in the broadside direction. A number of QSOs have been made with W6 and W7 stations from New Jersey. For the suburban antenna experimenter and "top-band" enthusiasts, the three-band inverted dipole/delta loop seems a natural step for solving the problem of space and efficiency on the lower-frequency bands. QST

ARE YOU LICENSED?

- When joining the League or renewing your membership, it is important that you show whether you have an amateur operator license. Please state your call so that we may verify your classification.

Technical Correspondence

MORE ON PHONE-PATCH LEVELS

Technical Editor, *QST*:

The February, 1972, issue of *QST* had an item of mine beginning on page 24.¹ It covered the way to modify a commercial volume-unit (VU) meter to read phone-patching line levels. After publication I received correspondence that suggests some follow-up may be in order on three points.

1) The design and production of the Calectro DI-930 meter was changed in mid-1972, resulting in different calibration.

2) A new, smaller VU meter has been added to the Calectro line, coded DI-958.

3) A number of amateurs are misinformed about the calibration and use of VU meters.

Amateurs can use any of the three types of meters for measuring voice levels at the input to a voice coupler if they will make some simple changes in the VU meter. The changes are shown in Table I. The older version of the DI-930 is somewhat easier to read, because of the greater needle deflection for a given input level. The new production of these meters can be recognized by the letter A in a circle near the bottom center of the meter-scale card. The new meter is so small that extreme care is required in modifying it. I suggest that if that is attempted, the internal rectifier be disconnected and removed from the meter housing. The meter coil can then be connected directly to the meter terminals. The rectifier and the external damping capacitance can then be mounted on a pc board and located in some convenient place.

With regard to the misunderstanding on VU-meter application, refer to Fig. 1. Most VU meters

¹ Schleicher, "Measuring Phone-Patch Levels Accurately," *QST*, February, 1972.

The three models of Calectro VU meters. At the right is the older style DI-930, and at the left is the new style DI-930 instrument. In the center is the smaller DI-958 which has recently become available.

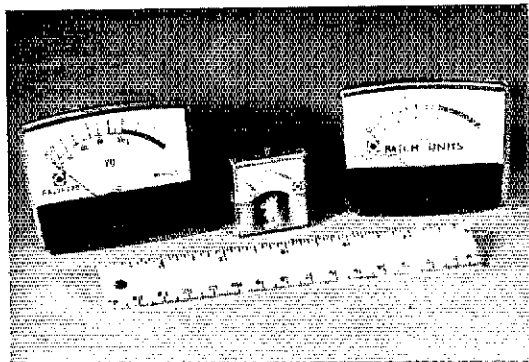


Table I -- Modification data for Calectro VU meters.

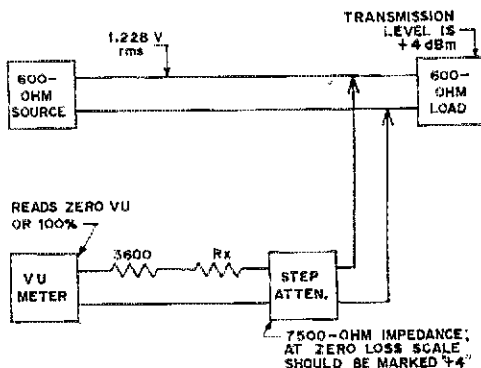
Meter Model	New Multiplier Resistance	Damping Capacitance	Maximum Scale Reading	Remarks
DI-930	365	300	Zero	Early production
DI-930(A)	No Change	400	-2	Recent production
DI-958	None	800	Zero	New product

Wiring and use are as described in *QST* for February, 1972, pages 25 and 26, and in *The Radio Amateur's Handbook*, 49th edition (1972). The column headed "Max. Scale Reading" indicates the level above which the maximum permissible energy level at the input of a voice interconnection arrangement will be exceeded.

are intended for use with an external step attenuator of 7500-ohm impedance. When the attenuator is on the zero-loss step (a straight-through connection) its knob should be pointing at "+4" on the associated scale; the reading is the algebraic sum of the meter scale and the attenuator scale. In other words, most meters indicate zero VU when connected to 1.22765 volts rms. That is equivalent to +4 dBm into a 600-ohm load. Some manufacturers provide a 3600-ohm resistance as part of the meter assembly. In the case of the two new Calectro meters, the user is expected to supply the resistor. Also shown in Fig. 1 is a resistance designated R_x . General practice is to provide a variable resistance or a string of 50-ohm resistors associated with the VU measuring assembly. These are either adjusted or strapped out when making the initial calibration of the assembly, using one of the two approaches described in the article referenced above.

The fact that the meter scale has a point marked ZERO has led a number of people to assume that either the meter was capable of measuring down to zero VU or that zero VU was somehow different from one milliwatt (zero dBm). Both concepts are in error; when measuring steady sine-wave tones (specifically one kilohertz) zero VU and zero dBm are identical. Reference: USASI standard C16.5-1961. -- George P. Schleicher, W9NLT, 1535 Dartmouth Ln., Deerfield, IL 60015.

Fig. 1 -- VU meter in use with external step attenuator.



REPLACEMENT FOR THE CA3055 VOLTAGE-REGULATOR IC

Technical Editor, *QST*:

I have just built the low-voltage power supply described in November, 1971, *QST*², and in the 1972 *Handbook*. In accumulating the components, I encountered only the usual difficulties except for the CA3055 IC.

After extensive telephoning of all the retail outlets in the greater Kansas City area, I wrote to RCA. From them I learned that the CA3055 has been discontinued and that their CA3085A is recommended as a substitute. I got a CA3085A from a local wholesale house, plugged it in, and everything works fine. I haven't been able to locate a spec. sheet on the CA3085A, so maybe the thing will do other tricks I don't know about! I thought you might want to know about the change on the IC. - *Don Inbody, WA0PBQ, 8413 Riggs, Overland Park, KS 66212.*

RUNNING A COOLER LM309K IC REGULATOR

Technical Editor, *QST*:

I recently constructed W1K1K's 30-300 kHz calibrator described in the April, 1972, issue of *QST*.³ It occurred to me that other *QST* readers might be interested in a slight modification that I incorporated into the project.

Rather than making a pc board, I purchased a ready-made one; however, after mounting the prescribed 12-volt power transformer, I discovered there really wasn't much room left for a heat sink around the LM309K voltage regulator. A quick glance at the LM309K data sheet and a little arithmetic convinced me that I could probably get away without one. After all, the LM309K needs to dissipate no more than about 750 mW (corresponding to a 25°C temperature rise without the heat sink) and besides, this IC has internal thermal-sensing circuitry that can provide emergency protection if needed.

So without feeling guilty about the heat sink omission, I completed construction and fired up the calibrator. Naturally, like practically all *QST* projects, it worked the first time. After several minutes of operation, the "finger-touch" temperature test disclosed that it wasn't the LM309K, but rather the 12-volt power transformer that could use a heat sink!

I wasn't too surprised at this development, as some of these small imported transformers are designed a little on the skimpy side to save on cost. Nevertheless, I was beginning to worry about the prospect of having thermal instability problems caused by the power transformer (as well as the LM309K) on the same board with the 3-MHz oscillator. Some quick fix was in order.

The solution was simple. An 1800-ohm, 2-watt resistor was placed in series with the power transformer primary (well removed from the pc board). As a result of the lower primary voltage, the power transformer runs cool, and as an added bonus the LM309K dissipation is almost halved

because its input voltage drops from nearly 20 to about 11 volts. Of course, the oscillator-counter electronics run on a regulated 5 volts and don't even notice the 1800-ohm resistor.

I may not be able to prove that the oscillator stability is any better now, but at least I'm confident the power transformer won't expire prematurely during long periods of continuous use. Congratulations to W1K1K for the calibrator article describing a simple, but extremely useful, piece of test gear for the amateur EMer. - *Thomas K. Mills, W4PIB, 6718 Barrett Rd., Falls Church, VA 22042.*

TELETYPE GOODIES

Technical Editor, *QST*:

A genuine bonanza of Teletype equipment lies in wait for the lucky souls who can pick it up. Over the past couple of years, the Santa Fe Railroad has been replacing all of its Teletype equipment with late-model units, and the older stuff - model 14 and model 15 gear - is up for grabs. Although most of it has already been disposed of (one story says that over six hundred model 15 printers were sold as scrap metal for two cents a pound), there are still quite a few pieces left.

The equipment is being sold "as is, where is," first come, first serve. Don't let the "as is" fool you. These machines were taken right out of service on the rail line, and have been maintained by experts. Of course, there's no guarantee, and you can't get your money back, but I bought quite a few of the machines that were from my local area, and I have never seen cleaner or more perfect equipment.

Now, the "where is." You have to pick it up yourself, so if you live near a "where is," you're in luck. The following table shows the quantities of equipment at each of the locations:

City	A	B	C	D	E
Amarillo TX			10	15	
Cleburne TX	2	6	5		4
Topeka KS			2		
Wickenburg AZ		2		1	
Bakersfield CA			3	1	1
Barstow CA				3	
Fresno CA			8		1
Los Angeles CA		1	7	11	3
Needles CA		3		2	
San Bernardino CA			15	12	3

A - Model 15

B - Model 15 RO (no keyboard)

C - Model 14 Transmitter distributor

D - Model 14 RO Typing reperfer; no keyboard

E - Model 14 Non typing reperforator

All machines are 60 speed, 5 level, with communications symbols and synchronous motors. The prices are as follows:

Model 15 page printers, \$25.00 each.

Model 15 RO page printers (no keyboard), \$20.00 each.

Model 14 transmitter distributors, \$10.00 each.

Model 14 RO typing reperforators (no keyboard), \$15.00 each.

Model 14 nontyping reperforators, \$10.00 each.

In order to purchase the equipment, you must send payment in full (cashier's check, money

² Blakeslee, "AC-Operated Regulated DC Power Supplies for Transistorized Rigs," *QST* for November, 1971, p. 11. See also Smith, "CA3055 IC Voltage Regulator and Current Limiting," Technical Correspondence, *QST* for June, 1972, p. 39.

³ Blakeslee, "Double Standards," *QST*, April, 1972, p. 13.

order, or other, payable to the A.T. & S.F. Railway Co.), with a letter stating the following:

1) The location(s) where you intend to pick up the equipment.

2) A list of the pieces you want to buy at the location(s) mentioned in (1).

3) Your name and address.

4) A statement as to whether or not you will accept a partial order (with appropriate refund) if all of the pieces specified are no longer available.

The letter must be addressed to Mr. C. C. Glover, Purchasing and Materials Dept., A.T. & S.F. Railway Co., P.O.Box 1674, Topeka, KS 66601. The inclusion of a self-addressed stamped envelope with your letter is mandatory for response to your letter or return of your money in the event that the equipment is sold out. — *William D. Johnston, WB5CBC, 1308 Pomona Dr., Las Cruces, NM 88001.*

SSTV VIDEO INVERSION AND SHORT SCANS

Technical Editor, *QST*:

There are many SSTV's who would like to transmit pictures with a video inversion capability, i.e., reverse a title from white background to black, like a negative. The following addition to a Robot camera is quite simple and effective. A small perforated board with the components shown in Fig. 2 can be mounted at the hole available on the rear deflection-coil assembly board, or epoxy glued to the printed circuit side of the main board. The NORMAL-INVERT switch can be mounted on front or rear of the camera case. Do not use shielded leads since about 250 kHz of video is carried, and make the leads as short as possible. After the components of Fig. 2 have been added, set the BALANCE control so that medium gray

(1900 Hz) will not change the intensity level when S1 is switched from NORMAL to INVERT.

A note on inverted pictures: There seems to be a general feeling that white letters on a black background is the best combination for transmitting titles. While this is fine for high signal levels and a "closed" circuit with good propagation conditions, it is not so for weak signals that are plagued by strong interference. With a black background (1500 Hz) the sync-select circuits in a monitor have more difficulty separating the sync pulse (1200 Hz) from background along with the noise, whereas, if the background is white (2300 Hz) the sync separation is easier even with noise present.

The other suggested change is to have the camera transmit short scans of quarter-frame or half-frame (vertical time of 2-1/8 seconds or 4-1/4 seconds respectively on Robot cameras). This, again, is for DX and weak signals. What frequently happens is that you wait eight seconds for a noise-disturbed signal to be repeated so that you can make out the call letters, and they probably get messed up again on the next scan. One good way to alleviate this problem is to have *RAPID REDUNDANCY* or short scans. With call letters filling the quarter frame, then in eight seconds you will have four scans, usually overcoming the noise by the more frequent repetition. Actual use has shown the signal-to-snow ratio is improved four-fold.

Fig. 3 shows a circuit modification for the Robot camera where two single-pole single-throw switches may be mounted and wired to replace two jumpers on the board. These switches may be mounted on the back for shorter leads. The lead length seems to be noncritical, as WA7NIN mounts all his switches, including the NORMAL-INVERT switch on the front panel between the REVERSE

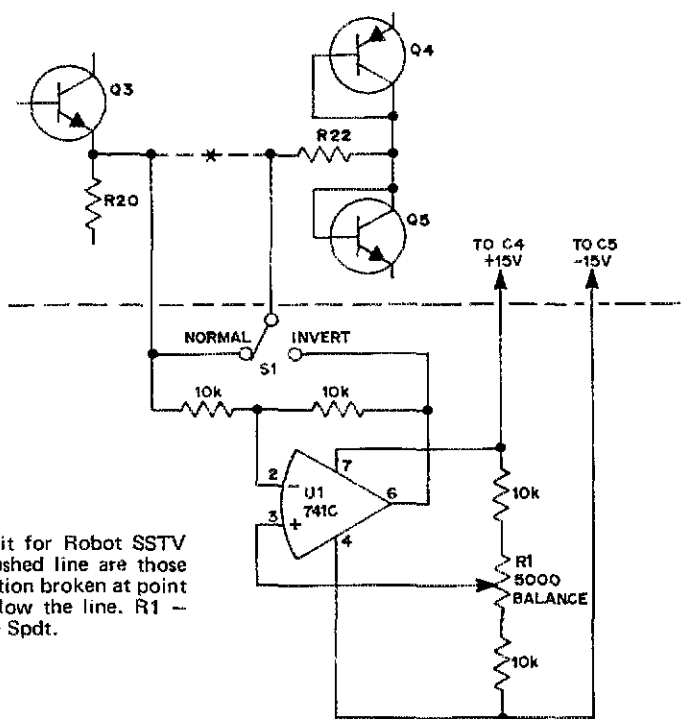


Fig. 2 — Video inverter circuit for Robot SSTV camera. Components above dashed line are those of original circuit, with connection broken at point X. Added components are below the line. R1 — Linear taper, low wattage. S1 — Spdt.

A CB Rig for 220 MHz

(Continued from page 33)

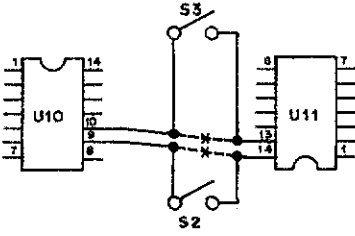


Fig. 3 — Modification for Robot SSTV camera to produce half frames (4-1/4-second frame period) and quarter frames (2-1/8-second period). Open S2 only for half frames, S2 and S3 for quarter frames.

switch and the lens. This made the short-scan switch leads approximately 10 inches long, with no coupling problems. I consider the short scan effect a really necessary adjunct to any SSTV transmission and I feel it should be used frequently for noise alleviation. — N.C. Stavrou, W4TB, 670 Kingsbury Circle, Winston-Salem, NC 27106.

SOURCE FOR LOWER COST 2N5591 TRANSISTORS

Technical Editor, *QST*:

In reference to the May, 1972, issue of *QST*,⁴ the transistor for the 25-watt amplifier (2N5591 or HEP S3007), which costs \$24.95, can now be bought for \$10.95, plus \$1.00 postage. It is available from Intermark Electronics, 2920 W. Warner Ave., Santa Ana, CA 92704 under the number 2N5591, and is made by Solid State Scientific, Inc. This device meets all ratings of the \$24.95 device. I hope this note will save someone \$13.00 cash. See you on 2 meters. — Mike Aust, WB6DJI, 410 Longfellow Ave., Hermosa Beach, CA 90254.

HIGH-PERFORMANCE RECEIVERS

Technical Editor, *QST*:

The high-performance receiver described by W1KLK in February, 1972, *QST*⁵ is reminiscent of the front-end approach to selectivity presented by Conklin in the August 1967 issue of *QST*.⁶ The favorable results reported by both make this a suitable field for further work.

It should be possible for a designer of linear integrated circuits to duplicate W1KLK's bulky mechanical apparatus on a single chip. Imagine a single chip containing varactor diodes and op amps in a gyrator configuration, which could be tuned from 3-30 MHz by a single potentiometer! LSI techniques should permit the high-density circuitry which would track several electronically tuned circuits with a minimum of external components.

Which manufacturer will be the first to come out with a family of these covering vlf to uhf? If it sounds like a dream, just think back to what phase-locked loops and digital counters used to look like! — Alan Horowitz, WA2FDG, 18 Cantitoe Rd., Yonkers, NY 10710.

⁴ Hejhall, "Some 2-Meter Solid-State RF Power-Amplifier Circuits," *QST*, May, 1972, p. 40.

⁵ Blakeslee, "An Experimental Receiver for 75-Meter DX Work," *QST* for February, 1972, p. 41.

⁶ Conklin, "Front-End Receiving Filters," *QST* for August, 1967, p. 14.

The first step is to select a circuit that is compatible with the power supply as well as with the physical layout of the transceiver. Since the 27-MHz transmitter inside the original unit used tubes, a tube transmitter for 220 MHz was built to replace it. All necessary voltages were available. If the transceiver is completely solid-state, a transmitter along the lines of one described in *QST* might be appropriate.⁷ All of the original transmitter components were removed. In this case, the CB transmitter had been wired point-to-point using a steel chassis as a foundation. The tube socket holes that were left on the chassis were not compatible with the layout that was desired for the new transmitter, therefore it was built on a 5 × 3-inch piece of sheet aluminum and supported above the former chassis by 1-inch metal spacers. The new transmitter is similar to one described in *QST*, although the output is taken from the 6360 that serves as a driver tube in the original article.⁸

The transmitter uses crystals in the 8-MHz range which, when multiplied 27 times, provides an operating frequency in the 220-MHz band. Fm is generated by using the modulated 270 volts from the original plate modulator. Modulation is applied to the plate and screen of the 8-MHz oscillator. It takes only a small amount of swing at 8 MHz, when multiplied by 27, to produce a large deviation at 220 MHz. An alternate method of producing fm would be to use a varactor diode in the oscillator circuit. Plenty of audio is available from the transceiver's original modulator for this application.

The Final Touch

Adding "polish" to the converted unit gives a certain degree of professionalism. A thin aluminum sheet was cut to fit the front panel in the area of the tuning dial. It covers up some of the original markings and holes. Matching paint enhances the appearance. Decals giving proper calibration points for the receiver makes the operation of this transceiver more convenient.

BIBLIOGRAPHY

¹ Lange, "Ten-Meter Conversion of CB Transceivers," *QST*, February, 1967.

² Blakeslee, "ARRL Proposed Band Plans for 220 and 420 MHz," *QST*, June, 1972.

³ McMullen, "450 Cubic Centimeters of New Front End for Your FM Receiver," *QST*, June, 1972.

⁴ *The Radio Amateur's Handbook*.

⁵ *The Radio Amateur's VHF Manual*.

⁶ DeMaw, "FM Pip-Squawk Mk II," *QST*, August, 1971.

⁷ McCoy, "Converting the Pip-Squeak to 220 MHz," *QST*, February, 1972.

⁸ *The Radio Amateur's VHF Manual*, Eleventh Edition.

QST



Recent Equipment



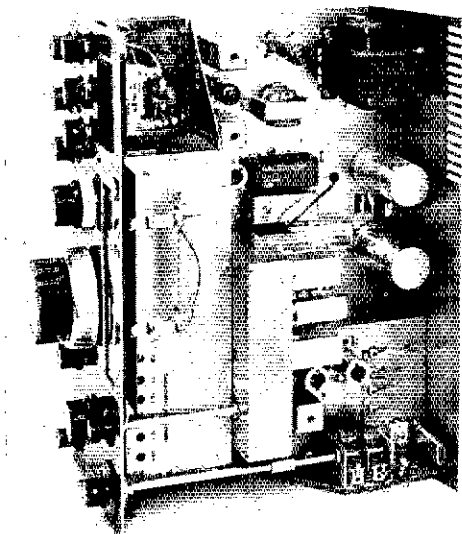
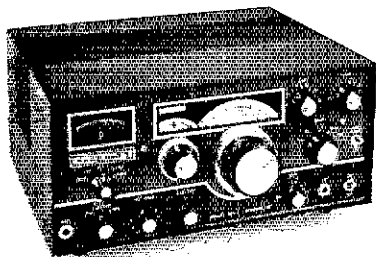
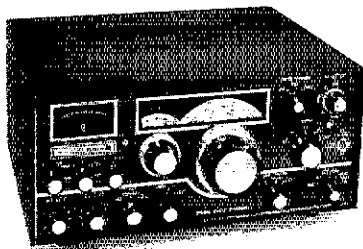
To acquaint you with the technical features of current amateur gear.

Swan Twins (600-T and 600-R)

A DOZEN OR SO years ago the name Swan helped spell the beginning of the end for a-m operation. It was the small single-band transceiver that added impetus to the growing number of sideband signals on the air at that time. Swan has marketed a number of five-band transceivers; however, until recently there was a void for the amateur who wanted a separate receiver and transmitter combination. The 600-R and 600-T fill this need. Either unit may be used independently, or both as a compatible pair. The receiver may also be used as an adjunct to one of the Swan transceivers such as the 500-CX.

The 600-R and 600-T are designed for use on amateur frequencies from 3.5 to 29.7 MHz. Generous additional coverage is provided for MARS frequencies. Adapters are available for transmitter crystal control, and for receiver general coverage from 3 to 30 MHz. Like the Swan transceivers, the 600-R and 600-T are both single-conversion units using a 5500-kHz i-f. They are designed for use on ssb, cw, fsk, and SSTV modes.

The 600-R and 600-T have an interesting band changing arrangement. The usual system is to mix the VFO output with a crystal oscillator, then heterodyne this energy with the signal from the rf amplifier stage. Instead, Swan uses a single VFO with two variable capacitors. A 12-pF capacitor provides 200 kHz coverage on all bands except 10



meters, where the range is 500 kHz. Adjacent to the MAIN-TUNING control on the front panel is a knob designated DIAL SET. The skirt is calibrated from +400 through zero to -400 in 100-kHz increments. When the DIAL SET is placed on zero, the unit (either transmitter or receiver) is set up for operation in the phone portion of each hf band. When going from phone band to phone band it is necessary only to activate the built-in crystal calibrator, set the MAIN TUNING to any convenient 25-kHz spot on the dial, and tweak the DIAL SET for zero beat. Going from the phone segment of one band to the cw segment of another band, however, is a chore. For example, if the units are set for operation on 75 meters, the DIAL SET is on zero and the band switch is on 3.8. To go to 40 cw, the band switch is placed on 7.2. However, 7.0 MHz is 200 kHz below 7.2 MHz and the DIAL SET must be adjusted to the -200 increment. The same procedure is followed with the transmitter. For operation on 21.0 MHz, the band switch is placed at 21.3 MHz and the dial is set for -300. The DIAL SET control can be mechanically locked in position on any band. This must be done carefully since it is possible to "bump" the DIAL SET out of alignment.

The 600-R Custom receiver. The optional IC audio Notcher/Peaker is located under the S meter. The noise limiter is mounted above the PRESELECTOR control.

Adjusting the carrier oscillators of the transmitter and receiver for transceive operation is a simple matter. A wire is connected between the test jacks on both units and the 5500-kHz oscillator trimmer (located on the side of the unit) is adjusted for zero beat. This is repeated for the 5503-kHz trimmer.

So much for the common denominators in both the transmitter and receiver. Now for the description of the individual units.

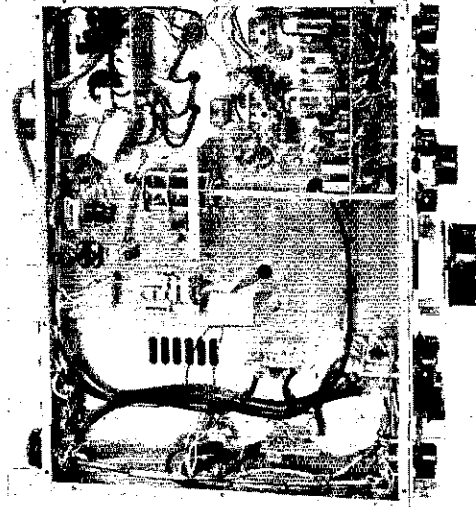
The 600-R Custom Receiver

The only difference between the 600-R and the 600-R Custom is the addition of an IC audio filter and noise blander in the latter unit.

Sensitivity tests indicate that the receiver is well within the manufacturer's specifications. Sensitivity measured 0.17 μV , or less, for 10 dB signal-plus-noise to noise ratio. Sensitivity is controlled by an agc circuit having two separate time constants selectable by a front-panel switch. The author's unit tended to "pump" in both SLOW and FAST agc positions when tuned to a strong signal. Agc recovery is slow for full break-in cw operation.

Selectivity is nominally 2.7 kHz and is determined by a crystal-lattice filter having a 1.7 shape factor. An optional 16-pole crystal-lattice filter, with the same bandwidth as the standard filter, is available. Other optional filters are a 0.6-kHz cw filter and a 6-kHz a-m filter.

The "Custom" comes with an IC audio notch-peaker. This solid-state device is inserted between the product detector and first audio stage providing a notch approximately 40 dB in depth. In the PEAK mode the filter acts like a Q



Bottom view of the Swan receiver.

multiplier. The audio filter, when used in conjunction with the 0.6-kHz cw filter, provides excellent selectivity.

When the i-f noise blander is activated, both the signal and the noise from the mixer are amplified by two 12BA6s and applied to a diode limiter where noise peaks are clipped. From there the

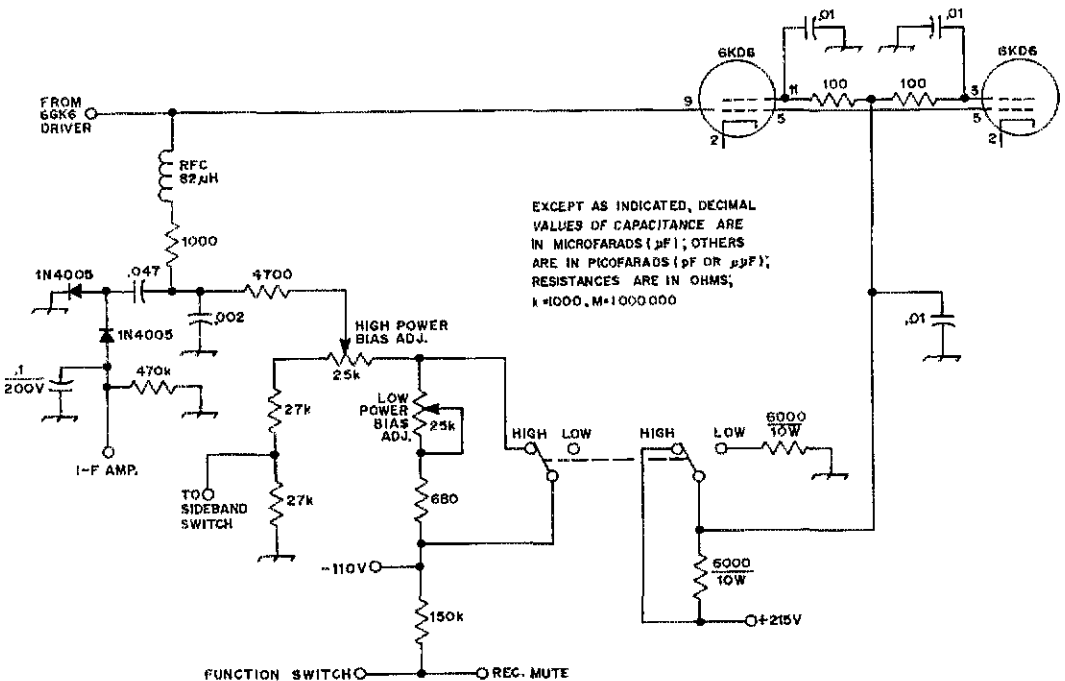
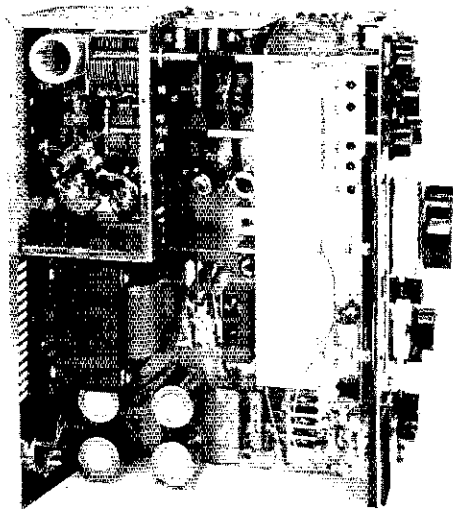


Fig. 1 — High/low power switching for the 600-T final amplifier.



Top view of the 600-T. The tuning eye is behind the lower dial light. The crystal-lattice filter is located between the power transformer and the VFO.

signal is attenuated to approximately the same level as the input signal to the blanker. There is a tendency for the noise blanker to overload when there are many strong signals on the band. Swan designed the noise blanker for two levels of gain (adjustable from the front panel). In the MED position, the output level is approximately the same as the input level to the blanker. The MAX position provides better noise reduction, but cross modulation problems introduced by the blanker make it almost unusable, especially during weak-signal reception periods.

VFO stability is quite good. The VFO is solid state and is isolated by a buffer stage to prevent "pulling." A Zener diode provides regulated voltage to the oscillator and buffer. The receiver and transmitter VFO are nearly identical. Table 1 gives VFO stability measurements made during a three-hour period. The measurements were taken from a "cold start" on 80 meters. Both 20- and 15-meter data were obtained after the receiver had been turned on for an hour.

TABLE I - SWAN VFO STABILITY

TIME MINUTES	VFO FREQUENCY IN kHz		
	80-Meters*	20-Meters	15-Meters
1	9306.767	8706.989	15,807.838
2	9306.784	8706.990	15,807.839
3	9306.829	8706.986	15,807.839
4	9306.877	8706.985	15,807.839
5	9306.931	8706.985	15,807.840
10	9307.031	8706.976	15,807.844
15	9307.027	8706.973	15,807.845
20	9307.055	8706.971	15,807.846
25	9307.097	8706.971	15,807.846
30	9307.120	8706.970	15,807.849
45	9307.195	8706.972	15,807.860
60	9307.208	8706.977	15,807.863

*80-meter measurements were taken from a cold start. 20- and 15-meter measurements were not.

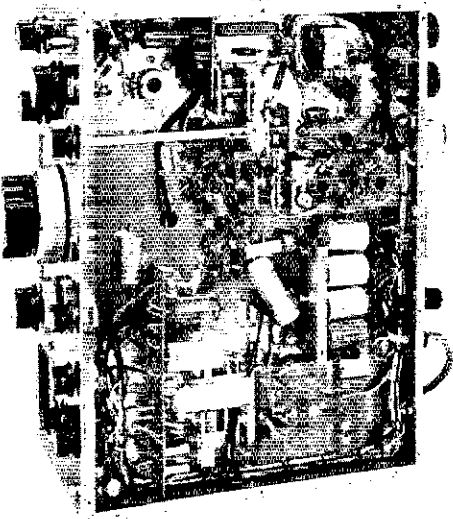
The 600-T Transmitter

The 600-T is a self-contained 600-watt ssb transmitter using a pair of 6KD6 sweep tubes in the final amplifier. The 600-T can be used on cw at 500 watts, a-m at 150 watts, and RTTY/SSTV at 100 watts, dc input.

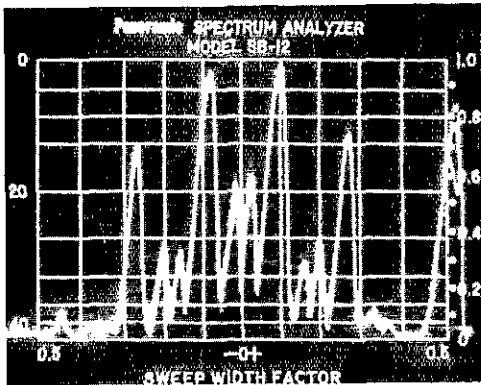
Each 6KD6 has a plate-dissipation rating of 33 watts. Care must be taken to prevent damaging these tubes when tuning the rig. The instruction manual warns many times that PA resonance adjustments must be performed quickly to preserve tube life. A front-panel HIGH/LOW power switch is provided to aid tune-up and extend tube life. As shown in Fig. 1 the HIGH position applies +215 volts to the screens of the final amplifier tubes. In the LOW position this value is reduced by approximately 30 percent. Although the final tune-up of the rig needs to be accomplished with the switch in the HIGH position, the operator may obtain "ballpark" settings for the drive, tuning, and loading controls in the LOW position.

Swan has provided an interesting tuning aid. A tuning eye, as used in many broadcast-band fm receivers, is used to allow constant monitoring of transmitted relative power output. As shown in Fig. 2, a small amount of rectified voltage from the 1N34A is applied to the grid of the tuning eye: the greater the rf power output, the greater the rectified voltage, and the more the tuning eye closes.

On cw, the 600-T may be operated full or semibreak-in. For the latter, the VOX accessory, VX-2, must be incorporated. Switching func-



Bottom view of the 600-T. The power supply circuit board is at the lower right below the protective Plexiglas plate. The crystal-lattice filter is mounted on top of the chassis.



tions from receiving to transmitting are automatic when the key is depressed. VOX-relay drop out may be delayed by varying a potentiometer. Full break-in does not require the use of the VX-2, but an external T-R switch or separate antennas for the receiver and transmitter are required. The 600-T can be operated manually by placing the front-panel function switch in the TRANS position. Receiver muting is accomplished either by an internal relay (in the semibreak-in mode) or a transistor (in the full break-in position). The 600-T uses grid-block keying.

For phone operation, the transmitter must be operated push-to-talk unless the optional VOX accessory is added. A front-panel switch allows the operator to use the opposite sideband (such as usb on 40 meters) if desired. The 600-T has a built-in power supply which surprisingly does not crowd components on the chassis. The final amplifier tubes get quite warm during periods of operation. The only station accessory items needed to put the 600-T on the air are a 117-volt power source, an antenna, and a mike (or key).

Other Comments

The Swan twins may be operated transceive using either the transmitter or the receiver VFO or they may be operated as separate units. VFO selection is accomplished by a front-panel switch on the receiver. Cw transceive operation on either VFO is possible. The cw carrier frequency is shifted 800 Hz above the receiver frequency,

Spectral analysis of the 600-T output under two-tone test conditions. The third-order distortion products are only 16 dB below the two-tone output. (The Panoramic scale is calibrated in dB below a single tone. To convert this scale for a two-tone test, subtract 6 dB from figures indicated at the left side of the scale. The line directly above 20 is equal to 10.)

Swan 600-R Receiver and 600-T Transmitter

600-R:

Sensitivity (for 10 dB Signal-to-Noise plus noise): 3.8 MHz - 0.1 μ V; 7.1 MHz - 0.17 μ V; 14.2 MHz - 0.1 μ V; 21.3 MHz - 0.12 μ V; 28.0 MHz - 0.1 μ V.*

Selectivity: 2.7 kHz. Optional filters available for a-m and cw.*

Stability: See Table I.*

Image rejection: better than 50 dB.*

Dial Calibration: Every 2 kHz for 80 through 15 meters; for 10 meters every 5 kHz.

Dial backlash: Unnoticeable.*

Dimensions (HWD) and Weight:

6-1/2 x 15 x 12 inches, 23 pounds.

Power requirements: 117 V ac, 120 watts.

Price class: \$440.

600-T:

Power output: 3.7 MHz - 250 watts; 7.1 MHz - 310 watts; 14.1 MHz - 270 watts; 21.2 MHz - 280 watts; 29.0 MHz - 150 watts. (Key-down operating conditions.)*

Plate Voltage: Key up - 930 volts; key down - approx. 800 volts.*

Intermodulation Distortion Products: Approx. - 16 dB for third-order products. (See photograph of analyzer display in text.)*

Carrier Suppression: Better than 50 dB.*

Keying: Grid block.

DC Power Input to PA: 600 watts PEP for ssb, 500 watts for cw, 150 watts for a-m, 100 watts for RTTY/SSTV.*¹

Amplifier Output Circuit: Pi network.

VFO Stability: Approx. the same as the receiver.*

Dial Calibration: Same as the receiver.

Power Amplifier Tubes: Pair of 6KD6s operated in parallel.

Meter Functions: Cathode current (relative output indicated by a tuning eye).

Dimensions (HWD) and Weight: 6-1/2 x 15 x 12 inches, 32 pounds.

Power Requirements: 117 V ac, 6.2 amperes (key down). Power supply is built in.

Price Class: \$590.

Manufacturer: Swan Electronics, Oceanside, California.

*Test measurements made in the ARRL Lab.

¹Ten meter input measured at 400 watts.

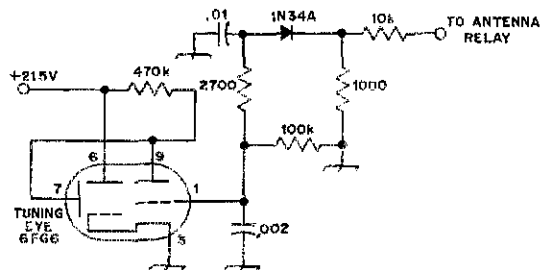


Fig. 2 - 600-T tuning eye circuit.

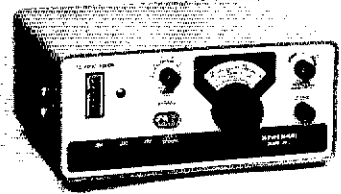
allowing the operator to cw transceive without having to listen to an uncomfortably high beat note.

Both transmitter and receiver use dual-ratio main-tuning knobs. The inner knob is used for fast frequency excursions and the outer one provides fine tuning. In the author's opinion, VFO accuracy leaves something to be desired. An inaccuracy of

one or two kHz per 25 kHz on the cw bands is not uncommon. Accuracy is greatest on the phone bands. Changing from cw band to cw band is, at best, a time-consuming chore. Although the 600-T instruction manual is complete and informative, the receiver manual lacks a circuit diagram. It is assumed this is a simple oversight by Swan! - *W1GNC and WA1PD*

QST ——— QST ——— QST

Heath HW-7 CW QRP Transceiver



Some Early Problems

PRACTICES OF PAST eras seem to return and tantalize the radio amateur from time to time. The remarkable curtain call for fm as a mode of communication is a sparkling example. Still another, and one that stirs nostalgia, is "straight key night," held each year. It would be difficult to pinpoint the stimulus that has incited so many radio amateurs into activity in the once-necessary QRP field, but testimony to the popularity of low-power operation is evident when listening to the phone and cw portions of our hf bands. Perhaps the QRP enthusiast is motivated in part by one philosophy of the day. . . a retreat from material wealth and status. The trend is toward a less complicated way of life, or so it seems, where simplicity is the life style. The application of personal skills seems to be of greater value to some than is the need to acquire recognition through affluence and showmanship. Certainly the QRP operator must exhibit unusual operating skill if he is to compete successfully with his QRO fellows. A QRP rig isn't likely to be regarded as a status symbol in one's shack; the size and the cost (both modest) negate such a possibility. For some, things have become too easy with respect to working WAS, WAC, or DXCC. Big antennas and high power will get the job done quickly if the operator is skilled and courteous, but the challenge does not sharpen one's appetite quite so markedly as when operating in the QRP class.

Heath Company has put QRP operation within the reach of anyone willing to invest less than \$75, and their HW-7 provides for operation on 40, 20, and 15 meters. The package is small enough to be tucked under the owner's arm and carried to a camp site, picnic spot, or friend's home. The transceiver can be powered by batteries (12 V) or an ac-operated dc supply. Maximum current taken by the unit is approximately 400 mA during transmit periods. Because of the low duty cycle of cw operation the camper should be able to do plenty of operating with a lantern battery or similar source. RF power output is in the 2-watt class on all three bands. Shades of the 01A vacuum tube! *We are* being haunted by our past!

The specific unit treated in this review came in kit form and was assembled by the writer. Some significant problems with the performance of the transmitter and receiver sections became manifest during initial testing. It was possible to tune the PA in such a manner as to obtain spurious output at 28, 14, 12, and 7 MHz during 15-meter operation. The peak in relative rf-output reading was so poorly defined that it was not possible to tell which peak was the desired one (21 MHz).

While testing the receiver it was observed that strong hf-band commercial stations tended to blanket the amateur band being listened to, despite careful peaking of the front end. Similarly, blanketing from nearby bc-band stations occurred when using antennas other than beams or resonant verticals.

A number of circuit modifications were made by the writer, and the difficulties were cleared up one at a time. The matter was called to the attention of the engineering staff at Heath. After considerable dialogue with the Heath engineers by phone and letter, three of them came to Newington to consult with the ARRL technical staff in an effort to investigate and resolve the problems.

The flaw in the transmitter turned out simply to be a defective component (Zener-diode clamp in the collector circuit of the PA stage). Once it was replaced, the instability and spurious-output problems were resolved. Some of the circuit changes recommended were adopted by Heath and are being offered to early-model owners in a modification kit. The ARRL Hq. staff was much impressed with Heath's concern over the questions raised, and with the dispatch in which they came east to resolve the problem. The remainder of this report deals with performance after the circuit modifications were made.

Circuit Features

Reception is provided by a direct-conversion receiver that has a dual-gate MOSFET product detector as a front end. A single-tuned circuit

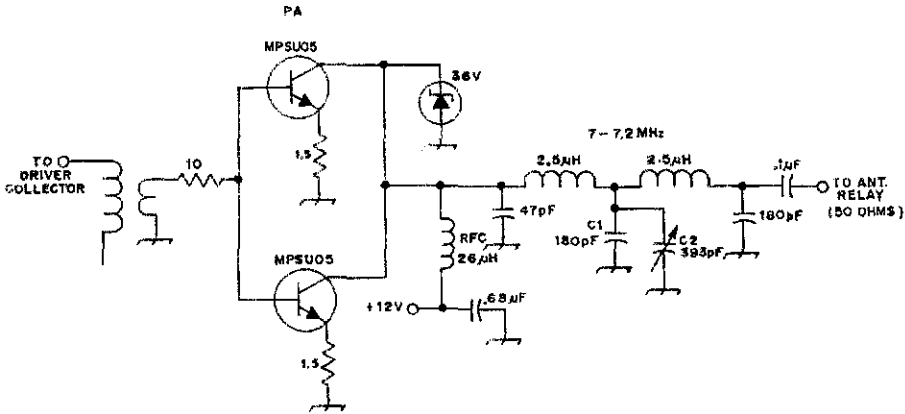


Fig. 1 -- Schematic diagram of the HW-7 PA circuit. The band-switch arrangement is not shown so that the illustration can be simplified. Constants given are for 40-meter operation. Fixed-value capacitor C1 is used during 40-meter operation. Only C2 is in the circuit when the transmitter is used on 20 and 15 meters. The Zener diode at the PA collectors limits sine-wave peaks in that part of the circuit, thus preventing the safe collector-to-emitter voltage from being exceeded. Without the diode in the circuit the PA can break into self-oscillation and the MPSU05s can be destroyed when the key is closed. The 1.5-ohm ballast resistors in the emitter returns protect the transistors from damage that could result during thermal runaway, and they help to equalize the currents drawn by the two devices.

provides the selectivity for that stage. It is tuned to resonance in each band by means of a 393-pF variable capacitor, thus eliminating the need for a band switch in that part of the circuit. This panel-mounted control is labeled **PRESELECTOR**, though this seems to represent a misnomer of sorts since it is purely a peaking control.

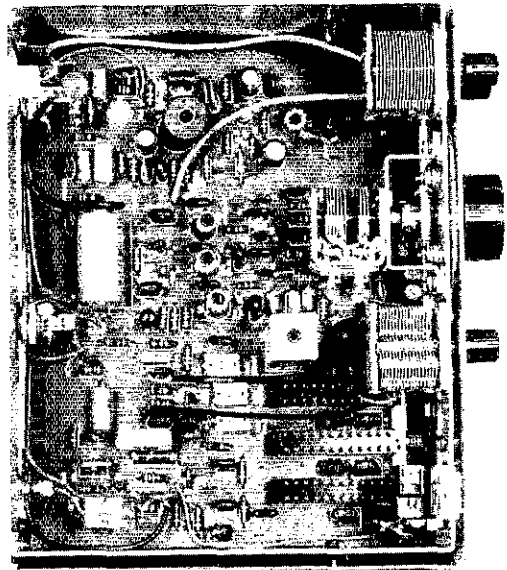
The oscillator chain for the transmitter VFO serves double duty to provide a tunable BFO, the output of which is injected into gate 2 of the MOSFET detector. Injection occurs at the frequency of reception in each band covered by the HW-7. The fundamental frequencies of the VFO are 3.5 and 7 MHz. VFO energy is multiplied in frequency to 14 and 21 MHz (VFO operating at 7 MHz) for operation on 20 and 15 meters. During 40-meter use the VFO operates at 3.5 MHz and its output is multiplied to 7 MHz.

Overall receiver selectivity is established by an *m*-derived low-pass filter in the audio line between the product detector and the af amplifier. Though the HW-7 is a cw transceiver, selectivity is set for ssb reception (approximately 2 kHz, and with broad skirts). The reviewer was able to sharpen the response by changing the value of capacitance at

each part of the filter. The .02- μ F value at each terminal was changed to 0.22 μ F, and this provided cw selectivity without impairing the level of audio output.

The filtered audio is amplified to headphone level (no speaker with this rig) by means of an audio IC which has the capability of 120 dB of amplification. The receiver is designed to work into high-impedance headphones.

The receiver is quite microphonic when its front end is peaked for the band of operation. This



View of the interior of the HW-7 (top). The push-button switch assembly is at the lower right. A dual-section variable (center right) is used to tune the VFO. The variable capacitor just below the split-stator one is the PA tuning control. The remaining variable capacitor (upper right) is for peaking the receiver front end. The rear panel of the cabinet (left) contains the power socket, key jack, antenna connector, and headphone receptacle.

is not a troublesome trait provided one does not bump the cabinet while listening to weak signals. The instruction manual mentions this condition and states that it is "typical" with this type receiver. No technical explanation is offered, however. Receiver sensitivity seems to be quite good despite the fact that no rf amplifier is used. Measurements made with a G.R. Model 80 signal generator indicate that 0.2 μV from the generator will produce a plainly audible cw note in the headphones. Normally, the man-made and atmospheric noise levels exceed that amount on the hf bands.

Performance

Transmitter performance is quite good. No chirp or hum has been noted on the transmitted signal, and only a slight click can be detected during keying intervals. The VFO is very stable during both the transmit and receive functions, mechanically and electrically. A precision ball drive is used to control the tuning capacitor in the VFO. No backlash can be detected, and tuning is smooth and easy. The dial is calibrated in 5-kHz steps. Tracking is within 2 kHz over any 100-kHz spread checked by this reviewer.

Provision is made for VFO or crystal control of the transmitter. Push-button switches located on the front panel enable the operator to choose VFO or crystal operation. The same row of switches contains those used to select the band of operation. A meter is mounted on the front panel. It indicates relative rf output during tune-up and operation.

Spurious and harmonic outputs are down at least 25 dB from the desired frequency. A clean sine wave was observed on a Tektronix 453 scope while operating the transmitter into a 50-ohm load. The relative freedom from unwanted output energy no doubt results from the use of a semi-tunable half-wave filter PA tank circuit (Fig. 1). The network has been designed for medium Q. This, plus the fact that a half-wave filter serves as a low-pass device, does much toward reducing harmonic output. Each end of the network is terminated by fixed values of capacitance. The center of the half-wave filter has a variable capacitor connected in parallel with a fixed-value capacitor. The variable enables the operator to tune the circuit to resonance at the frequency of operation without materially disturbing the impedance-matching characteristics of the network. Toroidal inductors are used in the circuit.

Since a direct-conversion receiver does not provide single-signal reception, the transmitter VFO must be offset by approximately one kHz on the *correct* side of zero beat on the received signal. The offset occurs automatically when shifting from transmit to receive, but the operator must tune in the received signal so that the beat note is on the *high-frequency* side of zero beat to assure that that transmitter signal is heard by the station being worked. It doesn't take long to adjust to this principle, so it should not present a significant problem to the buyer.

The HW-7 features a break-in delay circuit that contains a pc-board control for adjusting the length of the delay period. This circuit is akin to most of the VOX circuits found in cw/ssb transceivers. Its purpose is to prevent the antenna changeover relay (also built in) from cycling each time a code character is sent. When the relay is closed there is no audio output from the receiver and the sidetone monitor is heard in the phones each time the key is closed. The sidetone signal is *quite* loud, requiring that the operator turn down the af gain of the receiver during transmit lest he become distracted by the unusually high output level. This inconvenience could no doubt be remedied by cutting down the amount of sidetone energy supplied to the audio amplifier in the receiver. Installation of an internal sidetone level control should not be a major undertaking, though we have not tried it.

At first glance one might conclude that the HW-7 is a "Hot Water 12" (Heath HW-12) which has been subjected to the rituals of the head hunters. It closely resembles its larger brother in decor. The current two-tone green color scheme used by Heath Company has been applied to the HW-7. The knobs are made of dark green plastic, and are somewhat tiny for this operator's comfort . . . particularly for use on the front-end peaking control. The tuning rate is quite fast, and one can quickly pass the desired peak when adjusting with so small a knob.

The customary ruggedness of design is reflected in the cabinet and panels of the HW-7. Heavy-gauge aluminum is used for those parts. Most of the components are mounted on a single circuit board — an aid to fast assembly. The kit went together in 5-1/2 hours. Checkout and alignment required another hour.

Some Concluding Remarks

Those who have not tried low-power operation may find themselves wondering why a company would tool up to produce a package such as the HW-7. Well, plenty of good solid contacts can be made at the QRP level. While using the equipment described here the writer worked 28 states during five hours of casual band hopping. The antenna was an L-shaped, end-fed, 90-foot wire, approximately 35 feet above ground at its highest point.

(Continued on page 56)

Heath HW-7 Transceiver

Dimensions (HWD) and Weight:
4-1/4 × 9-1/4 × 8-1/2 inches, 4
pounds, 8 ounces.
Power Requirements: 13 V dc, 450 mA; ac
supply available.
Transmitter Power Output: 2 watts or
better.
Receiver Sensitivity: Readable signal, 1 μV
or less.
Selectivity: 2 kHz at 6 dB down.
Price Class: \$70. AC Power Supply: \$15.
Manufacturer: Heath Company, Benton
Harbor, MI 49022.



50 Years Ago

this month

January, 1923

... Some of the glamor and challenge of the Transatlantic tests has diminished — 91 Canadian and U.S. stations were already heard in Europe during the preliminary warmups for the main event. Amateur signals are getting around the Pacific, too — a shipboard operator logged several dozen 5-6-7-9- district calls while off the coasts of Japan and Australia.

... "10,000 Miles in 4 Minutes" is the record of a message traveling via amateur radio from Hartford to Hawaii and back. The route was 1AW-9AWM-6ZAC, and easily beat the previous mark of 6 minutes for only a transcontinental round trip. Most of the messages going the amateur route do not get such special attention, but the volume is growing to 50,000 a month, and for the most part the service still outclasses any commercial route, wire or radio, for speed.

... A major technical topic is vacuum tube amplification, with a discussion of the comparative advantages of resistance, impedance and transformer coupling. Somehow a resistance-coupled *rf* circuit just doesn't look right, but it was used fairly extensively in those days on the long waves.

... Fifteen feet of snow in Wyoming and Colorado marooned two railroad trains, and an ice storm isolated them by bringing down telegraph wires. Hams came to the rescue, and for several subsequent days maintained emergency communications for three railroad companies.



25 years ago

January, 1948.

... That unintelligible mish-mash recently heard on the 75-meter band is now identified as a "single-sideband, suppressed-carrier" (s.s.s.c.) signal. What's that? *QST* gives full treatment to the new mode. Editor Warner describes its practical advantages and correctly predicts its eventual acceptance (tho he does not foresee the many brickbats ARRL will receive meanwhile for "forcing" the new system onto amateurs). By Goodman, W1DX, explains the principles, using plenty of graphics, and points out that nothing is lost by discarding one sideband since (to quote W1DBM), "both sidebands are saying the same thing." Mike Villard, W6QYT, summarizes results of successful operating tests from W6YX. Art Nichols, W0TQK (now W6EVL) brings it all down to earth for us with the description of a complete transmitter for the new mode, of Professor Villard's design. Filter system, of course; the phasing approach will come later.

... The QSer has caught amateur fancy, since it does such a good job of improving selectivity. W1DX shows the "easy" way — adapt a BC-453 surplus unit instead of building from scratch. (And suddenly 10c-a-pound surplus became very valuable!) — *W1RW*

Silent Keys

IT IS with deep regret that we record the passing of these amateurs:

- W1AAT, Louis J. Rizoli, Salem, MA
 K1AJ, John M. Clayton, Rockport, MA
 W1AJH, Frank Parker, Wellesley, MA
 W1AQW/WA3JPK, Robert C. Rowe, East Raymond, ME
 WA1EJY, Adrien J. Bourbeau, New Bedford, MA
 WN1OYT, Jerrold E. Levin, New Haven, CT
 W1UFM, Ethel L. Daly, Wilmington, MA
 K2AJK/W3WMC, Harold B. Mathews, Westmont, NJ
 W2BEA, Mulford M. Brandt, Haddonfield, NJ
 W2DDQ, Benjamin B. Berry, Long Branch, NJ
 W2DGW, John F. Lubinski, Watervliet, NY
 K2ZIG, Clarke Redfield, Tenafly, NJ
 W2LAT, John J. Boyce, Highland Park, NJ
 K2IIM, Tobias "Ted" Braunstein, Jersey City, NJ
 WB2YZG, Charles H. Golden, Vernon, NY
 K3GGK, Samuel A. Bernstein, Pittsburgh, PA
 K3GXX, Alton E. Bowers, Reading, PA
 WA3JHK, Howard D. Hertzog, Jr., Shamokin, PA
 WA3JIK, Herbert S. Dunkeley, Jeannette, PA
 K3JZI, Norman E. Barni, Washington, PA
 W3OUH, Paul R. Dayen, Pittsburgh, PA
 W3ZFM, Arno Zillger, Narberth, PA
 WA4FSJ, Roy A. Scruggs, Chattanooga, TN
 W4HQT, George T. Tsistinas, Largo, FL
 W4KLL, Nat L. Williams, Miami Beach, FL
 W4KST, Clay H. Jarvis, Clinton, TN
 K4SZG, Daniel L. Bodin, Albany, GA
 Ex-5ATA, Louis A. Sims, Tulsa, OK
 WN5EYA, P. Palmer Swartz, El Paso, TX
 K5RUD, Don H. Bvers, Los Alamos, NM
 K5RYH, Lawrence E. Lyons, Albuquerque, NM
 W5TEX/Ex K3DTR, Gustav F. Jicha, Sr., Corpus Christi, TX
 K5VRC, Ralph Meadors, Alma, AR
 WA6HEL, Paul C. Borne, China Lake, CA
 K6BT, Charles E. Richardson, Los Angeles, CA
 W6DIE, Richard P. Hinz, Sacramento, CA
 K6FZ, Richard Johnstone, Larkspur, CA
 WA6IQP/Ex VF7ANF, Robert L. Wasserlein, San Francisco, CA
 W6NKP, Harold L. Graham, Soquel, CA
 W6RHW, John S. "Stan" Chapman, Solvang, CA
 K6VKP, Clifford J. Morarity, Pasadena, CA
 W7EEG, William L. Aikman, Bellingham, WA
 K7HBO, Charles W. Burnham, Tacoma, WA
 W7RA, Gale H. Johnson, Union, WA
 W7RK, Filwin W. McGinnis, Pasco, WA
 K7WIZ, Marquis D. Brown, Sun City, AZ
 Ex-8CFC, Ralph H. McRoberts, Detroit, MI
 Ex-W8CIO, Robert P. Irvine, Cleveland, OH
 W8FQY, Edward A. Shaw, Shelby, OH
 W8BUP, Donald B. Reis, Milford, MI
 W8FX, Ralph P. "Tate" Thetreau, Detroit, MI
 W8JYL, Edwin C. Warren, Flint, MI
 W8JYP, James B. Wirt, Flint, MI
 W8LRJ, Harry L. Schalkhauser, Toledo, OH
 W8MB/W8SSZ, Julian Stern, Huntington Woods, MI
 K8MNO, Merle McCullough, Jr., Mansfield, OH
 WA8PYM, Jack G. Csonka, New Boston, MI
 K8SHJ, Clarence W. "Jack" Flick, Martinsburg, WV
 W8VRY, Michael Younger, St. Clair Shores, MI
 W9DCW, Otis O. Armstrong, Anderson, IN
 K9EBN, Van W. Mountain, Staunton, IL
 W9GZH, John C. Collins, Hobart, IN
 K9HNG, Evan D. Wilkin, Jr., Homewood, IL
 W9LFY, Blendon C. Gilbert, Streator, IL
 W9AW, William F. Mathemeier, Fremont, NE
 W90CRM, Stan T. Jones, Aurora, CO
 W90U, * William J. Schmidt, Wichita, KS
 W9LFN, Nicholas R. Maynard, Sabetha, KS
 W9PHU, M.W. Voss, Garber, IA
 W90QT, Gene E. Neal, Arkansas City, KS
 W9RIE, Karl R. Prell, Sr., Kansas City, MO
 W9RRN, John W. Sikorski, Sioux Falls, SD
 VE3APT, A. J. Watt, London, ON
 VE3PM, F.S. "Pat" Murphy, Islington, ON
 VE3VC, D.V. Carrull, Manotick, ON
 *Life Members



Hints and Kinks

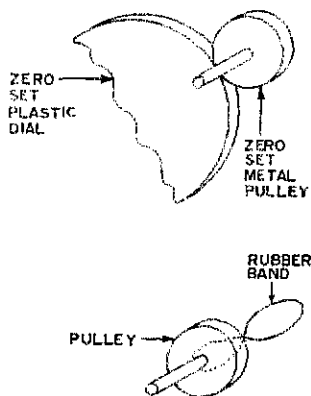
For the Experimenter



INCREASING THE FRICTION IN WORN PULLEY GRIPS

In the Heath SB-301, and similar equipment, there is a split-ring pulley that moves a zero-set dial by means of friction. After a time, the pulley wears enough of the plastic from the dial that the oscillator cannot be set to zero for frequency calibration.

One way that I've found to remedy the situation cheaply and easily is to loop a rubber band around the inside of the pulley (several times) and build up the contact area so that the zero-set dial will make contact with the rubber on the pulley in place of rubbing on the metallic sides of the latter. I've made this change on all my equipment and find that it works very well. — *Dennis G. Eksten, W9DDI.*

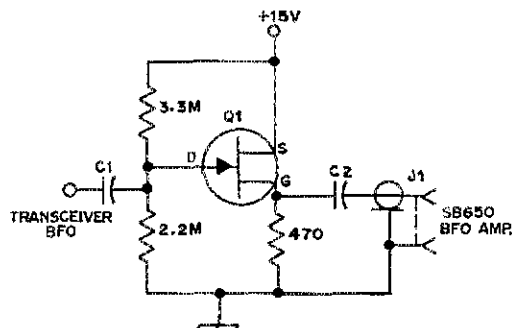


The rubber band is shown being looped around the pulley several times to build up the center so that it makes contact with the driven dial.

USING THE HEATH SB650 WITH OTHER THAN HEATH TRANSCEIVERS

Because the various oscillators in the Drake 4-line, Yaesu FT transceivers, and Collins S-line have the proper relationship (first LO above the signal, second oscillator below the first i-f) the Heath SB650 digital readout unit may be connected to them directly with the following changes: on the BFO input of the SB650, change the coupling (47 pF) and bypass (.001- μ F) capacitors to a low value of reactance at the BFO frequency. For instance, in the Drake R-4B and Collins 7583, the capacitors should be changed to a 0.1- μ F disk ceramic. The output should be taken from a low-impedance point such as the cathodes or emitters of the oscillators. If for some reason

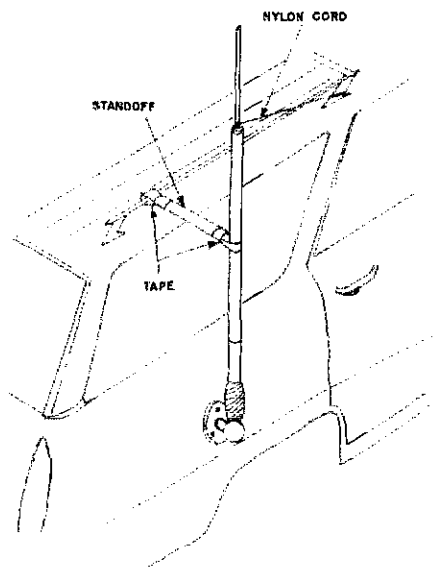
this is not possible, a source follower, similar to the one shown here, may provide the proper amount of isolation. — *Dave Windisch, K3BHJ*



- C1 — Selected for a reactance of approximately 25,000 ohms at lowest operating frequency.
- C2 — Selected for approximately 25-ohms at lowest operating frequency.
- Q1 — 2N3819, HEP801, HEP802, MPF102.
- J1 — Phono jack.

PREVENTING MOBILE ANTENNA SWAY

It wasn't very long after going mobile that I had to solve the problem of antenna detuning because of antenna sway while in motion. As many before me have done, a piece of nylon cord tied to the luggage rack eliminated the leaning backward of my Webster Bandspanner. But *sideways* motion caused operating problems.



The 15-cent golf club separator, widely acclaimed for its coil-form shape in the Delta Loop antenna article, was again pressed into service. It is easily fashioned into a standoff insulator. The ends are notched to fit both the antenna and luggage rack, and it is held in place by wide flexible tape. If the tape breaks and the standoff is lost, it can be replaced cheaply and easily. — *Baxter Williams, WSKYB*

PICTURE QSL CARDS

I've found in my search for a different QSL card that most picture post cards have too much gloss to take ink from a rubber stamp, such as might be used with an amateur call sign. However a



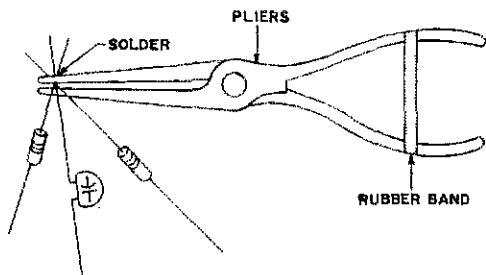
sharp single-edged razor blade can be used to scrape a portion of the card bare in a jiffy. The white base material will then accept the rubber-stamped information, making a colorful QSL card. — *Edson B. Snow, W2UN*

ELIMINATING A STAGE IN THE W1UYK SYNTHESIZER

A relatively simple change in the programmable divider of the W1UYK/WA2DHA 2-meter synthesizer, *QST*, September, 1972, will eliminate one programmable counter IC package. With such counters costing around \$6.50 each in small quantities, the cash saving is significant.

Two decade counters (Motorola MC4016P or equiv.) U15 and U14 in Fig. 8 of the article are programmed to count by "1" and "4" respectively in the two most significant places of the divider chain. These two stages may be replaced by a single hexadecimal counter (Motorola MC4018P or equiv.) programmed to count to "14" before resetting. Aside from their counting range, the MC4016P and MC4018P are identical. The modification is shown in the drawing. — *R.B. Gibson, WB9GKW/1*

The IC-saving modification to the 2-meter synthesizer using a Motorola MC4018P in place of two MC4016Ps.



THAT OFT-NEEDED "THIRD HAND"

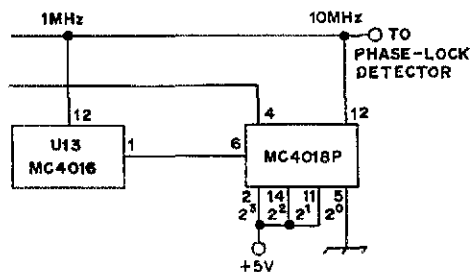
It can be frustrating when trying to solder several leads together at one time. If only someone were near at hand to hold those elusive wires together until they were soldered! Well, here's a simple remedy for the problem. Simply encircle the handles of your long-nose pliers with a good sturdy rubber band, then grip the leads to be soldered with the tips of the jaws. The rubber band will maintain tension on the jaws, thus freeing one of your hands.

Long-nose pliers work nicely as a heat sink when soldering solid-state devices. Simply clamp the jaws of the pliers over the pigtail of the transistor, diode, or IC (between the point to be soldered and the body of the semiconductor) before doing the soldering. (This idea was borrowed from the Heath HW-101 manual.) — *WN1LZQ*

MAKE A TO-PACK IC FIT AN IN-LINE SOCKET

Forming the leads of a TO-5 packaged IC for insertion into an in-line-type socket can be greatly simplified with the help of a small square of P-pattern "Micro-Vectorbord." The P-pattern board material consists of .042-inch holes spaced on 0.1-inch centers.

Preparation of the leads is as follows: divide the leads of the TO-5 device into two rows. Insert each of the leads into every fourth hole on the board in order, 0.3-inch apart. Press the IC down until the bottom of the case is approximately 1/8 to 3/16 inch from the board. While maintaining pressure on the IC, form the leads emerging from the other side of the board so that they are perpendicular with the board. Remove the IC and trim the leads to the desired length. The TO-5 IC is ready for insertion into an in-line-type socket. — *Stephen Pawlowicz, WA3SDV*



HAAT

How to Determine Height Above Average Terrain

BY BRUCE S. MARCUS * WAINXG

WITH THE RELEASE of Docket 18803 we now have rules which, for the first time, define a repeater station in the Amateur Radio Service. Along with "establishing" repeaters we also have new technical standards which must be met. Some people think this is an infringement on amateur activity as we have known it in the past. But as I and others feel, when operating a repeater station in an amateur band where other activities are taking place, one must take a different attitude. We must be able to prove to the FCC that we intend to operate our repeaters with due respect to our fellow amateurs as well as proving our technical competence to do so.

In the new regs are power requirements for repeaters. The amount of *effective radiated power* (erp) that a repeater is permitted to use is based on the height of the repeater antenna above average terrain (HAAT). This article shows you how to determine both HAAT and erp.

HAAT — The Easy Way

There are several methods that can be used to compute HAAT. The easy way is when you share the tower or site with a commercial installation. If the site is in use by either a TV, fm, or a Common-Carrier Mobile Telephone, or any station operating under FCC rules, Part 21, your problem may be simplified. These types of stations have to file their height above average terrain with the Commission. If you use this data as opposed to computing your own, you'll have a more accurate representation of the HAAT. As we'll explain below, only 40 check points based on eight radials are required for amateur installations. Common-carrier installations require 80 check points and broadcast stations even more.

There are two ways of obtaining the information for the commercial installation (which is on file with the FCC). The least expensive is based on knowing the people who run the existing commercial installation. You *gingerly* ask them for a copy of their radial plan which they supplied to the commission. The reason we say "gingerly" is because they may think you are trying to compete with them, or file a complaint on their renewal. In any event, be diplomatic and if you can get the plan, you're in business.

Next, you submit the data with a sketch of your antenna mounted on their tower or your own. You must compute the difference between the center of radiation of your antenna versus the

one used by the broadcast station or Common Carrier. It is unlikely that your antenna will be mounted in exactly the same place as theirs. Your installation will probably end up either higher (wishful thinking!) or lower. If your site is adjacent to an existing facility, but not actually at it, you may use the data on file if your location and terrain are not substantially different.

If you cannot get the data directly from the owner of the station, it can be obtained from the official document-copying agent for the FCC. The present contractor will copy any document on file with the Commission for 12 cents per page. A minimum charge of two dollars applies for any order. The agent is FCC Services Section of the Keufel and Esser Co., 1521 North Danville St., Arlington, Virginia 22201. Your request should include the name, call sign, and address of the radio station along with a self-addressed stamped envelope. An explanation indicating your request is for HAAT data only will reduce the amount of information that must be copied (and paid for). Authorization for the agency to call you collect could be included also, if it is desired to have the cost before ordering the material. Otherwise, if time is not a factor, the agency will give price information by return mail.

HAAT — The Hard Way

Now we come to the nitty gritty. If you cannot get out the easy way you're going to have to do it yourself. It's not as bad as it seems. You will need the following items: a topographical map (or maps, depending on the scale of the area of the site and the area ten miles around the site); a good scale or ruler at least 24 inches long; a protractor; some graph paper (preferably the type which has bold lines every inch in the vertical as well as horizontal grids); scratch paper; pencils; and a fiber-tipped marking pen.

Topographical maps are available and for sale from the U.S. Geological Survey. You can order an index for the maps that are available in your area as well as the name of the local distributor. For areas east of the Mississippi River, including Puerto Rico and the Virgin Islands of the United States, maps should be ordered from the Distribution Section, U.S. Geological Survey, 1200 South Eads Street, Arlington, Virginia 22202. Maps of areas west of the Mississippi River, including Alaska, Hawaii, Louisiana, Minnesota, American Samoa, and Guam should be ordered from the Distribution Section, U.S. Geological Survey, Federal Center, Denver, Colorado 80225. Residents of Alaska may order Alaska maps or an index for Alaska from the

* 134 E. Center St., Manchester, CT 06040.

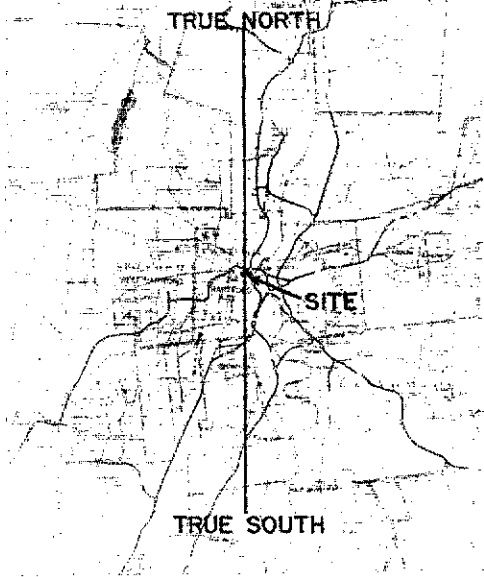


Fig. 1

Distribution Section, U.S. Geological Survey, 310 First Ave., Fairbanks, Alaska 99701.

The object is to have eight radials centered on the repeater site. These radials are each to be 10 miles long, equally spaced, starting at 0 degrees. Each radial will have five check points, at 2, 4, 6, 8, and 10 miles from the site. When completed you will have a total of 40 check points.

The FCC will accept a map with a scale of 1:250,000. However, the detail on a map of this scale is very poor so it may be to your advantage to use a map with more detail. The illustrations in this article are obtained using a map with a scale of 1:125,000. Also, we'll explain how to use the 7 1/2-minute maps, which show the greatest detail of all.

For the first step, locate the repeater site on the map and mark the location with a small x. We want a line extending through the site from true north to true south. Locate the nearest longitude line and using that as a guide, draw a parallel line through the site, see Fig. 1. Place your protractor so that zero (0°) degrees is on the line that extends north of the site, and 180 degrees on the line that runs south of the site. If you have positioned the protractor correctly, 90 degrees will be facing east or to your right, see Fig. 2. Now place marks at 45 degrees, 90 and 135 degrees. You will note that we are making marks which are 45 degrees apart in a circle starting at zero degrees, being true north. If your protractor does not have a second row of degree marks which continue above 180 to 360, do the following: Turn the protractor around so that 0 is still on north but 90 is facing west or to your left. Again mark every 45 degrees, starting at either 180 or 0. You will now have eight marks in a circle. Start at zero degrees and number each mark going clockwise from zero as No. 1 and continue to No. 8.

Label each number mark in degrees from 0 degrees north: No. 1=0, No. 2=45, No. 3=90, No. 4=135, No. 5=180, No. 6=225, No. 7=270 and No.

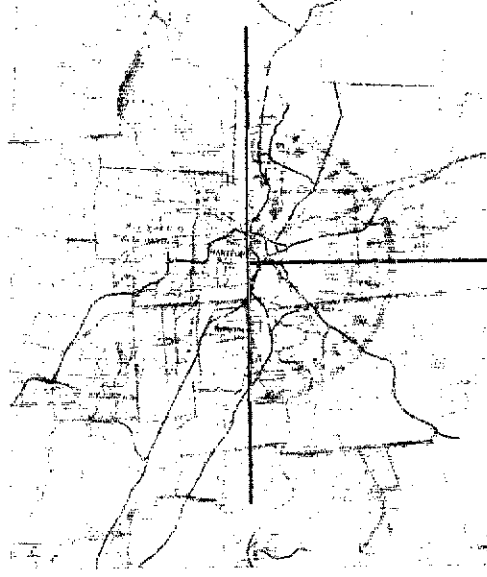
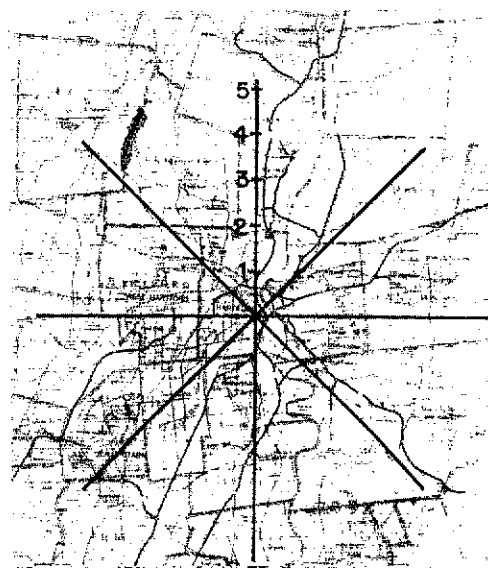


Fig. 2

8=315. Next, take your ruler or scale and place it on 270 through the site to 90 degrees. Draw a line to scale at least ten miles long, extending in both directions from the site through 270 and 90 degrees. You should now have a line east and west and one north and south of the site. Do the same for 315 and 135, and again for 45 and 225 degrees. You will have eight radials extending from the site, ten miles in each direction. Go to the scale on the map and determine what 2 miles is in inches and mark a point on every radial extending from the site every two miles. We should have 5 points on every line and a total of 40 points.

We must determine the height above sea level of each of the points. We do this by checking the contour lines on the map. If you are using the large map, 1:250,000 scale, the contour interval is 50 feet, meaning that every line depicted is 50 feet higher or lower than the next. We can determine if

Fig. 3



the next line of contour is higher or lower by looking over to the bold lines of contour and determining by the numbers which appear every so often in them, if we follow the line around until we find it. If it is higher or lower, we then subtract or add 50 feet to the bold figure until we arrive at the line closest to our mark.

On a scratch pad make a list of radials, starting with 0 degree true north. Going clockwise, put the numbers one to five under each radial degree, see Fig. 3. Next to each number put the height above sea level at each point. Add all the columns of numbers and divide by eight. You will now have the average of all the 40 points.


If you are using the 7-1/2-minute maps, which are much more detailed, you will have to fold back or cut off the borders on all four sides. Use the map that shows the site and follow the same procedure as in the large map above, except draw a line to the border on the quadrangle rather than to a scale of 10 miles. Next, take one of the adjoining maps and butt this map against the one which has the site on it. You may have two to four maps butted together to get one 10-mile radial. You may wish to work on one radial at a time, so that you will have enough room for the maps you are working with. All the other steps will be the same as with the large map.

The figure we have is the average height above sea level of the ground at our site. We must make one further calculation to determine the HAAT. First, determine the height above mean sea level at the site. For example, let's suppose that the site of the installation is 900 feet above mean sea level and let's assume the antenna is on a tower and the center of radiation of the antenna is 100 feet above the site. This means that our center of radiation is 1000 feet above *mean* (or average) sea level. Next, assume that our 40 check points average out to 800 feet. All we need do is subtract 800 from

1000. This means that our height above *average* terrain is 200 feet.

The last thing we have to do is to make all this information presentable to the FCC. We have several ways to do this. One is to take a fiber-tipped marker and darken all our penciled-in lines, properly label them and neatly list the computations for each radial on a separate sheet of paper. Submit both the maps and the computations with your form 610 or form 610B if for a club, military or recreation station.

Figuring Your ERP

In order to figure your effective radiated power there are several steps that must be followed. First, determine the power output from the repeater transmitter. This measurement should be made directly at the transmitter between the rig and any duplexers or other devices in the line. A wattmeter can be used for this measurement. Next subtract the loss through any device such as a duplexer that is in the line. The loss figures for such devices are usually measured in dB so this figure must be converted to power and subtracted from the output figure. Determine the exact length of the feed line and subtract the feed-line loss. Feed-line loss can be determined from the manufacturer's catalog or from charts in *The Radio Amateur's Handbook*. You now know the amount of power that is reaching the feed point of the antenna. This power, times the gain factor of the antenna used, equals the effective radiated power. The FCC also requires that radiation patterns of the installation be provided. These can be either mathematical computations; range measurements, or both. Also, in lieu of the foregoing, manufacturers' specifications for particular antennas may be submitted, provided the manufacturers' data has been filed previously with the Chief, Amateur and Citizens Division, and approved by the Commission. 

Recent Equipment

(Continued from page 50)

The worst signal report⁺ was RST 449. The majority of the reports fell in the 579 to 599 class. Solid contacts were made on all three bands (several times) from Newington with stations on the West Coast of the U.S.A. Europeans were worked from the same East Coast location on 20 meters while using a sloping dipole with its center just 20 feet above ground. Answers to CQs run approximately 65 percent during normal band conditions. When answering another station's CQ the odds have been somewhat better -- about 80 percent. It's anyone's guess what would happen if the rig were connected to a beam antenna!

One thing that the HW-7 does not like is to be used with an end-fed wire antenna if the high-impedance part of it is near the rig. Even if a Transmatch is used to provide a 50-ohm termination for the transceiver the proximity of the wire

with respect to the unit introduces a most annoying 60-Hz hum in the receiver when the front end is peaked. This happens only if an ac-operated dc supply is being used. No problems were noted during operation with batteries. The hum problem is worst at the highest frequency of operation (15 meters). No difficulties were experienced when working with coaxial-fed beams and dipoles.

Power output was measured in rms volts across a 50-ohm dummy load: at 7.1 MHz, 11 V (2.5 W); at 14.1 MHz, 10.25 V (2.2 W); at 21.1 MHz, 10 V (2.1 W). These values were confirmed when making pk-pk voltage checks with a Tektronix 453 scope.

In view of the low price and versatility of the HW-7 transceiver the writer believes the equipment to be a bargain. It may seem that \$35 per watt is a rather high price to pay, but you're getting a receiver too! The few shortcomings mentioned here are no greater in percentage than those found in some of the high-priced, esoteric transceivers on today's market. The HW-7 may be your key to getting in on the QRP fun. — WICER

Marconi Commemorative Station to Operate from Cape Cod

Members of three amateur radio organizations, Murphy's Marauders, the Middlesex Amateur Radio Club, and the Waltham Amateur Radio Club, together with other individual amateurs, are completing plans for operation of a special event station, hopefully to have the call WM1CC, from the historic site of Marconi's station "CC" at South Wellfleet on Cape Cod which sent the first U.S.-transatlantic message 70 years ago. In England, the Cornish Radio Amateur Club is planning to operate a similar commemorative station from Marconi's site at Poldhu, Cornwall which received his message from Cape Cod.

Marconi was at the "tapper" when this first message was sent to England with a 30 kW spark on 1800 meters. His spark, so thunderous that it could be heard without a receiver several miles away, spanned a record-breaking 3,000 miles on the night of January 18, 1903, and helped convince his many critics, including Edison, that international wireless communication was indeed possible.

Marconi's station has long since been dismantled and the sea and wind have claimed almost half of

the original site as the sand cliff has eroded. All that remains today is the concrete foundation of the transmitter room and the base of one of the four towers.

Operation will begin from the Cape Cod Marconi site on Saturday, January 13, 1973, at 8:00 A.M. EST (1300 GMT) and run around-the-clock until 10:00 P.M. EST, Thursday, January 18 (0300, Friday, GMT). The last four minutes of operation, from 0256 to 0300 GMT, will consist of a 14-wpm transmission of the original message sent by Marconi on the three lower cw frequencies (3587, 7060, and 14070 kHz). Those who copy this message and submit it with their QSL cards will receive a commemorative certificate in addition to a special QSL card. These six days from January 13 to 18, 1973, have been proclaimed "Marconi Days" by Governor Sargent of Massachusetts.

Frequencies will be 3587, 7060, 14070, 21060, and 28025 kHz; and for voice, 3900, 7285, 14290, 21360, and 28520 kHz. Occasional operation in the Novice bands is also planned.

QSL cards should be sent by U.S. and Canadian stations via WIHWM, 30 Fairlawn Lane, Lexington, MA 02173, preferably with s.a.s.e. Foreign cards can be sent to the ARRL QSL Bureau, Hampden County Radio Association, Box 216, Forest Park Station, Springfield, Mass. 01108.

OSCAR NEWS

Activity through the Oscar 6 two-to-ten-meter translator remained at a high level throughout the month of November. While battery recharging considerations make it impossible to leave the satellite package operating continuously, every effort is made to keep it on the air for the weekend evening passes. In general, the translator will be off during the early part of the week and will be turned on toward the end of the week. The nightly W1AW bulletins include Oscar status reports, as well as orbital data.¹

Several observers have commented on the apparent absence of the ten-meter beacon on 29.45 MHz. The beacon signal shares power with the signals being repeated from two meters, so it is extremely weak during high-activity periods. The 435.1 MHz beacon, which is independent of the translator, has proved to be very useful for obtaining telemetry.

When the beacon is not sending telemetry it may be transmitting messages via Codestore, a

¹ Oscar's orbital elements are: mean altitude, 1459.62 km; period, 114.9947 minutes; inclination, 101.73 degrees; revolutions per day, 12.5223.

Morse code message storage unit which can be loaded from the ground. The first Codestore message was loaded successfully from WA1IOX, located at the Talcott Mountain Science Center in Avon, Conn., on October 22.

Operating News

Though by no means typical, the logs of K1HTV and K2RTH demonstrate the kind of DX that can be worked through the satellite: DJ6QP, DJ9BL, DK2ZF, DK5KB, DL1KO, DL3YBA, EA4AO, EI6AS, F1YS, F2TO, F3NB, F6BSJ, F8RZ, F8VN, F9BO, F9FT, FP8AA, G3s COJ DAH IUD JVL LTF NEO NHE NJ USB XGS, G5ZN, G6AG, G6RH, G8BCG, G8BCL, GI3CDF, GW2HIY, GW3FSP, GW3LEW, GW3MFY, HB9MQ, HB9QQ, HB9RG, HK5MO, LA1K, LA4KF, LA8WF, OX3EL, OZIOF, PA0JMV, PA0WLB, SM2CFG, VP2VL, XE1PY, XE1RY, and 6Y5AG. Each has worked 16 countries, but Bruce (RTH) is ahead in states with 37 to Rich's 31.

DK2ZF has made 254 contacts, with as many as 10 QSOs during a single pass. Rolf's list of 25 countries worked is quite impressive: DL, EA, EI, F, G, GI, GW, HA, HB9, I, K, LA, LZ, OE, OH, OH0, OK, OX, OZ, PA0, SM, SP, SV, UA1, and VE.

By way of contrast, the most contacts by a single station through a previous Oscar satellite was 21!

Who will be the first to win the "1000" award, announced on page 58 of December QST? K7BBO
(Continued on page 61)

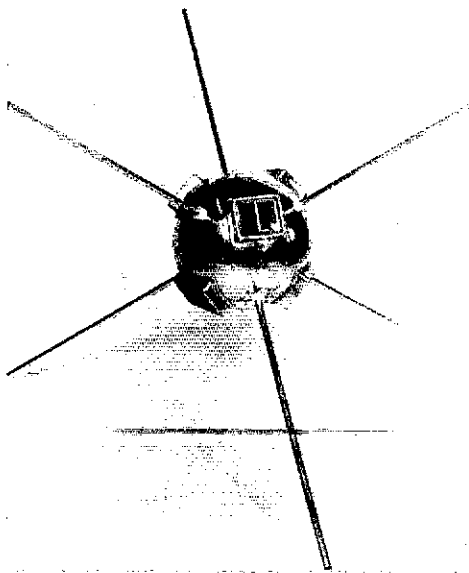
ARRL President Harry J. Dannals, W2TUK, tunes in Oscar 6 signals at WA1IOX under the watchful eye of QST Managing Editor Bill Dunkerley, WA2INB. Is all that equipment necessary to command the satellite? Not really — but there's some that's required that we couldn't fit into the picture!



"Science for the Navy and the Nation"

50th Anniversary of the Naval Research Laboratory

BY HOWARD O. LORENZEN*, W3BLC



Vanguard satellite

THE NAVAL RESEARCH LABORATORY, in Washington, D.C., is celebrating its 50th anniversary during 1973. During the early 1920s before the Laboratory was established, Dr. A. Hoyt Taylor, ex-9XN, was busy assembling a team for the Navy of leading amateurs in the United States. Among those he recruited were L.A. Gebhard, ex-8AG, and Leo Young, ex-9PC, W3WV, still active. This group provided the nucleus for exploring the higher radio frequencies with an aim toward providing a better understanding of propagation effects and more reliable communications for the Navy.

In the early days, before the Federal Communications Commission had been established, presidential authority was obtained to have the call letters NKF assigned to the Laboratory. As a part of the early studies to improve Naval radio communication, Dr. Taylor was busy, with the help of amateurs, investigating propagation of radio waves above 1500 kHz. Radio amateurs

* Superintendent, Space Systems Division, NRL.

worldwide, with the valuable assistance of the American Radio Relay League, made it possible to carry on these experiments by providing numerous transmitting and receiving points from which propagation data could be gathered, in addition to the Naval communications installations afloat and ashore.

NRL and the amateurs provided the push which resulted in development of equipment for higher frequencies. A related development which NRL pioneered was the master oscillator power amplifier (MOPA). To secure the frequency stability required at the higher frequencies, NRL pioneered in development of crystal-controlled oscillator (VFO), common today in amateur radio. Cooperative experiments by NRL and the amateurs (notably J. L. Reinartz, 1XAM, and M. J. Lee) in the early 1920s led to the discovery of the skip-distance effect and resulted in the first paper on the subject, by Dr. Taylor and Dr. E. O. Hulburt of NRL, published in the Institute of Radio Engineers *Proceedings* in 1926.

In 1922, prior to the opening of the Laboratory, the radio group under Dr. Taylor at the Washington Navy Yard engineered the first presidential broadcast, by President Harding, on the dedication of the Lincoln Memorial. Mr. Gebhard had built the transmitter used for the broadcast. This same year they detected a moving ship by radio waves. In 1924 they demonstrated the first flight of radio-controlled aircraft without a pilot at Dahlgren, Virginia.

NRL built the first high-powered, crystal-controlled radio transmitter, covering the high-frequency bands, for the Navy dirigible *Shenandoah* in 1924. During its fateful transcontinental flight, they communicated with the amateurs. Meanwhile, back at the Laboratory, Mr. Young maintained a daily schedule with the *Shenandoah*. These same high-powered transmitters were used nightly to broadcast the official business of the Navy Department to the American Embassy in London. In 1925 long-range daylight communication at 15,000 kHz was carried on daily with the Navy station at Balboa, Canal Zone.

Navy Adopts Short Waves

In 1925 the U.S. Navy, during its cruise to New Zealand and Australia, demonstrated the usefulness of short-wave communications. Fred Schnell, IMD,

of ARRL Headquarters, was the Fleet Radio Officer. Utilizing frequencies up to 18,000 kHz, he held regular schedules with Mr. Young at NRL and with radio amateurs throughout the world.

During their studies of radio-wave propagation, Dr. Taylor and Mr. Young identified signals which had traveled twice around the world. These techniques, used later, laid the groundwork for detecting radar echoes.

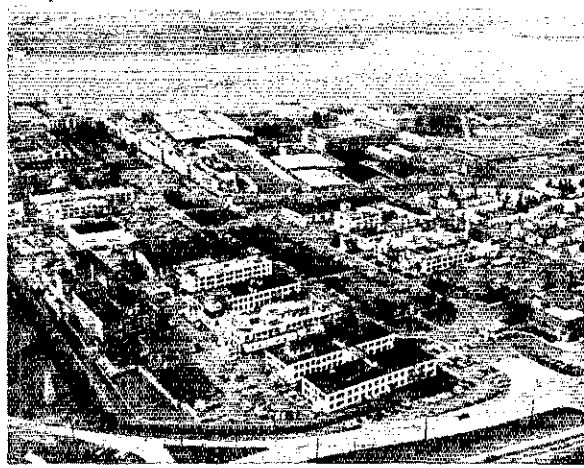
When Admiral Byrd's South Pole expedition was planned in 1928, NRL designed and built equipment that was used in their ships and aircraft. NRL maintained regular communication schedules with the base at the South Pole, as well as the ships used to deliver supplies to it. The aircraft which flew over the pole were using NRL radio equipment. As a demonstration of the usefulness of short-wave communications with aircraft, NRL worked an aircraft flying near San Diego, California, as an experiment. That same year NRL supplied the equipment for submarine short-wave communications and conducted two-way tests with a submarine operating off Honolulu.

In 1930, NRL scientists detected an airplane in flight by radio waves. Improvements in technology, suggested by Mr. Young, led to the detection of aircraft by pulse radar in 1934. Further refinements in technology led to the first radar duplexing system, employing a single antenna in 1936. By 1937 NRL had installed the first radar aboard ship, and in 1940 production radars were being installed on U.S. ships. This same year, the first submarine radar was developed. In 1939, NRL developed and demonstrated the plan position indicator (ppi) for radar. In 1941 antijam techniques were being applied to the Navy's radar by NRL. In 1942, NRL built a millionwatt peak power radar transmitter. This was followed in 1944 by a demonstration of the first monopulse radar system for target tracking.

Airborne Communications

NRL further demonstrated its leadership in electronics in 1938, when the Laboratory developed a 300-MHz airborne communication equipment, pioneering for the Navy in vhf development. In 1940, NRL developed the first pulse altimeter. That same year, to cope with the submarine threat, NRL demonstrated its first radio sonobuoy. By 1943 electronic countermeasures equipment for ships and submarines was demonstrated, beginning the radio war in the ether. That same year the Laboratory developed effective practical equipment to mitigate precipitation static interference on aircraft.

NRL's research radar installation on Chesapeake Bay, Maryland. The high-frequency radar is in the left foreground.



Following the war, NRL was the first to employ a flying laboratory to study radio propagation in the troposphere. This laboratory demonstrated evidence of scatter propagation beyond the horizon. The year 1946 saw the first radio homing system for carrier aircraft. That same year, demonstrations of a radar beamrider receiver for missile guidance were held. In 1948, utilizing a high-altitude rocket, NRL produced a photograph of the earth from 101 miles.

In 1949 NRL produced the first ionospheric radar to demonstrate the ability to detect targets "over the horizon." Another first for that year was the high-resolution airport taxiing surveillance radar. In 1950 the Laboratory designed the first surface-to-air missile-control radar, pioneering the present surface-to-air missile systems. Another startling development was the demonstration, in 1952, of the first electron memory tube with indefinitely long memory and instantaneous erasure time. This was followed, in 1954, by the traveling-wave oscilloscope tube for recording high-speed events in the order of one millimicrosecond duration. In 1957 NRL demonstrated a fully automatic landing system for aircraft on carriers.

Space Communication

In outer-space exploration, NRL demonstrated, in 1955, the first communications using the moon as a passive reflector. Later the Navy established an operational moon-bounce communication circuit between Washington and Hawaii. Observations of the absorption by interstellar hydrogen gas of the emissions of radio stars were reported in 1956. The following year NRL built the first worldwide



satellite tracking system, called Minitrack. Using the Minitrack system and observing U.S. and Soviet satellites, NRL scientists determined the upper atmosphere density. This same year, NRL launched the first Project Vanguard artificial earth satellite. Later this same year, SPASUR was the first U.S. satellite surveillance system. In 1959 NRL demonstrated the first automatic data-reduction equipment for satellite research.

In 1960 the first solar observatory satellite, Solar Radiation 1, was launched. This same year NRL pioneered in demonstrating the injection of multiple satellites into orbit from a single launch vehicle. In 1961 NRL scientists disproved the widely accepted theory that very-low-frequency waves do not penetrate the ionosphere, through the use of NRL's LoFTI satellite. In 1961 NRL also demonstrated the successful communication relay from shore to ship at sea, using the moon's surface as a passive reflector. That same year, as a part of the space study program, the Laboratory built the first high-performance steerable 150-foot parabolic antenna.

All told the Laboratory has launched 60 successful satellites on 20 launches of its own.

These are but a few of the exciting developments in the electronic fields pioneered by the Naval Research Laboratory scientists, many of whom are amateur radio operators as well.

Today the Laboratory consists of four organizational areas of Naval Research - Electronics, Materials and General Sciences, Space Science and Technology, and Oceanology. These areas include 17 scientific divisions and special groups. Backing up the research program in all of the areas above is the Support Services Department. From a humble beginning the Naval Research Laboratory has grown to be the Navy's corporate laboratory for research.

NRL 50th ANNIVERSARY SSB, CW, RTTY, VHF, SSTV EME OPERATIONS

Amateurs worldwide are invited to participate in on-the-air celebration of NRL's 50th Anniversary. General operation by NRL amateurs will take place during the period of 1 January 1973 to 16 July 1973. Concentrated activity of a contest-like nature will take place 23 June through 15 July 1973 to celebrate the original ground-breaking date 50 years ago of NRL on 2 July 1922.

Jan 1973		1296.000 MHz	
Date	Start GMT	Stop GMT	Area
20 Jan 1973	0400	0430	Europe, Africa
Saturday	0430	0500	East Coast US, S.A.
(Friday PM in U.S.)	0500 1200	0530 1230	Midwest & W. Coast Australia, Asia

432.000 MHz and 144.050 MHz

21 Jan 1973	0500	0530	Europe, Africa
Sunday	0530	0600	East Coast US, S.A.
	0600	0630	Midwest & West Coast
	1300	1330	Australia, Asia

A commemorative QSL will be sent to all stations QSO. A special certificate and reproduction of the 1922 QSL of station NKF, the Navy operational call of NRL, will be awarded to those stations who work 5 or more NRL amateurs in any mode or combination of modes. A certificate award and NKF QSL will also be made for a successful SSTV QSO or readable copy on EME (Moon Bounce).

NRL amateurs and the NRL ham station W3NKF will use the general call "CQ NRL," and exchange will consist of QSO number, call letters of NRL amateur, signal report, state, and first name. EME stations will use format noted below. Following are special frequencies, times, dates, and information on each mode:

SSB and CW:

Operation can be in any part of the band, but effort will be made to operate on the following frequencies, especially during the concentrated operating period of 0000 GMT, 23 June, to 0000 GMT, 16 July 1973.

Cw - 1.805, 3.560, 7.060, 14.060, 21.060, and 28.060 MHz

Ssb - 1.820, 3.860, 7.230, 14.260, 21.360, and 28.560 MHz

RTTY - Same as above. Operation will be centered around typical RTTY frequencies.

Operations, using unique high gain antennas, will take place Monday through Friday, 1600 to 1800 GMT and 2100 to 2200 GMT on 40, 20, 15, and 10 meters on ssb, cw, and RTTY. During the concentrated operating period, longer operating times on Saturday and Sunday will be available beginning at approximately the same time.

VHF:

RTTY - 146.70 MHz

Fm Phone - 146.94 MHz

Am Phone - 145.20 MHz

Am Phone and AFSK - 221.00 MHz

Operation will be primarily on Sunday, 1400 to 1500 GMT. During the concentrated operating period a 150-foot parabolic antenna will be used with operation from 1400 to 2300 on Saturdays and Sundays.

SSTV:

3.845 or 14.230 MHz on Saturdays, 1600 to 1700 GMT primarily from W3NKF. During the concentrated operating period Saturday and Sunday 1600 - 2200 GMT.

EME:

A 150-foot parabolic antenna to receive moon-bounce cw only at 10 wpm will be used to listen and log EME stations from various areas of the world on EME bands, one weekend in January 1973 and one in March, as shown. A 2x2 format "NRL NRL TEST TEST DE CALL CALL" repeated for the area, every half hour, should be used.

Coordinators for the above activities will be:

Overall plan - W3BLC

Cw, ssb, RTTY - W3MFI, W3SRA, W3WOX

Vhf - W3SFY, W3BDK

SSTV - WA9GVK, WB4YTU

EME - W3KE

Operation NRL station W3NKF - W3KVC

Inquiries to the above coordinators on any aspect of this program are invited.

QST

FCC Commissioner Visits Amateur Repeater Group

The AFAR (Aurora FM Amateur Repeater) hoped to score an epic first by having one of the seven FCC Commissioners attend one of our meetings and view our Repeater facilities.

Actually, no coincidence because one of the Commission's newest members, Charlotte T. Reid, was born and raised in Aurora and was Congresswoman in the district for six years. As Congresswoman, she was exceedingly popular with her constituents. She was known to always have an ear open for current issues in her district.

With this in mind and with some impetuosity, we decided to invite the new Commissioner to visit the repeater facilities. AFAR, while strongly supporting the League's position concerning the proposed repeater rules and regulations, decided to enter its own comments in this matter (Docket 18803). Knowing the protocol that exists when such matters are before the Commission, our attorney requested advice from the General Counsel to the FCC. He replied: it would be quite proper for the Commissioner from Aurora to visit the Aurora Radio Club. We then invited Commissioner Reid to attend one of our functions.

We arranged to hold our meeting in an abandoned night club at the top of the local hotel, just one floor below the repeater location. A delegation was sent to pick up the Commissioner and during the trip to the hotel, she talked to many area amateurs through the repeater. Interestingly enough, she was quite familiar with the operation, the easy informality, and was addressed by almost everyone as "Charlotte."

At the meeting site a block diagram was displayed and explained, showing the operation of this system. Ellis Boyer, President of the Club, presented the Commissioner with our engraved certificate, making her an honorary member of the local repeater association.

Congresswoman instincts were apparent as she described her staff, which included an attorney, and an engineer, along with her office force. She told the club that she had not encountered amateur matters formally as Commissioner, but prior to visiting our club, she had conferred with her staff to learn more about amateur radio. Her opinion was that amateur radio was self regulating and was pretty much a good bunch of people who caused the Commission little, if any, trouble. She invited the local amateurs to communicate with her on items of interest about which they had strong feelings, and promised to always have her Congresswoman ear open for her new "Constituency." Commissioner Reid was especially interested in hearing of the blind and disabled amateurs in the area and suggested that some organized training in special schools could be useful in opening up new vistas for handicapped persons. She told us of some of the problems in the Commission, the enormous workload and that her particular project is reorganization of the national defense warning system, whereby the President has access to the country through broadcast channels. She spoke of the other commissioners; and in all the FCC seemed less awesome as she described the commissioners as being entirely human. She extended her visit to an hour and one-half beyond her schedule in order to answer questions.

We think we may have made a friend for amateur radio at the highest level in the Commission. Ellis Boyer, K9VWJ, President of AFAR; Dave Spensley, W9BOI, Club Secretary; Ray Sherwood, W9DRY, Publicity and Promotion; Carol Borne, WA9NEJ, Mrs. Reid's escort and Roger Bara, WA9UIP, were largely responsible for the arrangements.

We now know that hanging on the wall of one of the seven FCC Commissioners in Washington, is a certificate of membership in The Aurora FM Repeater Association. We hope that this will remind the Commissioner that we amateurs value our privileges and will continue to self-regulate through the League, and cause the Commission the least amount of trouble. — W9DRY.

Oscar News

(Continued from page 57)

will no doubt be working on this one. By November 18, Dave had made 340 QSOs with 23 states and six countries. W4CKB has 9 countries and 3 continents. If you'll supply us with a list of states and DX worked, we'll be pleased to record your achievements here.

Interest in Oscar 6 is not confined to North America and Europe; about 40 countries have been in contact through the satellite. F6AGR plans to be active from FB8XC or FB8XX on Kerguelen Island. Even from this remote spot, dozens of countries are within range.

If you have been trying, but have been unable to hear yourself through the satellite or to make any contacts, don't be discouraged. The first contact is by far the hardest! With all the usual variables that are present in amateur communication, plus the new ones of doppler shift, satellite rotation, the constantly changing antenna bearings, and so on, it is a real accomplishment to complete a contact. With experience, the variables become "knowns" and the QSO equation becomes a lot less complicated.

Let's hear from you! — K1ZND

FCC Commissioner Charlotte Reid receiving membership scroll from Aurora FM Amateur Repeater Association (AFAR). Left to Right: Ray Sherwood, W9DRY, Master of Ceremonies; Commissioner Reid; Ellis Boyer, K9VWJ, President of AFAR; and Dave Spensley, W9BOI, AFAR Secretary.



January 1973



CANADA

Maritime
VEIASJ 2842 98-29-A
VE2DFO 1182 85-37-ABC
Ontario
VE3ASO 4080-146-30-B
VE3ONT (VE3HB, opt.)
VE3CRU 2675-102-25-A
VE3EMS 2668 83-29-ABC-D
VE3GNN 1430 63-22-B
VE3JND 1200 75-16-B
VE3ADI 1178 62-19-B
VE3JWV 795 38-15-BD
VE3DNR 8 4 2-B
VE3JHK (+VE3IHU)
3330-111-40-AB

British Columbia
VE7ANP 30 8 3-BD
VE7ARM/7 (VE7S ADL AZG BKX)
245-48-5-ABD

USA
1

Connecticut
K1PXE 9963-185-41-BCDf
K1ZND* 66-10-170-39-A
W1HDQ* 1008 56-18-AB
W1ALFO 867 51-17-B
W1WHL 504 42-12-AB
W1QJL 156 26-6-B
W1NOYZ 65 13-5-B
W1WEL 51 17-1-B
W1KHM 12 4 3-A
W1AIFOK/1 (+K1VYU W1AIGP)
1920-112-35-AB
K1MUM/1 (K1S ONW K1K W1A1HYN)
1898 146-13-A
W1MYI/1 (W1AS MPY MTZ)
910 70-13-AB

Eastern Massachusetts
K1AGB 8745-14-555-ABC-D
W1ANNW 5440-170-32-A
W1AINPZ 2280 95-24-A
K1IQJ 1909 72-23-BD
W1GAO 1386 63-22-A
W1ALXP 416 32-13-A
W1JOT 84 8 4-D
W1A1LD (+K1HEM)
2904 78-33-ABC-D
K1ASB/1 (+K1JHB W1AS1YF KVK LHL ODU PGI PMB)
1755-117-15-AB
W1ITYM (K1S CKS VTT W1A1OLD)
585 65 9-AB

Maine
W1YTW 7696-122-52-ABCDE

New Hampshire
W1A1OUR 5250-175-30-A
W1JSM 572 44-13-B
K1NOZ 432 54 8-A
W1A1FSZ 56 8 7-AB
W1A1OAM/1 5 5 1-A
W1DX/1 (K1S COX KEC MUC NZO JVI TWI W1S AGN BJ1 GGM JVL OUP PVT W1AS DRO L1H HOH IZO LXU NPN OZI PBU P1R K4GG)
75,383-73-89-ABC'Df
K1NZQ/1 (+W1B1X1)
250 13-10-ABC'Df

Rhode Island
W1CPC 488 39-12-A
W1A1NTT 208 20-10-A
W1A1ODD 72 12 6-A

Vermont
K1GYT 13,770-270-51-AB
W1A1M 1375 55-25-AB
K1LJG 240 20-12-AB
W1A2MZH/1 55 11 5-A
W1MX/1 (W1AS) M1D MSK
W1A2JHR W1B2GLO K9AOP)
25,130-328-70-ABC'Df
W1AJEX (+W1AS) MAG NAM NBU1
3306-114-29-AB

Western Massachusetts
W1AMC 1632-115-30 5-B

WA2SPL WB2S BXP BYP DRW
DUS OLU WARUSA)
109.667-1040-98-ABC'DE

2

Eastern New York
W2CRS 17,886-251-66-ABC'D
WA1RAT/2 2,384-149-16-B
K2BGU 900 56-18-A
W2AWX 867 51-17-B
WA2RUW 273 21-14-AB
K2ARO 272 17 8-D
K2G5T 144 16 4-R
W2IP 72 12 6-B
W2HI 46 5 4-D
W2VFC/2 25 8 4-R
WR2ZCM 14 7 7-B

New York City-Long Island
WB2YZV 12,032-237-47-ABD
K2OV5 3074 88-29-ABDf
K2DDK 2835-105-27-AB
K2RTW 2160 54-20-D
WR2TUT 1060-106-10-B
W2FTH 740 74-10-AB
W2JFG (WB2J5), opt.)
484 44-11-AB
WN2SXG 5 7 1-B
WA2ZPX (+WB2ZLF)
1540-110-14-B

Northern New Jersey
WB2CST 4060-145-28-AB
W2OMS 1870 41-22-Df
W2UK 1860 55-10-Bf
W2CVW 1864 52-22-ABC'D
W21WM 1180 59-20-B
WA2FCW 259 37 7-B
WR2CUT 205 41 5-B
WA2ND 33 11 3-A
WB2GKE/2 (WA2S AOL BAT DBf)
12W ZOW WB2S UGT W1K Emly
Rahineau)
38,257-535-67-ABD
K2OWR/2 (+WB2LSO)
32,688-410-72-ABC'Df
W2MOZ/2 (WA2S BLL E1W1)
7837-155-44-ABC'Df
WB2LYP/2 (+WB2LOE)
6840-218-30-AB
WA2UDT (+WA2PKY)
2210-130-17-B
WB2MFC/2 (W2S AZP INT GHO
WB2S BMG DTG GBW ZMD)
504 72 7-B

Southern New Jersey
W2LH 10,126-136-61-ABC'Df
K1MBQ/2 1278 71-18-A
K1BWR (+K1JZR)
9240-158-53-ABC

Western New York
W2WGL 377 29 13-B
K21JO 342 22 11-AB
K2TXB/2 (+W2DRZ)
15,216-294-53-AB
W2OW (K1S KZ1 SSV W2S EDN
HDD DPA W2AS MSV OMI QVM
RBJ RBY RXY WB2S LQK GHH
HDT Wes Babcock)
794-153-47-ABC'Df
K2LFB (+WA2G1A)
507 39-13-AB
K2JBG (+WB2ZDR)
48 16 3-A

3

Delaware
WA3BAO 3276 82-86-ABC'Df
W3BHG 1254 66-19-B
W3CGV 648 23-18-ADf
WA3HD 30 10 3-B

Eastern Pennsylvania
K1SHF/3 7482-127-43-ABC'Df
W3ANJK 2024 92-22-AB
W3ARJM 1080 60-18-AB
W3JLU 714 42-17-B
W3JTB 370 36-10-ABC
W3G0A 216 24 9-A
K2YSX/3 (+W2S BHP E1H1 PVG
W2AS CQJ K1J QID WB2S TFO L1E
LDZ)
25,277-315-72-ABC'Df

Maryland-D.C.
W3KMV 4585-131-35-AB
W3CJX 2548 86-26-BD
W3LUL 1562 71-22-B
W3UO 600 50-12-AB
W3MSN 550 50-11-AB
W3JPT 315 35 9-AB
WA3JLY 196 28 7-AB
WA3OIB 84 21 4-B
W31FH 20 10 7-B
WA3LOS (K2ODL WA3NDU)
3616-110-32-ABC

Western Pennsylvania
W3BWU 1869 89-21-AB
WA3MYI 576 48-12-A
E3AKR 407 37-11-AB
W3D1M 72 18 4-A
W3GJBJ/3 (+WA3PTV K9L1O
W9JOE)
1480-145-24-AB

4

Alabama
WB4NCN 980 49-20-A

Eastern Florida
K4BNC 2093 91-24-AB
W4OJU 1504 94-16-AB
W4RYW/4 286 28-11-AB

Georgia
WA4NJP 4551-122-37-ABC
K4RH 3308 87-38-AB
WB4WMT/4 3080-110-28-A
WB4RUA 504 28-18-AB
W41SU 266 19-14-AB
W4WDH 60 10 6-B

Kentucky
WA4COG 3168-144-22-A
WB4YAB 2088 87-22-A
WB4YJS 612 48-19-A
K4J1B 84 8 4-C
WB4YIH (+WA91A1)
7363-199-37-A
WA4JOS/4 (+WB4JQC)
3911-115-34-AB

North Carolina
K4ROM 1316 62-18-A
E4JOU 470 35-12-B
K4MSG 4 3 2-B

South Carolina
WB4MJY 1375 51-25-AB
WB4TWW/4 645 45-15-A
K4VAA 420 30-14-A
W4VHH 210 17-10-BDE

Tennessee
WB4JG/4 4860-135-36-AB
WR4H1/4 (+WA4ZCX WB4NDQ)
15,796-359-44-AB
W4GZX/4 (WA4S HLS Y11 WB4S
DAJ JBC)
288 52 9-AB

Virginia
K4PCL/4 12,836-249-9-AB
KH61LD/W4 1491 71-21-AB
K41TO 300 30-10-B

Western Florida
W4C5C 364 28-13-A

5

Louisiana
WA5QBX 85 17 5-A

Mississippi
W5RCT 429 30-13-Bf

New Mexico
W5SCAG 160 20 8-A
K5LFW 107 17 6-A

Northern Texas
W5SWY 612 50-17-ABD
K51VE 432 36-12-B
WASZUC 28 7 4-A

Oklahoma
K5WVX 4900-140-35-A
W5WAX (+K5HXG)
2664-109-24-ABD

Southern Texas

FYK CYL G1V)
360 45 8-AB

6

East Bay
W6ROZ 36 9 4-B
WB6NMT/6 (+W6YKM WA6JUD)
5400-176-27-ABC

Los Angeles
K6SSN 2880-135-20-ABC'D
WA6LHL/6 448 64 7-AB
WB6FVO 282 47 6-A

Orange
K61BY 390 21-15-ABf
WB6NXD/6 (+WB6WRH)
1 1 1-B

Santa Barbara
K6YNB/6 11,134-263-38-ABC'D
W6OAL/6 (+K6WV WB6S IMM LLI
WN6IMS)
2016 70-24-ABC'Df

7

Santa Clara Valley
K6OAX 1461 48-19-ABCf
WA6LJAP 1724 45-17-BCD
W6KOC 1110 74-15-A
WB6JON 440 44-10-AB
W6LZJ 512 75 8-AD
W61LP 64 10 4-B
K6GSS/6 (+WB6KZB)
10,106-299-31-ABC'Df
K61V7/6 (W6OUP W6EY2I
WN6LSN W6RPA)
3476-130-22-ABC
W6LZT (+W6H3O)
1100-110-10-AB

San Diego
W6QFD 2068 85-22-ABC'Df

San Francisco
WA6PYN 180 30 6-A
WA6LZB 168 28 6-A
W61AV 80 20 4-B

Sacramento Valley
WB6NKO 750 50-15-AB
WB6NKM 20 5 4-B
WB6QJF/6 (+WB6S ASU DTB)
1862 87-19-ABC

8

Nevada
K7ICW 300 27-10-ABC'Df

Oregon
W7TYR 730 62-10-ABC'Df
K7H5J 42 11 3-ABC
K7A8O/7 (K7S HUN JYS VMK
WKT W7S ADV I1DM UVE RPT
W7A7GP)
7737-136-17-ABC'Df
W7WTO (+W7D1A1)
136 34 4-ABf
K7WK7/7 (+W7RPT W7A7G1P)
40 4 4-Bf

Washington
W7EN 1080 72-15-AB
K7DBR 630 70 9-AB
K7IDJ/7 225 45 5-A
W7A7PVT 70 35 2-AB
W7OXY 26 13 2-AB
W7VE/7 (WB6HLL K7S GWI T1O)
WA7NLU)
2568-209-12-ABD
K7H7Y/7 (+K7MOJ WA7HIF)
1751 97-17-ABC'Df
W7SMV/7 (+W7S GPU VRM)
240 16 8-BCDE

9

Michigan
WB8BGY 7105-204-35-AB
W8U1 6040-142-40-ABC
K8HWW 5852-138-18-ABC
W8BPIE 3778-178-21-B
W8ABLH 1892 81-22-ABC
W8RLY 1428 84-17-B
W8BLLY 1264 78-16-ABC
W8BDSG 732 61-12-AB
W8BXY 187 43 9-AB
W8CJQ 363 26-11-ABD
K8A1C 240 40 6-AB
W8NCH 100 20 5-AB

ARMED FORCES DAY 1972

COMMUNICATION TESTS RESULTS

THE ANNUAL Armed Forces Day Communication Tests, sponsored by the Departments of the Army, Navy and Air Force, held on 20 May 1972, once again proved to be a highly successful event.

The military radio stations WAR (Army), NSS (Navy), N0NNN (Navy) and AIR (Air Force) located in the Washington, D.C. area and NPG (Navy) in the San Francisco area conducted the communication tests. The tests included military-amateur crossband operations and receiving contests for both continuous wave (cw) and radioteletypewriter (RTTY) modes of operations. The Navy aircraft, using the call sign NSSAM, scheduled to fly over various cities, was cancelled. However, amateur radio station K4BSS operating on board a Navy aircraft conducted operations on the 80-40-20- and 15-meter amateur bands. A total of 213 air-to-ground QSOs were made during the more than eight hour flight.

Crossband Results

WAR, NSS, NPG, N0NNN and AIR had a combined total of 9,272 QSOs during the twelve hours and forty-five minutes devoted to the military-to-amateur crossband portion of the communication tests. Commemorative QSL cards have been mailed to all participants who could be identified in the Winter 1971-72 and Spring 1972 supplement of the *Radio Amateur Callbook Magazine*. Any amateur who has not received a QSL card confirming his contact should request confirmation, listing his call sign, the station worked, military and amateur frequencies and time. The request should be addressed to the appropriate radio station; or to Armed Forces Day Tests, Chief, Navy-Marine Corps MARS, 4401 Massachusetts Avenue, N.W., Washington D.C. 20390, Mail Stop 394.

CW Receiving Contest Results

There were 351 acceptable entries for the 25 words per minute cw broadcast message originated by the Secretary of Defense. A Certificate of Merit has been mailed to the stations/individuals who submitted an acceptable entry. The complete text of the 25 word per minute Morse code message is printed below:

R 202100Z May 72
FM WASHINGTON DC

TO ALL ARMED FORCES DAY PARTICIPANTS
BT

ARMED FORCES DAY IS AN OPPORTUNITY FOR THE DEPARTMENT OF DEFENSE TO PAY TRIBUTE TO ALL LICENSED AMATEUR RADIO OPERATORS WORLD-WIDE, WHO BY THEIR SKILLS, DEDICATED EFFORTS AND SPIRIT OF COOPERATION, ARE HELPING PEOPLE EVERYWHERE BUILD BETTER BRIDGES OF UNDERSTANDING THROUGH VOLUNTEER COMMUNICATIONS SERVICES DEDICATED TO PROGRESS AND THE PRESERVATION OF PEACE. THE AMATEUR RADIO OPERATOR HAS TRADITIONALLY DEMONSTRATED HIS SKILL AS AN AMBASSADOR OF GOOD WILL, SERVING PEOPLE EVERYWHERE WHENEVER NEEDED, WHEN EMERGENCIES INVOLVING LIFE, PROPERTY, SAFETY AND THE PUBLIC INTEREST AND NECESSITY OCCUR ONE CAN EXPECT TO FIND SOME INDIVIDUAL AMATEUR RADIO OPERATOR OR GROUP INVOLVED IN HELPING PROVIDE THE NEEDED COMMUNICATIONS. THE MILITARY AFFILIATE RADIO SYSTEM IS YET ANOTHER EXAMPLE WHICH REFLECTS AN ORGANIZED VOLUNTEER EFFORT OF THE AMATEUR RADIO OPERATOR TO SERVE IN A MORE ACTIVE CAPACITY. HERE, RADIO AMATEURS ARE THE BACKBONE OF THE MARS SERVICE THAT PROVIDES AN ORGANIZED AUXILIARY MEANS OF COMMUNICATION READILY AVAILABLE TO MILITARY COMMANDERS EVERYWHERE DURING LOCAL OR NATIONAL EMERGENCIES AS WELL AS PROVIDING A MEANS OF LINKING OUR MILITARY SERVICE PERSONNEL THROUGHOUT THE WORLD WITH THEIR LOVED ONES AT HOME VIA MESSAGES AND PHONE PATCHES.

I COMMEND THE ENTIRE AMATEUR RADIO FRATERNITY FOR THEIR CONTRIBUTIONS THROUGHOUT THE WORLD IN COMMUNICATIONS AND IN PARTICULAR THOSE DEDICATED AMATEUR RADIO OPERATORS WHO ARE SO GENEROUSLY SERVING AS VOLUNTEERS IN THE ARMY, NAVY-MARINE CORPS AND AIR FORCE MARS SERVICES; SIGNED MELVIN R. LAIRD, SECRETARY OF DEFENSE.

BT

QRU AR

RTTY Receiving Contest Results

There were 376 acceptable entries for the 60 word per minute broadcast message originated by the Secretary of Defense. A Certificate of Merit has been mailed to the stations/individuals who submitted acceptable copy. The text was similar, but not identical, to the cw message.

DEF

AMATEUR RADIO PUBLIC SERVICE

NTS RACES AREC

In the Public Interest, Convenience, Necessity

CONDUCTED BY GEORGE HART,* WINJM

THE SET AND FIELD DAY

THIS ISSUE OF *QST* WILL REACH most of you before the Simulated Emergency Test, which takes place the last weekend in January. There is still time to make plans to participate, in most cases. The SET was announced in Dec. *QST*, page 49, and a complete list of SECs was included on page 50 of that issue. Please read, for further information, and plan to take part in this annual all-emergency-preparedness event.

Field Day occurs on the fourth weekend of every June. It is not 100% an emergency-preparedness activity, although there are those who would like to make it such, but a combination of many things that result in getting many people out who would otherwise have no inclination to participate in even this much emergency preparedness. FD is a contest, and its rules are recommended by the Contest Advisory Committee. SET is not a contest, and its rules are set by headquarters entirely with emergency preparedness and public relations in mind.

So there is the difference. Field Day is a contest combining emergency preparedness, fraternity, rivalry, competition, group effort, family or social gathering, practical technical achievement, outdoor recreation, public relations and a great many other attractive features into a single weekend activity which annually brings out the greatest number of licensed amateurs and prospective amateurs of any other regular ARRL-sponsored event. The SET is an emergency-preparedness activity combining two principal features: (1) a test of our AREC/RACES/NTS organization to assess its emergency communications capability, and (2) a public demonstration of amateur radio preparedness and potential in which direct contact is made with other public service and news media.

*Communications Manager, ARRL.

There is no nonsense about the SET. This doesn't mean it can't be "fun," for fun is where you find it, and to the extent that it connotes personal satisfaction in doing something really worthwhile, the SET is the most fun there is. If you are looking for personal aggrandisement, forget about both FD and SET. If you are looking for group competition, FD is for you. If you are interested in doing your bit to assist amateur radio to comply with the first-mentioned "basis and purpose" of the service (i.e., to provide "a voluntary noncommercial communications service" for the public), then *get into the Simulated Emergency Test, OMs!*

Planned and Unplanned

Above we used the expression "plan to take part" in the SET. A natural rejoinder to this is "how can you plan to take part in a simulated emergency when, to be a good simulation, an emergency cannot be planned?" A good point, and one which has often been raised. What kind of simulation can it be if everything is planned in advance, when we know that when the real thing comes along we will have little or no warning and be unable to plan in advance? Isn't a simulation supposed to be realistic?

There are two answers to these questions. The first is that the only situation that can be truly realistic is a real situation. No matter how much we try to simulate an actual emergency, we'll never achieve more than about 50% realism — unless, that is, the participants *think* it is real, and this could have unfortunate consequences. You can simulate some of the physical conditions of a real emergency, successfully use imagination for some of the rest of it, but you can never simulate the tension, the anxiety, the pressures that will exist in the real thing. And this is a very large part of the battle. As a result, your SET results will be far more favorable than the results you would get in the real thing.

The second answer is that if you try to simulate the real thing by pulling a "surprise" emergency,

One of the critique sessions concerning Hurricane Agnes was held at Onondaga Co. (Syracuse), NY C.D. Headquarters last August. Four of the "discussioners" were (left to right): K2KTK, SCM WNY; W2WS, Ham columnist for a Syracuse newspaper; W2ABV, Co. RO; and W2MTA, NYS Net Mgr.



QST for

This picture was snapped at the Colorado Code Net — Silver State Net Picnic in Colorado Springs, CO last June. Left to right are: WAØTMA WØSIN (Rocky Mtn. Div. Director), K5MAT (TCC-Pacific Dir.) and WØLRN (CO RM).



such as you would have it if it were for real, you just may find yourself sadly lacking in participation and defeating your own purpose. Many who would gladly turn out at considerable inconvenience for the real thing are not going to do so for a test unless they are given some ideas beforehand when it will be.

So find out from your local EC, your SEC or your SCM, just what information is available on the Jan. 27-28 SET. If there is no local activity planned, perhaps you'd like to try to organize something yourself. Go to it, we'll be glad to have your report of what you were able to accomplish on short notice, whether you are an EC appointee or even an ARRL member or not; and you'll get full credit in the eventual QST writeup. Otherwise, you can help out by making yourself available in your section net to handle traffic coming your way. Even if you do succeed in contacting a leadership appointee, don't expect to be given chapter and verse; we are "planning an unplanned SET" this year. Be available on Saturday and Sunday, Jan. 27-28. You may be needed, just as you most certainly would be if the real thing came along. — WINJM.

Traffic Talk

With the status of much of our traditional traffic activity in limbo because of the new ruling on Docket 19245, it is hard to go on talking about traffic as though nothing had happened, and equally hard to think of anything else to talk about. Nevertheless, all is not yet lost. Let's not panic. The plans for a Daytime NTS continue, ENTS continues as before, and we'll wager not many independent nets are "breaking and fleeing" before a harsh interpretation — at least not before the lion bares his teeth. ARRL is quietly, inobtrusively exploring the matter. Meanwhile, we continue pretty much as before — although inevitably more of us will be "gun shy" about what kind of traffic we handle.

So let's see what the folder can produce in the way of a subject. Oh yes, numbered texts. Quite a few suggestions for new ones, lately. If we adopted all such suggestions, we'd have a volume full of them. Consequently, it is customary to rely on spontaneous suggestion to determine what is needed. So far, there has been no spontaneity. Almost every suggestion for a new numbered text has been the only one of its kind.

A useful numbered text must be one which is used a great deal, and therefore is suggested by a number of different sources having no connection with each other except for a common need. For example, you don't create a "spontaneous" demand by selling the idea to others. You may create a demand, all right, but it's the kind of demand created by advertising and applying pressure. The demand may really be there, but more than likely it is artificial, created to sell a product — or in this case, an idea, *your* idea. Nothing wrong with

having ideas and trying to sell them, but when it comes to numbered texts one of the criteria should be spontaneous and frequent demand.

Another criterion should be usable convenience. You'll notice that none of the ARL numbered texts are very short phrases, such as "Happy birthday" or "I love you" or "Drop dead," longer or harder to send (in fact, sometimes shorter or easier) than a spelled-out ARL number.

Still another criterion should be a limitation in the number of blanks to be filled in. If the text requires more than a single variable, it may well not be practical as a standard text. For example, "See you on (freq.) at (time) on (date)" might sound like a usable standard text, but it's confusing even if it is shorter (which in this case it isn't) to send "ARL EIGHTY THREE 21273 2130Z NOV 21" than to send "SEE YOU 21273 KHZ 2130Z NOV 21." Even two fill-ins are too many.

Of course, as some will be quick to point out, it is possible to shorten the procedure in order to make standard shorter texts practical. For example, when using a standard text the text number could be indicated instead of the "check," preceded by an S (for "standard"), and the text of the message then omitted entirely. Thus, a check of S75 would indicate standard text number 75, with the address followed immediately by a signature instead of a text. If a fill-in is required, the text could comprise the fill-in only. This wouldn't save much, however, unless the requirement to spell out the number of the text is removed — and initially at least would cause even more confusion.

The above is just typographical cerebration, for what it's worth. What we started to say, and with which we now conclude, is that no new numbered texts will be added unless there is a *spontaneous* demand, lest our standard-text list get unwieldy.

— WINJM.

National Traffic System. Seven members of the Central Area Staff, an advisory group consisting of region and area net managers, the TCC director and three members-at-large in the NTS Central Area, met at St. Louis, Mo., on Oct. 21 to hash out some NTS problems. Two members were absent, Member-at-Large W9QLW and RN5 Manager W5SBM, both of whom were on the sick list. W5SBM, however, sent an authorized proxy. Those present: CAN Manager WØINH, chairman; TCC Director WØLCX; for RN5, KØBAD/4; 9RN Manager W9HRY; TEN Manager WØHI; and Members-at-Large W5MI and WØZHN. Also present as invited observers: KØAEM WAØMLE, WINJM. The formal meeting began at 1330 CDT on the 21st and ended 2330, with a break for dinner — a formal session of approximately eight hours. Several informal sessions took place before and following the formal meeting. Some of the actions taken and topics discussed in depth:

(1) Reaffirmed support for the Daytime NTS and recommended that PAMs and other active

traffic operators in leadership categories be canvassed for leadership volunteers; also recommended that present NTS operators be encouraged to actively participate in interface operations to the extent possible.

(2) Three members of the staff submitted resignations. RN5 Manager WSSBM resigned through his proxy at the meeting, and that proxy, KØBAD/4, was recommended to replace him. WØLCX resigned as TCC director and his recommended replacement was KØAEM. WØINH resigned as CAN manager; his recommended replacement is WAØMLE. W9HRY indicated his wish to be replaced in the spring, but no recommendation was made at this time. All resignations were for reasons of health or personal obligations, and all pledged to continue support of NTS by active participation.

(3) The CAS recommended that fair station organizers prearrange with NTS managers and the TCC director for expeditious handling of their traffic, that local schedules be utilized to clear all traffic from the fair site as quickly as filed, preferably by voice or teletype.

(3) CAS voiced strong approval of the new format for the Simulated Emergency Test, but recommended stronger emphasis on emergency power.

(4) W5MI, W9QLW and WØZHN were all unanimously reelected to two-year terms as members-at-large of the NTS Central Area Staff. WØZHN was then elected to succeed WØINH as chairman.

(5) Other topics discussed without action included FCC Docket 19245, the CAN Bulletin, CAS correspondence and effect of the new sub-band allocations on NTS nets.

Thanks to WAØMLE, who acted as secretary of the meeting and compiled the above info.

October Reports. Not much from the net managers this month. Things going okay, fellas? W3NEM reports visits from WA2ASM/8, K8KMQ and VE3LK. RN5 participation is up and KØBAD/4 hopes it will continue to improve. RN6 will be maintaining MARS liaison on their late session. W6LRU further adds that the loss of WB6BBO to 3RN has left some holes in the duty list. From RN7, W7KZ reports a few "washouts" due to bad conditions, but for the most part schedules have been successful. The ham exhibit at the Ontario Science Center boosted ECN's traffic total. Average traffic per session increased 68%. K7NHL awarded TWN certificates to: W2FPV/Ø W5UH, K7s HLR MTZ, WØs IW LQ, KØOTH, WAØs NZA ZWA.

October Reports

Net	Sessions	Traffic	Rate	Avg.	%Rep.
EAN	31	1605	1.276	51.7	99.4
CAN	31	1016	.918	32.8	100.0
PAN	31	977	.777	31.5	98.0
1RN	62	522	.380	8.4	87.3
2RN	61	469	.773	7.7	99.0
3RN	61	435	.580	7.0	97.3
4RN	47	398	.416	8.4	70.2
RN5	62	724	.424	11.7	93.3
RN6	62	639	.414	10.3	100.0
RN7	62	270	.280	4.4	55.7
8RN	61	431	.353	7.1	90.8
9RN	61	339	.364	5.6	93.2
TEN	62	611	.531	9.9	86.9
ECN	61	232	.297	3.8	84.4
TWN	52	226	.224	4.3	51.9

Public Service Honor Roll October 1972

This listing is available to amateurs whose public service performance during the month indicated qualifies for 30 or more total points in the nine categories below. A delineation of the points awarded for each function is given in the category key at the end of the Honor Roll listing. Please note maximum points for each category. Those making fewer than 48 points are listed with point totals only.

Category	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	Totals
Max. Pts.	10	10	12	12	20	3	-	5	5	Totals
WA3QOZ	10	10	12	12	12	6	3	-	5	70
W3FCS	2	10	12	12	9	19	-	-	5	64
WA8ETX	10	10	12	12	12	4	3	-	5	68
WB4SVH	10	10	12	12	12	4	-	-	5	65
W4OGG	10	10	10	12	12	20	-	-	5	64
WB5DEK	10	10	12	12	12	5	-	-	5	64
WA3GSM	10	10	12	12	12	2	-	-	5	63
WA3JGM	10	10	12	12	12	7	-	-	5	63
WB8BMV	10	10	12	12	12	2	-	-	5	63
WA2RYD	10	10	12	12	12	2	-	-	5	61
W7BQ	10	10	12	12	12	5	-	-	5	61
KØBAD/4	10	10	12	12	12	12	-	-	5	61
WØLRW	10	10	12	12	12	12	-	-	5	61
KØPIV/4	10	10	12	12	12	12	-	-	5	61
WB2NRK	10	10	9	12	12	4	3	-	5	60
WA7JOS	10	10	12	12	20	-	-	-	5	59
WSSBM	10	10	12	12	12	2	-	-	5	58
WA8UPI	10	10	9	12	12	-	-	-	5	58
WAØVAS	10	10	12	12	20	3	-	-	5	57
R1GXD	10	10	12	12	12	12	-	-	5	56
WA2EUO	10	10	12	12	12	12	-	-	5	56
WB2IKL/2	10	10	12	12	12	12	-	-	5	56
K3KAI	10	10	12	12	12	12	-	-	5	56
WB5ETN	10	10	12	12	12	12	-	-	5	56
W7LBK	10	10	12	12	12	12	-	-	5	56
WB8KVU	10	10	12	12	12	12	-	-	5	56
K8NOW	10	10	12	12	12	4	3	-	5	56
WB9AHJ	10	10	12	12	12	12	-	-	5	56
WB5AMN	10	10	6	9	20	-	-	-	5	55
WA2ICU	10	10	12	9	12	-	-	-	5	53
WA2UOQ/2	10	10	12	3	12	-	-	-	5	52
W7OCK	10	10	3	12	12	-	-	-	5	52
KØBIX	10	10	12	3	12	-	-	-	5	52
WA1FCM	10	10	6	9	12	-	3	-	5	50
WB2CST	10	10	12	3	12	-	3	-	5	50
WB4VZO	10	10	12	12	6	-	-	-	5	50
W2OE	10	10	12	12	-	-	-	-	5	49
W2TPV/Ø	10	10	12	12	12	-	-	-	5	49
WA9EED	10	10	12	12	12	-	-	-	5	49
KØMRI	10	10	12	12	12	-	-	-	5	49
VE3GFN	10	10	12	12	12	-	-	-	5	49
VE3GI	10	10	12	12	5	-	-	-	5	49
VE4EA	10	8	12	12	1	-	-	-	5	48
WA2AEL/4	10	10	12	3	12	-	-	-	5	47
W3EZ1	5	12	12	9	4	-	-	-	5	47
WA3QQR	10	10	12	12	12	-	3	-	5	47
WA6DEI	10	10	12	3	12	-	-	-	5	47
VE3LQ	10	10	12	12	12	-	-	-	5	47
VE3EHJ	10	10	12	12	12	-	3	-	5	47
WA5TVA	10	10	12	12	9	-	-	-	5	46
WB4PNG	10	6	12	12	12	-	-	-	5	45
WAØMLE	10	6	12	12	12	-	-	-	5	45

WB2CFT	44	WB8HUP	42	WA2AYC	35
WB2CHY	44	WA8WKF	40	K4UWV	35
WA2CLB	44	WBØBY	40	WØHFF	35
W2CNE	44	W1UBG	39	WB6KOL	35
WB2FEK	44	W2RUF	39	WB5AQY	35
WA3DUM	44	W3LOG	39	WA8BCX	35
K3JOI	44	W3NFM	39	WA8FTW	35
WB4RIA	44	WB8KKJ	39	KØCCG/4	35
WB4SOA	44	W9HRY	39	K1SKF	34
WSABQ	44	KØAEM	39	W3OKN	34
K5ROZ	44	WØHI	39	W3TN	34
W7AXT	44	VE3AWE	39	W3YA	34
W7GHT	44	VE3DPO	39	W4UO	34
K7OUF	44	VE3EWD	39	W4ZJY	34
WA8NQG*	44	WB4JMH	38	WB4KJ	34
WBØCNM	44	W6AUC	38	WØYHV	34
WAØSJ	44	W7PI	38	W7WAH/5	34
VE3JAL	44	K8MLO	38	WB9BAP	34
VE3FOZ	44	WØBV	38	WØFI	34
VE3FRG	44	WA2ELD	37	WB6ZVC	32
VE3EXI	44	WB2OYV	37	WAØYVB	32
VE3SB	44	W2RQF	37	VE3BPC	32
W8GLC	43	W6INH	37	W2MTA	31
WB4FKJ	42	W6OAW	36	WN3RCI	30
		W7IWN	36		

*Denotes multiplier station.
Category Key. (1) Checking into cw nets, 1 point each; (2) Checking into phone/RTTY nets, 1 point each; (3) NCS cw nets, 3 points each; (4) NCS phone/RTTY nets, 3 points each; (5) Performing assigned liaison, 3 points each; (6) Legal phone patches, 1 point each; (7) Making BPL, 3 points regardless of traffic total; (8) Handling emergency traffic directly with a disaster area, 1 point each message; (9) Serving as net manager for entire month, 5 points.

Here's a picture of K5QKM, appointed SEC for NTx this past Sept. Joe has had several years experience as EC for Henderson Co.

TCC Eastern	1241	593	
TCC Central	931	549	
TCC Pacific	1231	681	
Sections ²	2545	10716	4.2
Summary	3352	21433	6.4
Record	3146	31117	1,440 16.4

¹TCC functions not counted as net sessions.

²Section and local nets reporting (65): AFND, AENO, AENR, ARNT (AL); ALEN (AZ); OZK (AR); NCN, SCN (CA); CCN (CO); CN, CPN, Nutmeg VHF (CT); DEPN, DTN (DE); FAST, FMTN, PPTN, GN, QFN, QFTN, TPTN, VEN (FL); GSN (GA); ILL (IL); QKS (KS); KNTN, KTN (KY); LAN (LA); SGN (ME); MDCTN (MD-DC); EMN, WMN (MA); OMN, WSB (MI); MJN, MSPN, PAW (MN); MON, MSN, WEN (MO); NJEPTN, NJN (NJ); NLL, NYS (NY); BN, BNR, OSSBN (OH); EPA, PPTN, WPA (PA); TN, TNN (TN); BUN (UT); VN, VRN, VSBN (VA); NSN, WSN (WA); WYPN (WV); APSN (AB); MTN (MB); GBN, OPN (ON); WQV/UHF, OQN (PQ).

Transcontinental Corps.

No comments from the TCC directors this month. K6KCB/5 has earned a TCC-Central certificate

Area	Functions	%Successful	Traffic	Out-of-Net Traffic
Eastern	124	97.0	1774	593
Central	93	96.7	1130	549
Pacific	124	91.9	1365	681
Summary	341	94.8	4269	1823

The TCC roster (Oct.): Eastern Area (W3EML, Dir.) - W1s BJG EJJ NJM QYY YNE, K1SSH, W2s FR GKZ, WA2s ELD ICU UWA, W3s CB EML, K3MVO, WA3OGM, W4s SQO UQ, K4s FAC KNP WB4OMG, W8s IBX PMJ RYP VDA/4, K8KMQ, WA8PIM. Central Area (W0LCX, Dir.) - W4OGG, WB4s KPE YCV, W5s MI QU SBM, WB5CIC/5, K6KCB/5, W9s CXY DND YB, W0s HI INH LCX ZHN, R0s AEM DDA, WA0IAW. Pacific Area (K5MAT, Dir.) - W5RE, K5MAT, W6s BGF EOT IPW MLE VNO VZT, WA6DEL, WB6VKV, W7s BQ EKH EM GHT KZ PI, K7NHL, W0LO, K0OTH, WB0AXW.

Independent Net Reports (October)

Net	Sessions	Traffic	Check-ins
20 Meter ISSB	23	1398	388
All Service	4	5	22
Mike Farad	26	181	257
Clearing House	25	244	267
75 Meter ISSB	31	235	1311
North American Traffic	26	251	547
IMRA	48	559	1676
7290 Traffic	44	482	1797
Ohio Valley Teenage	28	94	241



BRASS POUNDERS LEAGUE

Winners of BPL Certificates for October Traffic

Call	Orig.	Recd.	Ret.	Del.	Total
W1CUL	329	1051	941	69	2390
K0ONK	167	695	679	15	1556
W3VVR	201	390	341	16	948
K3NSN	10	400	400	-	810
WA0VAS	115	320	60	260	755
WA3QOZ	52	304	264	34	654
W1QIM	6	322	322	-	650
WA4IH	14	311	335	32	692
W3EML	29	291	264	2	517
WB4WCM	76	239	151	41	507

BPL for 100 or more originations-plus-deliveries

W0WYX	148	WA1FCM	114	WIPEX	106
W3RCT	133	WB6TVK	114	K4SU1	105
K3CR	131	VE3EHF	114	WB5CIR	105
WB2CST	130	WA8HQO	112	WA4JQR	102
WB2NRK	121	WA6HAD	109	WA3QQR	101
WB4YCV	121	WA8FTX	109	WA6AUX	101
K8NQW	117			WYTN	100

More-Than-One Operator Station

W4BAZ 116, VR2UN 111

BPL Medallions (see July, 1968 QST, p. 99) have been awarded to the following amateurs since last month's listings: W2CU, K3BR, W3RCT, WB6VTK, WA8VKI, W0MFC.

The BPL is open to all amateurs in the United States, Canada and U.S. possessions who report to their SCM a message total of 500 or a sum of originations 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 ARRT form.

Three members of the Virginia cw nets are pictured here. K0PIV/4 (left) is RM for the Va RTTY Net. In the picture on the right, we see K4KNP (left) and K4JM (right) both long time ORSs.





This month's NTS column reviews the Central Area Staff Meeting held in St. Louis, MO, Oct. 21. Participants pictured are (clockwise, starting at front): W9HRY, W0LCX, W0ZHN, W0HI, K0AEM, W0INH, W5MI and WA0MLE.

Public Service Diary

While participating in a Muscular Dystrophy Fund drive in Ottawa, ON, Sept. 23-24, an amateur crew observed a hit-and-run accident involving a car and truck. The accident was reported via the VE2CRA repeater which was being used for fund drive communications. Thirty-three amateurs were participating in the drive. - (VE3DV, SCM ON)

During a simulated plane-crash drill (Oct. 7-8) in which the Boeing Employees Amateur Radio Society were providing communications for a search and rescue group, two real rescues were needed: a hiker with a broken ankle and a man with a heart problem. Communications for the drill and rescue was through the BEARS net on 75 meters. - (W7RJW, EC King Co. - BEARS)

At 0030Z Oct. 8, WB4YQH/mobile broke a QSO on the Jacksonville, FL repeater, WB4QFL, between WA4BUX/mobile and K0ECG/mobile and reported a highway accident near Lake City, FL. K0ECG dialed the highway patrol on the auto-patch and WA4BUX told authorities where the accident was. - (K0ECG/4)

At a polo field near Memphis TN, on Oct. 14, a rider was seriously injured when thrown from his horse. A doctor at the scene, WB4FVU, found the man in a state of shock and administered oxygen while his wife, WB4SZR, called for a helicopter via the WA4HBY repeater facility. Minutes later the helicopter arrived and WB4FVU notified the necessary doctors to be standing by at the hospital. On his way to the hospital, WB4FVU notified relatives and friends of the injured man via the repeater. The man's life was saved because of WB4FVU's medical training and his ability to communicate rapidly. - (WB4ANX, SEC TN)

A participant in the Dallas, TX, Community Radio Watch, WB5FVD, saw a major five car accident while traveling on US-75 near Richardson, TX, on Oct. 21. He reported the accident via the WA5VKW repeater and administered first aid until police and fire department units and an ambulance arrived a few minutes later - (*The Mike*)

Two clubs, K1MUJ and WA1QBJ, supplied seven mobiles for a motorcycle enduro in Plainfield, CT, on Oct. 22. During the event, one rider broke his leg. WA1ONZ was monitoring from home and summoned an ambulance to the scene. - (WA1HYN Asst. EC)

At 0030 Oct. 23, K7JUT was asked to assist with communications for a hunter lost in the Concrete, WA area. He alerted K7KXN and W7REC for assistance. K7JUT was portable in the

field with mobile search units, W7REC/mobile acted as relay and K7KXN provided a link by telephone with the sheriff's office. Two-meter fm was used as the primary communications link with 75 meters as backup. W7IEU and K7NQR assisted as standby for the emergency. The hunter was found at 1100 in good condition. - (K7KXN, Asst. EC Skagit Co., WA)

On Oct. 26, K5IRO was the first person at the scene of a two vehicle collision in the Edmond, OK area. Using the WA5YTI repeater autopatch, police and ambulance were summoned, after which he rendered first aid which in all probability saved the life of one of the victims. - (WA5FSN, SEC OK)

Also on Oct. 26, another accident was reported via the WA4QFL repeater. K0ECG/4 received a call from WB4DHA who had spotted an automobile accident on Route 11 in Jacksonville FL. K0ECG/4 alerted the Jacksonville sheriff's office. - (K0ECG/4)

On Oct. 27, K0SUH/mobile stopped to assist a stranded motorist south of Denver, CO. A call on the W0WYX repeater was answered by K0ELE/mobile who then contacted WA7SGH/0 who was able to send a tow truck to the scene. - (WA7SGH/0)

While monitoring the WA4QFL repeater on Oct. 30, K0ECG/4 was called by K4FTF/mobile who reported a truck stalled on I-95 in Jacksonville, FL and was blocking traffic. K0ECG/4 advised the police. - (K0ECG/4)

On Nov. 5, WA5CAC (Jackson, MS) answered a call by CP5DB who needed a phone call to Lake Jacksonville, TX, to report that a downed pilot who had crashed in the Bolivian Andes had been found unharmed. WA5CAC made the call. - (WA5FIL, SEC MS)

While traveling on Route 67 near Muncie, IN on Nov. 5, a car ahead of W9CUC was struck by another vehicle. W9CUC was in 2-meter QSO with WB9ESF who notified highway authorities for assistance and an ambulance. - (W9CUC)

Two alerts were reported in Miss. as a result of bad or threatening weather: one on Sept. 31, one on Oct. 22. Stations assembled on the Mississippi Sideband Net frequency on 75 meters, each time. Although a few "touch-downs" of tornadoes were reported, no emergency situation developed. - (WA5FIL, SEC MS)

AREC members in the Seattle, WA area assisted Seattle SEAFAIR (a service organization) during their Salmon Fishing Derby, Sept. 9-10. Twenty participants, lead by K7WTG (EC) and WA7HQG (Asst. EC), provided a wide-spread communications network covering a fishing area of more than 250 square miles. - (SEAFAIR News Release)

On the evening of Sept. 21, Metro Denver (CO) AREC provided communications linking district headquarters and schools during a Boy Scout membership drive. Thirteen portables and over 50 mobile stations participated using 2-meter fm through 4 repeaters. Over 3000 boys joined the scouting ranks. — (WAØHLQ, SCM CO)

Twenty amateurs in the Omaha, NE area supplied communications for a Multiple Sclerosis Bike-A-Thon on Sept. 24 in Boys Town, Gretna, and Ashland, NE. The Douglas Co. 2-meter AREC Net was a center for amateur activities. — (WØODL, Asst. EC)

Three Halloween reports were received concerning amateur involvement. Seven amateurs in the Willimantic, CT area established a network linking townspeople (via published telephone numbers) to town and state police. — (WIHHR, SEC CT). North Shore ARA, WB9IEZ (IL), worked with police and acting as "extra eyes and ears." Six amateurs participated. — (WA9LRI). Marysville, WA, police were aided by HAMS Club and Snohomish Co. AREC members. Reserve policemen

were carried by 8 mobile units. Thirteen amateurs were involved. — (W7IEU, EC Snoh. Co., WA)

The 1972 Crippled Children's Thanksgiving Telethon was held on a Toronto (ON) TV station from 1800 EDT Oct. 7 to 1830 EDT Oct. 9. A combined effort by the Toronto FM Society and the Toronto AREC group provided radio equipped mobiles for picking up donations as they were telephoned in by the TV audience. — (VE3GFN, EC Toronto, ON)

Thirty-six Section Emergency Coordinator reports were received for October. That's the same number as last year but down three from last month. AREC members "covered" by the reports are down too: 11,859 vs 13,332 last year and 12,738 last month. Now is the time for the non-reporters to resolve to do better next year. The SECs in the following sections reported for October: Alta, Ariz, Conn, Del, EFla, ENY, EMass, Ida, Ind, Iowa, Kans, Mar, Mich, Miss, Nebr, Nev, NNJ, NTex, Ohio, Okla, Org, Oreg, SV, SDgo, SBar, Sask, SDak, Tenn, Utah, Va, Wash, WVa, WFla, WMass, WNY, WPA.

QST



SOUTHEASTERN DIVISION CONVENTION

Miami, Florida

January 20-21, 1973

The Dade Radio Club of Miami invites you to spend two exciting mid-winter days in the "coats off" sunshine at the 1973 ARRL Southeastern Division Convention and Tropical Hamboree. From nine 'til five, Saturday and Sunday, January 20-21, Miami Bayfront Auditorium will offer displays by major manufacturers and distributors, a giant flea market/swap shop of second-hand goodies, and a convention program featuring ARRL Communications Manager George Hart, WINJM, QST Managing Editor William Dunkerley, WA2INB, the ARRL Southeastern Division Director and other League officials. Up-to-the-minute news from the January Board Meeting will be presented at the League Forum.

Saturday evening is "open" for special interest group dinners and meetings by QCWA, DXers, fimers, traffic nets and others who will have their own speakers and programs for interested visitors. A special YL/XYL tour package (\$3.50) will include entry fee and coach transportation to the world-famous estate-museum Viscaya Saturday afternoon and a boat cruise Sunday morning. For visitors desiring to expand the convention trip into a full-fledged vacation, the club has prepared a brochure of tantalizing suggestions.

Pre-registration is \$1 (\$2 at the door). Hotel rates are \$14 single and \$18 double if reserved through the club prior to January 15 (no deposit required). For further information write DRC, P.O. Box 73, B.A., Miami, FL 33152.

Illinois — The Wheaton Community Radio Amateurs' (WCRA) 11th Annual Mid-Winter Swap and Shop is Sunday, February 11, at the DuPage County Fairgrounds, Wheaton. Hours 8 A.M. to 5 P.M. Tickets \$1 advance; \$1.50 at the door. Two buildings this year and unlimited parking. Bring your own tables. Free coffee and donuts 9:00 to 9:30 A.M. For info write WCRA: Bill Rambow, WB9AVD, P.O. Box QSL, Wheaton IL 60187.

Michigan — The Norup Jr. High Science Club's 2nd Annual Hamfest and Swap n' Shop is Sunday, January 21, at the Oak Park Community Center, 14300 Oak Blvd. near Coolidge Hwy., Oak Park. Hours 10 A.M. to 5 P.M. Refreshments available. For advance tickets send 75¢ and s.a.s.e. to Mark Kay, 14831 Talbot St., Oak Park MI 48237. Tickets \$1.00 at the door.

Wisconsin — The west Allis Mid-Winter Swapfest is February 3 at Hart Park, 7300 Chestnut St., Wauwatosa. Directions: take 70th St. exit on I-94 North 1.2 miles to Chestnut St. Doors open at 8 A.M. Refreshments available. Talk in station on 3985 and 146.91. Rain or shine. Tickets \$1 advance; \$1.50 at the door. For details write WA9KRE, 4582 South Ahmedi Ave., Milwaukee WI 53207.

QST

COMING ARRL CONVENTIONS

January 20-21 — Southeastern Division, Miami, Florida.

March 23-24 — Great Lakes Division, Muskegon, Michigan.

NOTE: Sponsors of large ham gatherings should check with League Headquarters for an advisory on possible date conflicts before contracting for meeting space. Dates may be recorded at ARRL Hq. for up to two years in advance.

Annual ARRL Novice Roundup

Announcement

February 3 through February 11

With the advent of VFOs and 10 meters, the Novice Roundup takes on a new look this year. Freed from the grips of the crystal menace, Novice Liberation takes its place among the burgeoning ranks of "Lib" movements that have succeeded in accomplishing their goals. This year's NR should be more fun and exciting than ever.

Novices, this is *your* contest. You can improve your code speed to help prepare for that higher class exam, and you can also work new states to increase your WAS total. The contest is 9 days long, but you can only operate a maximum of 30 hours during that period. Those of school age can still get homework done, and Novices slightly older can get the beauty rest they need.

New disqualification criteria have been added, and are included at the end of the rules. All NR participants should read them — in addition to the rest of the rules, of course.

One point that seemed to give Novices problems last year was the foreign country multiplier. The U.S.A., Canada, KH6, KL7, KP4, KV4 and KG4 are *sections* and **CANNOT** be counted a second time as a foreign country. For example, if you work VA, WA, MI, CT, KV4, KP4, G3 and JA7 you have 7 multipliers. The KV4 and KP4 are a part of the same West Indies section and cannot be counted again as a foreign country.

During the contest, after calling CQ, listen on either side of your frequency for an answer; not everyone will have a VFO.

Contest log forms, dupe sheets (Op Aid 6), WAS maps and other operating aids are available from ARRL Hq. Send us a stamped, self-addressed envelope for some right away. After the contest, send us your log along with comments and photos. Logs become the property of the ARRL and cannot be returned, so make sure you still have a copy of your log. Entries must be postmarked no later than March 5, 1973 and must be sent to ARRL Hq.

How to Participate

Contest QSOs are much briefer than ordinary ragchews. You should not repeat your transmission (call, RST and section) at all unless you're requested to do so. Here's the way a typical exchange might go:

CQ NR CQ NR DE WN4VMC WN4VMC
WN4VMC NR K

WN4VMC WN4VMC WN4VMC DE WN9AXP
WN9AXP WN9AXP AR

WN9AXP DE WN4VMC 579 TENN BK

WN4VMC DE WN9AXP R 569 ILL K

WN9AXP R TNX 73 SK DE WN4VMC NR K

In most cases your state is your section. However, new hams in PA NJ NY MA CA FLA & TX should check page 6 of any issue of *QST* to learn their exact section (within the 16 ARRL divisions). If you still don't know your ARRL section after referring to page 6 of *QST*, drop us a card and we'll help you out. Generals: *don't* call CQ NR; answer Novice CQ NRs.

ROUNDUP PERIOD

Starts	Ends
February 3 0001 (12:01 A.M.) Greenwich Mean Time	February 11 2359 (11:59 P.M.) Greenwich Mean Time

Note that time is expressed in Greenwich Mean Time (GMT). If you're unfamiliar with GMT, remember that it's 5 hours ahead of EST, 6 ahead of CST, 7 ahead of MST and 8 ahead of PST. Better yet, send for our handy Operating Aid #14, which contains, among other goodies, a time conversion chart and explanation of the RST system.

Scoring

Count one point for each contact (you may work a station only once, regardless of band); add your ARRL Code Proficiency credit, then multiply by the total number of multipliers (sections + countries) worked. And remember, KH6 KL7 KP4/KV4 KZ5 and VE districts are sections and *cannot* be counted a second time as a foreign country. If you work 100 stations in 31 sections + 3 foreign countries and have an ARRL (not FCC) Code Proficiency credit of 10 wpm from W1AW or W6OWP, then your score is 100-plus-10 X total multipliers (31+3) or 34, for a total of 3740 points. For details on the Code Proficiency program, see OP-News of this issue. You may work DX stations for contest credit, a multiplier of 1 is earned for each separate foreign country worked.

Go To It!

Read the rules carefully. Keep a check-sheet of stations worked (we have Operating Aid #6 available free) so that you don't have duplicate QSOs. Log sheets, OP Aid 6 and a map of the United States are now available from your ARRL Headquarters. *Unless first-class postage is included with your request, log sheets will be sent by third-class mail.* To aid us in getting these forms to you as quickly as possible, please be sure to include with each request a self-addressed and stamped envelope containing: your full name, call and mailing address complete with Zip code. We suggest a minimum of 8 cents postage attached. This will assure your receiving 3 log-sheets (enough for 300 QSOs), 1 Op Aid 6 and a WAS map (if desired). Using this as a guideline, you can adjust the postage according to the number of logs you anticipate needing.

B C N U in the NR! —WA1PID

Rules

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

2) *Time:* All contacts must be made during the contest period starting at 0001 (12:01 A.M.) Greenwich Mean Time on the first Saturday of February and continuing until 2359 (11:59 P.M.) Greenwich Mean Time the second Sunday of February. Time may be divided as desired but *must not exceed 30 hours total. Off periods may not be*

(Continued on page 84)

would ease rules for model control in the amateur bands; Docket 19555, seeking to implement the Environmental Protection Act (this last triggering a massive opposition by ARRL, printed in December *QST*). A host of requests, however, still hung in limbo, including about 15 seeking more privileges for Technicians, one of which is RM-1535, filed by ARRL more than three years ago. And one petition for rulemaking we'd just as soon see hang forever is RM-1747, the EIA attempt to take part of the 220 MHz band for a new Class E citizens radio service. The League of course filed a strong opposition with some alternative suggestions for making CB work better where it is.

Congressional activity was light and late: a bill was filed near the end of the session requiring filters on broadcast receivers (see "Haps" in this issue); and FCC sent up legislative requests for authority over unlicensed people; over manufacturers; over users of restricted and incidental radiation devices; and for authority to levy heavier fines.

In Canada, the changes were minor yet welcome: elimination of the 15-year age limit for amateur license, and expansion of the 160-meter segments and powers. A small minus was the loss of the remaining 11-meter allocation, 26.96-27.0 MHz.

For U.S. hams at least, it was truly the "year of the regulation!" But moving now to League affairs, the Board of Directors in January elected Harry J. Dannals, W2TUK, as ARRL president and nominated Robert W. Denniston, WØDX, as president of the International Amateur Radio Union (the latter speedily confirmed in the post by the other member-societies around the world . . . the first time since the founding of IARU that the twin presidencies have been split). The Board also reluctantly raised dues for membership with a differential for Canada and "overseas" recognizing the vast spread in postal rates to domestic and extraterritorial points; implementation was delayed until July 1, giving members an opportunity to arrange for multiple-year or life memberships at the earlier rate. This was the first year of two regular Board meetings, primarily providing for faster feedback on matters sent down to committee. The committee structure was rearranged effective with the 1973 Annual Meeting this month, into the following groups: International Affairs; Plans and Programs; Membership Affairs; Management and Finance; Legal and Regulatory. Much attention was given to formal planning procedures, with stated goals and objectives, and enumerations of position responsibilities. Emphasis here should be on "formal" - there were no immediate shifts in the League's direction as a result, but proponents felt it would be easier to plan and to measure progress toward achievements of these plans.

The Board registered its opposition to any proposal which would involve compulsory change of call signs. A trial technical symposium was scheduled for Washington D.C. in 1973; a QSL

card competition focused on the U.S. 200th Anniversary in 1976 was authorized; and the Museum of Amateur Radio at Hq. was dedicated to the memory of the late Roland B. Bourne, W1ANA. In the field of publications, a completely-rewritten *Course in Radio Fundamentals* appeared; a new book, *FM and Repeaters for the Radio Amateur* was announced; and the *Mobile Manual* went out of print, its major work finished.

Life Membership applications in particular took a sharp upward turn as the dues increase drew near, from a range of 20-40 per month to more than 900 during June. By December 1, 2171 were elected LMs and some 2000 more were working on it through the eight-payment plan. But regular memberships were up, too, by a healthy percentage.

New membership services included revamped audio-visual training aids with many new films; more copies of our main public-relations film, "Hams Wide World," on order to shorten the waiting time; and a new Canadian PR film, "Fine Business," being purchased. W1AW shifted its frequencies during the year, one benefit being to make it easier for General Class hams to work the station during those stand-by periods which follow bulletins and code practice sessions. And steps were taken to set up a daytime National Traffic System, paralleling the evening version, but making full use of ssb nets and operators.

There was also a good round share of fraternalism at the "eyeball" level - 169 hamfests, picnics and auctions were registered with ARRL, not to mention the seven official ARRL conventions (four divisional, three state). Incidentally, the register is open for 1973 - as soon as your club considers a date for one of these affairs, let hq. know by letter, and we'll record your choice, and tell you if any neighboring groups have notified us of similar intentions.

The Board reaffirmed its support in amateur space activities by formation of the Amateur Satellite Service Committee composed of members appointed by Project Oscar, Radio Amateur Satellite Corporation (Amsat) and ARRL. Speaking of Oscar, the sixth in the series (and second launched under the Amsat banner) got off the ground in October. The first month's reports showed more contacts through this satellite than all the previous shots, and interest continues strong. NASA's next major undertaking, Skylab, will include an amateur, Dr. Owen Garriott, W5LFL, a member of both ARRL and Amsat, but it was not found possible to include an amateur station in the space package.

Back in the "dc bands," our traditional emergency training exercise, Field Day, turned into the real thing for many groups in the East in the aftermath of Hurricane Agnes - a fitting encore to earlier work by the amateurs of South Dakota who put together the pieces after disastrous floods around Rapid city.

The international scene was generally quiet - no world administrative radio conferences affecting amateurs held or in immediate stages of preparation. On the other hand, long term planning

(Continued on page 79)

Happenings of the Month

ARRL ELECTION RESULTS

In the November issue, we reported on the uncontested reelection of Hudson Division Director Stan Zak, K2SJO, and Vice Director George Diehl, W2IHA; Rocky Mountain Director Charles M. Cotterell, W0SIN, and Vice Director Allen C. Auten, W0ECN; West Gulf Director Roy L. Albright, W5EYB, and Vice Director Jack D. Gant, W5GM; and the election of Dale T. Justice, K7WWR/WA7KTV, as vice director from the Northwestern Division.

The other nine posts for which elections were held required balloting by the members, resulting in the return to office of five incumbent directors and two incumbent vice directors and the election of two new vice directors.

In the Central Division, Philip E. Haller, W9HPG, was reelected to a sixth term as director, defeating William O. Reichert, WA9HHH, by 3044 votes to 1037. Robert York Chapman, W1QV, won a fifth term, 2239 votes to 887 for Daniel A. MacDonald, W1PEX, in the New England director contest. A three-cornered race in the Northwestern Division resulted in the reelection of Robert B. Thurston, W7PGY, for a fifth term as director, with 1192 votes as against 779 for Harry W. Lewis, W7JWJ, and 506 for William R. Watson, W7BQ. Victor C. Clark, W4KFC, director from the Roanoke Division since 1967, chalked up a one-sided victory against James W. Harrison, Jr., WB4TBX, 2252 votes to 253. The Southwestern Division, for the seventh time, picked John R. Griggs, W6KW, as its director, giving him 3220 votes to 682 for former director Ray E. Meyers, W6MLZ.

The Central Division vice director contest was a replay of two years ago, with Edmond A. Metzger, W9PRN, winning a fifth term, 2266 votes to 1809 for Kenneth A. Ebnetter, K9GSC. (In 1970, the tallies were 2166 and 1702!) L. Phil Wicker, W4ACY, vice director from the Roanoke Division since 1967, was reelected with 2006 votes versus 491 for James L. Bulebush, WB4KKT.

In the New England Division, where incumbent Vice Director Roger E. Corey, W1AX, was not a candidate, a close contest was won by John C. Sullivan, W1HHR, who garnered 1657 votes to 1462 for Leslie S. Radnay, W1PL. "Sully" is 43, a resident of Columbia, Connecticut, and a design engineer at Emhart Corporation which makes machinery for the glass industry. (Incidentally, Emhart is the company which originally bought out The Old Man's firm, Maxim Silencer!) W1HHR has served as an assistant director in the New England Division since 1971; is past president, past vice president, past activities manager of the Willimantic Radio Club; past vice president, Connecticut Yankee Radio Club; ARRL section emergency coordinator for Connecticut; communications and radio officer, area 4, Connecticut Civil Defense and director, Columbia CD; and is founder and past advisor of Radio Explorer Post 64, BSA. He was first licensed in 1955.

Gary A. Stilwell, W6NJU, of Canoga Park, California, defeated incumbent Vice Director Arnold Dahlman, W6UEI, in a tight Southwestern Division race, 1981 votes to 1883. Gary has been an assistant director for the past four years; is secretary, Pacifico Radio Club; past president, past director, past treasurer, past secretary, Southern California DX Club; past director, past treasurer, San Fernando Valley DX Club; past secretary, Two Meters and Down Club; chairman of the DX Breakfast at the 1972 Southwestern Division Convention; and an amateur since 1952.

The new two-year terms start at noon, EST on January 1, 1973.

PRICE NEW DIRECTOR

H. Dale Strieter, W4DQS, has submitted his resignation as director from the Southeastern Division, effective January 1, 1973, citing the pressure of business and personal affairs and his consequent inability to attend amateur functions. In accordance with the Articles of Association, therefore, Larry E. Price, W4DQD, of Statesboro, Georgia, becomes director for the remainder of the



Canadians will readily appreciate the humor of this: Art Blick, VE3AHU, president of the Canadian Amateur Radio Federation, won a copy of the ARRL Handbook at the Radio Society of Ontario Convention. The prize was presented by ARRL Canadian Director Noel B. Eaton, VE3CJ. For statesiders, this is approximately like Henry Ford II winning a pictorial history of General Motors (Photo tnx to VE3AVY)

term ending at noon, January 1, 1974. Larry, who is 38 years old, is a professor at Georgia Southern College. He has been vice director for the past year and prior to that served as an assistant director for two years in the Southeastern Division. Other offices include: past president, past vice president, University of Arkansas Radio Club; past faculty sponsor and secretary, Georgia Southern College Radio Club; trustee of club station WA4DTF and special events stations WC4GSC, KF4GSC and WE4SUN; OPS, AREC, Army MARS, communications officer, Statesboro-Bulloch County Civil Defense. Larry is a Life Member of ARRL; was first licensed in 1951 as W5TIA and since then as K7BIT and K9MJA.

The rules provide for appointment by the president of a vice director to fill the vacancy, but none has been made as of press time.

HAMS WIN IN READING, PA.

Cooperative effort by the officers and directors of the Reading (Pennsylvania) Radio Club; the city planning board; Berks County Civil Defense; the Reading *Eagle* and reporter Robert Zissa and ARRL General Counsel Bob Booth, W3PS, under the skilled leadership of Attorney Walter Diener, W3EQF, Art Gantert, W3OLG and Jim Stamm, WA3KBH, has led to adoption of a new ordinance specifically providing for amateur antenna towers, up to 25 feet if attached to a building and 75 feet if free standing. Higher towers can be approved by variance in some cases. The ordinance codifies the principles set forth in the landmark case, Appeal of Lord, Pennsylvania Supreme Court, 368 Pa 121 (1951). The text follows:

THE COUNCIL OF THE CITY OF READING HEREBY ENACTS AS FOLLOWS:

Section 1. That Section 600.3.1 of Article VI of Ordinance Bill No. 49, The Reading City Zoning Ordinance, enacted November 10, 1971, be and is hereby amended to read as follows:

600.3.1 Commercial Radio and Television Studios and Transmitting Facilities - Commercial radio and television studios and transmitting facilities and towers shall be a primary use in all commercial and manufacturing zoning districts, subject to the provisions of paragraph 600.3.3, below. Commercial radio and television studios and transmitting facilities and towers shall be permitted in preservation and residential districts only if approved by the Zoning Hearing Board under the provisions of Sections 600.3.3 and 814.

600.3.2 Amateur Radio and Citizens Radio Service Stations - In all zoning districts, duly licensed radio and television transmitting and receiving stations of the Amateur Radio Service and Citizens Radio Service that are accessory to the established primary use shall be permitted.

600.3.3 Radio and Television Transmitting and Receiving Antennae and Antenna Structures.

a. Radio and television transmitting and receiving antennae and antenna structures attached to a building shall not exceed a height of twenty-five (25) feet above the established roof line. These structures shall include roof mounted, chimney mounted and ground established structures bracketed or guyed to primary or

THE WHITE HOUSE
WASHINGTON

November 15, 1972

Dear Mr. Dannals:

During the disastrous floods that hit South Dakota and the eastern part of the United States this year, amateur radio operators played an important role in rescue operations. Under hazardous conditions, and even at the risk of their own personal safety, amateur operators helped coordinate emergency transportation and evacuation and aided rescue workers in countless situations.

While the nation's amateur radio operators have a proud tradition of emergency service, their efforts during the past summer merit special recognition. I hope you will convey to all the members of your organization, and particularly to those who took part in flood rescue operations, my warmest congratulations on a job well done.

Sincerely,



Mr. Harry Dannals
President
American Radio Relay League, Inc.
225 Main Street
Newington, Connecticut 06111

President Nixon congratulates amateurs for work in the South Dakota floods and following Hurricane Agnes.

accessory structures that are not antenna structures.

b. Radio and television transmitting and receiving antennae and antenna structures not attached to a building shall not exceed seventy-five (75) feet in height.

c. In all zoning districts, radio and television transmitting and receiving antennae and antenna structures exceeding the heights specified in Sections a and b, above, shall be governed by Section 814.

Section 2. That Section 814 of Article VIII of Ordinance Bill No. 49, The Reading City Zoning Ordinance, enacted November 19, 1971, be and is hereby added to read as follows:

814 Antennae - Antennae and antenna structures exceeding the heights specified in Section 600.3.3 (a) and (b) shall be permitted in all zoning districts provided that the following requirements are met along with any other requirements deemed necessary by the Zoning Hearing Board so as to protect the health, safety and welfare of the public.

a. Such antennae or antenna structure shall meet the yard requirements of the primary use



A New England Division Merit Award went to Norman Young, W1HX, (second from left) for his work in promoting the New England DX Century Club and marking his fifty years in amateur radio. Others, from left, are Charles Mellen, W1FH; Robert York Chapman, W1QV, New England Director of ARRL; and Robert L. White, W1CW, assistant communications manager of ARRL. (Photo tnx to W1MIJ)

in the district, except that guy wires and anchors may be located within such required yards.

b. The applicant shall submit to the Board feasibility studies and valid engineering data.

c. Such antennae or antenna structure shall conform to all other applicable Federal, State and local Codes and Ordinances.

Section 3. This ordinance shall become effective immediately upon final enactment.

SPACE CENTER RADIO, WM4SFC

The Marshall Amateur Radio Club at the Marshall Space Flight Center, Huntsville, Alabama, will operate a special-events station, WM4SFC, during the flight of Apollo 17 and throughout the eight-month Skylab mission. (One of the members of the Skylab crew is Dr. Owen Gariott, W5LFL.) The club will issue special commemorative certificates and send NASA info to amateurs and listeners who contact the station or report hearing a contact respectively. QSL to Marshall Amateur Radio Club, Marshall Space Flight Center, Alabama 35812.

CONGRESSMAN SEEKS FILTERS

The Honorable Charles M. Teague, representative from the 13th District of California (Santa Barbara, Ventura and part of Los Angeles Counties) introduced a bill, HR 16916, which would amend the Communications Act of 1934 requiring that "apparatus designed to receive broadcasts" shall meet FCC standards to be adopted so that "all interference from any amateur station operating on its assigned frequency [will] be filtered out." No action was taken by Congress before it adjourned, but the expectation is that the bill will be reintroduced into the 93rd Congress: when we have the new number for the bill we'll pass it along in this column.

This sort of legislation might not normally rate very high on a Congressman's list of priorities. It may take a massive letter-writing campaign by amateurs interested in the bill to insure that the text is reintroduced; that the legislation moves promptly through committee; and that it is speedily adopted by Congress.

ALIEN PERMIT RENEWALS

Reciprocal operating permits issued to aliens by FCC have a term of one year or less, but may be

renewed upon proper filing of an application on form 610-A. In the past, the need to secure agency approvals has sometimes delayed the issuance of a renewal permit, and the amateur has had to leave the air until the new document has arrived. FCC has now adopted an amendment to its rules permitting these aliens to continue operating past the nominal expiration date of the permit, provided timely filing for renewal has been made. The new words:

Section 97.307 *Issuance of Permit.* (a) The Commission may issue a permit to an alien amateur under such terms and conditions as it deems appropriate. If a change in the terms of a permit is desired, an application for modification of the permit is required. If operation beyond the expiration date of a permit is desired, an application for renewal of the permit is required. In any case in which the permittee has, in accordance with the provisions of this subpart, made a timely and sufficient application for renewal of an unexpired permit, such permit shall not expire until the application has been finally determined. Application for modification or for renewal of a permit shall be filed on FCC Form 610-A.

SHORT CALL DENIED

A petition filed by Michael R. Beverly, WB6-UTC/WB4NQA, in April 1970 asked that FCC add a new subsection to Section 97.87 of the amateur rules:

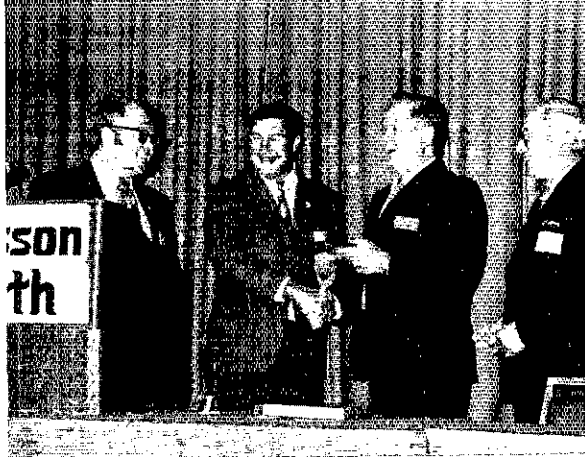
"During an exchange of telegraphy or telephony transmissions of less than two minutes duration, an amateur station shall be identified by its call sign at the end of such exchange. Additionally, at the beginning of each such exchange, the call sign (or generally accepted network identifier) shall be given for the station, or at least one of the group of stations with which communications was established."

The Chief, Safety and Special Radio Services Bureau, under delegated authority, denied this petition (RM-1604) on October 20, 1972. The Order said in part:

"... While the required form of identification may be somewhat awkward during very short transmissions, the reasons for this identification procedure remains the same regardless of the length of the communications."

In passing, may we say that FCC had earlier issued some suggested identification procedures for 30-second transmissions which it felt would provide the necessary monitoring information to the Commission. These are shown on page 56 of *QST* for December, 1972.

The First Dakota Division PICON award was presented to ARRL Vice Director Ed Gray, WA0-CPX, (second from left) for his leadership in emergency communications following the Rapid City flood in June. From left, others in the picture are Dakota Director Larry J. Shima, W0PAN, ARRL President Harry J. Dannels, W2TUK and ARRL First Vice President Charles G. Compton, W0BUO. (The word PICON comes from the phrase, "public interest, convenience or necessity," which appears several places in the Communications Act as the criterion for the issuance of licenses.) (Photo by Irwin D. Norlme)



RETIREMENT OF VE3ZU

A.G.E. "Ted" Argue, Director, Operational Standards and Procedures in the Department of Communications, retired at the end of November after 42 years of service to Canada. At a reception held at the Talisman Seaway Motor Inn, Ottawa, on November 27, Ted, VE3ZU, was presented with a hardbound copy of *The Radio Amateur's Handbook* by ARRL Canadian Director Noel B. Eaton, VE3CJ, by way of thanks from the amateurs of Canada for his long service, including representation at ITU conferences.

JOHN M. CLAYTON, K1AJ DR. ELLIOTT A. WHITE, EX-W1SP

We regret to report the deaths of two early League directors, John M. Clayton, K1AJ, and Dr. Elliott A. White. John was an ARRL director from February, 1920 to February, 1922 and also served as Delta Division Manager for traffic purposes during the same period. He later (1925-1927) was an assistant technical editor of *QST*. John lived recently in Rockport, Massachusetts; earlier licenses in Arkansas had been 5BV, 5AF and 5ZL.

Dr. White was originally 9HB of Columbia, Missouri, followed by 1BMK, at Orono, Maine and later Hanover, New Hampshire, with the call W1SP being assigned after World War II. He also held on behalf of Dartmouth College the calls 1XAV and 1YB. He served as director from the New England Division from 1925 through 1928.

ADVISORY COMMITTEE APPOINTMENTS

ARRL President Harry J. Dannels, W2TUK, has announced a revised list of personnel of our three specialty advisory committees. Members are comprised of previous appointees with continuing terms, renewed appointments, or new additions to replace those who are resigning or who have completed two terms and are not eligible for re-appointment. (In the special case of the VRAC, however, the Executive Committee waived the two-term limit in this instance.)

Repeater Advisory Committee

William C. Parris, K4GHR, of Salisbury, North Carolina, has been appointed to the RAC. He was one of the principal organizers, and currently is secretary/treasurer, of the North Carolina FM Repeater Association, Inc., which operates W4EXR, 146.28/146.88 MHz. K4GHR holds ARRL appointments as official vhf and official

phone stations, has the Advanced Class license, and is a life member of the League.

Another RAC appointee is Charles Richard Flanagan, WA0WZY/W6OLD, currently from Circle Pines, Minnesota. Dick is chairman of the Minnesota Repeater Council; is a member of Air Force MARS and the Palisades Radio Club of California; is a life member of ARRL and holds an Advanced Class license.

Continuing or renewed appointments filling the roster are K1ABR, W2ODC, W3DTN, W5VPO, W6MEP, W7FHZ, W9BUB and VE3BUI. The new chairman is W2ODC, Howard Lester.

Contest Advisory Committee

A new appointee to the CAC is Eugene Zimmerman, W3BQV/K1ANV, an Extra Class licensee presently living in Gaithersburg, Maryland. A past "veep" and activities manager of the Potomac Valley Radio Club, and an honorary member of the Connecticut Wireless Association, Gene has helped post top scores from multiop stations W3MSK, W4BVV, PJ0DX, PJ0CC, W1TX/1, K6BAG/1 and W1GB. With Gene at the controls, W3GRF has been a top Sweepstakes phone station for Maryland in 1964-1969 and K1ANV/4 pulled a similar cw honor for Virginia in 1969. K1ANV/4 pulled a similar cw honor for Virginia in 1969.

John T. Laney, III, K4BAI, is another new CAC member. He's from Columbus, Georgia, holds a General Class ticket, and is a charter life member of ARRL. John gets in virtually all the contests - solo, multi-single, multi-multi, phone and cw. His accomplishments include at least 15 section awards for SS and top scores from TG0AA, W4KXV, HL9US, HL9KQ, PJ0CW. K4BAI holds ARRL appointments as route manager, official relay station, official bulletin station and emergency coordinator. He's also an assistant director, assistant section communications manager and editor/publisher of the Georgia State Net Bulletin.

From Pocatello, Idaho, comes Albert K. Francisco, K7NHV, also on the CAC. Life member and Extra Class, Al operates both phone and cw in SS (K7NHV, K7NHV/0, K8UDJ, W8SH); DX Test (K7NHV, multiop K8UDJ, W8EUN), Field Day (K7EFA, K7NHV/0, W8SH/8), and CommDept parties. Traffic work included participation in RN7, PAN, QMN, 8RN and EAN and earned him

the public service award and the Brass Pounders League medallion. Then there's DXCC (K7NHV and K7NHV/8) WAC, WAZ and 5 Band WAS No. 59.

Continuing or renewed appointments to this group are WIBGD, W2EIF, K5TSR, W6DQX, WA9UCE, W0HP, VE2NV and KH6IJ. The new chairman is WIBGD, Pete Chamalian.

DX Advisory Committee

Layfield Lynn Lamb, W3BWZ/W4HZI, an Extra Class licensee from Clinton, Maryland and life member of ARRL is joining the DXAC. Lynn is vice president and activities manager, past secretary of the Potomac Valley Radio Club; past secretary, Biloxi Amateur Radio Club, charter member and first secretary, National Capitol DX Association, and honorary member, Virginia Century Club. He's an assistant director of the ARRL Atlantic Division; has a DXCC score at the 310 level; has posted high scores in DX tests; handles QSLs for VU2BEO and VK3ARX; and has been on the air from the DX end with KX, KJ and DL prefixes.

Also appointed to DXAC is William F. Christian, K4IKR, of Huntsville, Alabama. Bill is one of the W4 QSL Bureau crew; a member of the North Alabama DX Club; member, Huntsville Amateur Radio Club and a former assistant director of the ARRL Southeastern Division. He's been an active DX chaser since 1965 and holds the Advanced Class license.

Rounding out the list of new appointees is Robert E. Shank, W5AO. An Extra Class licensee, Bob has been on the DXCC Honor Roll for ten years, with current totals at 320/343. W5AO holds an ARRL appointment as official observer, and is a member of the A-1 Operator club. Earlier calls include W9CKY (back to 1929) and W5CKY.

Here the continuing or renewed appointments include WIBIH, WA2FOG, W6RGG, W7LFA, W8BF, W9NN, W0ELA and VE3MJ. The new chairman is WA2FOG, Ted Marks.

These advisory committees welcome comment from members, to help fulfill their responsibilities in communicating "advice, recommendations and expertise from the League's membership to its management in various specialty areas of amateur radio."

EXECUTIVE COMMITTEE MINUTES

Minutes of

EXECUTIVE COMMITTEE MEETING

No. 343

November 18, 1972

Pursuant to due notice, the Executive Committee of The American Radio Relay League, Inc., met at the headquarters office of the League in Newington, Connecticut, at 9:33 A.M. November 18, 1972. Present: President Harry J. Dannals, W2TUK, in the Chair; First Vice President Charles G. Compton, W0BUO; Directors Victor C. Clark, W4KFC, Noel B. Eaton, VE3CJ, John R. Griggs, W6KW, and Robert B. Thurston, W7PGY; and General Manager John Huntoon, W1RW. Also present were Directors Max Arnold, W4WHN, Al Michel, W8WC, and Stan Zak, K2SJO; General Counsel Robert M. Booth, Jr., W3PS; and Asst. General Manager Richard L. Baldwin, W1RU.

On motion of Mr. Griggs, Life Membership was unanimously GRANTED to the following applicants:

Eugene H. Adams, WA9YFB; Thomas G. Adcock, WB4RSA; Earl Francis Arbuckle, III, WB6QWH; John B. Barnett, Jr., K4WVK; William Wright Bell, W4JLS; William R. Boring, W7YQI; Thomas M. Brigham; S. D. Brokhausen, W2GEI; David A. Brown, W6NBM; Philip Donald Brust, W8QCU; James Cain, WA9AUM; Edward Cartotto, W6ZZN; David Chaffin, WB4WHE; Marvin J. Cook, W9WWE; Hugh Cotton, W8FPM; Steven P. Czai-kowski, WB4ZTR; T. J. Daugherty, WB5HQY; Stephen L. Denny, WB4UUH; Richard H. DeWitt, W3WD; D. S. Dirden, K6OM; J. M. Dorworth, K4HUZ; Roy A. Duffus, jr., W2SEN; Josef C. Fngressia, sr., WA4JZT; Roy L. Fansler, WA9UES; James R. L. Fitzgerald, Jr., K4OJE; William M. Fugate, W8IYD; John R. Gotthardt, K1UAF; James P. Hamilton, WA5WZL; Dewaine C. Hardin, KL7IP; Edmund M. Hartlin, VE3FXZ; John Haungs, WA8STX; Maurice G. Herbstritt, W3LFF; Ernst J. Hergenroether, W8MTW; John Hicks, W6NEW; Richard L. Hoffman, WA6TCH; John E. Hunt, K7SII; Jean Jolkovski, W4CIH; Ian Arthur Kellman, K2UMO; Dennis W. Killeby, K6IVY; Paul B. Kissinger, W9MLL; Benjamin F. Lamb, K1AUE; Francis P. Lanzer, WA2COU; Walter R. Larson, K6DM; William J. LeBaron, W0MTK; John D. Lovelace, WA4RDB; William R. Luebke, W6EXX; James F. Marden, WA3RZH; Thurman B. Martz, WB4ILF; Julian Perry Masterson, WA6VUE; Walter R. McGugan, Jr., WA2ABY; Larry Morgan, W7FOQ; Sab Nakamura, WB6AUX; Melvin R. New-comer, WA3KJI; Joseph E. O'Brien, WB2QQE; Lionel A. Oubre, K5DPG; Robert Reed, WB2DIN; Richard Schoueri, PY2AXO; Alfred E. Schwaneke, W0GS; Louis M. Seeberger, WA6HQT; J. Jay Sewell, W5DWN; R. V. Shafer, KL7HKH; Terry Shanklund, WA8MVR; David S. Short, W4SKI/W5PWG/DL5DA; Horace M. Skinner, WB6HSG; Charles L. Smith, W6ASO; Stephen C. Smith, WN9HBH; Carl W. Spik, W4UBT; James F. Stamm, Jr., WA3KBH; John B. Steffen, WA6DCZ; Ronald E. Szymczak, WB9CYO; Maury M. Tepper, K8DAJ; Lorne Titus, VE1IN; Paul Trepanier, WB2HYG; Stanley R. Wallace, WA7JCM; Lawrence K. Wartell, WB4JMY; John Jos. Whitney; Walter G. Williams, W5YUO; Roger Wood, WA5QHI; Ronald A. Yarbrough, WB4KRW.

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

Bloomfield High School Amateur Radio Club, Bloomfield, Conn.; Franklin Amateur Radio Club, Franklin, No. Carolina; Kokomo Firebird Radio Club, Kokomo, Ind.; Longmont Amateur Radio Club, Inc., Longmont, Colo.; Mike & Key Radio Club, Inc., Federal Way, Washn.; The Mountain Amateur Radio Club, Pineville, Ky.; Northeast Georgia Area Amateur Radio Club, Athens, Ga.; Northern Colorado Amateur Radio Club, Greeley, Colo.; Youngstown State University Amateur Radio Club, Youngstown, Ohio.

The Committee then proceeded to examine the FCC Notice of Proposed Rule Making in Docket 19605. After extended discussion, on motion of Mr. Compton, unanimously VOTED that the General Counsel should file comment in general support of that portion of the notice dealing with compensation for control operators, and recommending the addition of "medium-frequency" operation for code-practice and bulletin services as a requisite for meeting the requirements.

The Gloucester County (NJ) Amateur Radio Club entered a float of "Snoopy, W2K9" in the annual Gloucester County Fall Parade held in Woodbury, New Jersey on October 7. The theme was chosen from among several by vote of the club; it was originated by club proxy WB2JZX. Some 30 members of the club, headed by W2FBF, helped to construct the display which was towed by a Jeep past some thousands of cheering viewers. Results: good publicity for hams; good fellowship for club members — an idea worth copying wherever there are parades! (Photo forwarded by W2AFZ, club secretary)



On motion of Mr. Clark, unanimously VOTED to request a 60-day extension of time for comment on that portion of Docket 19605 concerning retention of message traffic records.

The Committee then proceeded to examine the FCC Report and Order in Docket 19245. After extended discussion, on motion of Mr. Clark, unanimously VOTED that the Hq. staff is directed to study the ramifications of the Report and Order in Docket 19245, with the objective of assuring continuing effective performance of the amateur radio service in furnishing "a voluntary non-commercial communication service" to the public, as required in Section 97.1 (Basis & Purpose) of the rules. During the course of the above action, the Committee was in recess, from 11:05 to 11:15 A.M.

At this point the Committee viewed a color film produced as a private venture by VE3BQN, entitled, "Fine Business," and comments of praise and approval ensued. On motion of Mr. Eaton, unanimously VOTED that several prints be obtained to cover distribution by loan to affiliated clubs in Canada, and one or two to add to the Hq. Training Aids program, with a maximum authorization of \$1,500.00 expenditure.

On motion of Mr. Clark, after discussion, unanimously VOTED to authorize the expenditure of up to \$4,000.00 for additional prints of "The Ham's Wide World," to replace worn copies currently in distribution, to add to the available stock to shorten the present extensive waiting period for loans, and to permit a division director to obtain a second print when the demand in his division warrants such action.

At this point the Committee examined a proposal from the Radio Amateur Satellite Corporation concerning expanded education in the field of amateur space communications, and on motion of Mr. Clark, unanimously VOTED to underwrite \$2,000.00 of expense for the preparation of a suitable curriculum by the personnel of the Talcott Mountain Science Center.

On motion of Mr. Eaton, after discussion, unanimously VOTED that to obtain wider distribution of information concerning amateur radio, a complete set of League publications be made available at a reduced rate to affiliated clubs on condition that this material be donated to a local public library.

On motion of Mr. Eaton, unanimously VOTED that because of the desirability of maintaining continuity of personnel of the VHF Repeater Advisory Committee during periods requiring extensive regulatory studies, the limitation to two terms for members of that Committee is waived for the appointments to become effective in January, 1973.

At this point the Committee heard a summary report from Assistant General Manager Baldwin on his participation in the ITU frequency management seminar in Geneva during October.

(During the course of its meeting the Committee discussed, without formal action, conflicts in convention scheduling, FCC Docket 19555, concerning environmental protection, FCC actions in calling up some Conditional Class licensees for examination, phone DXCC, an ARRL technical symposium, and the Uniform Building Code.)

There being no further business, the Committee adjourned, at 4:35 P.M.

Respectfully submitted,
JOHN HUNTOON, W1RW
Secretary

It Seems . . .

(Continued from page 73)

prompted the setting up of a more definite program for protection (and perhaps expansion) of our frequencies, an important part of which is an ever-stronger International Amateur Radio Union. Another step in that direction was the Region I Conference held in Scheveningen, the Netherlands, in May. Twenty-two European, African, and Near Eastern societies had representatives present, with another eight arranging for proxies — largest attendance ever at an IARU regional meeting. A particular decision bears quoting: "Subscribing member societies shall give priority to all programmes intended to improve the status of the amateur service with the national administration." Members were also urged to take part in national and international technical study groups, as for instance the CCIR, because of their effect on eventual allocations decisions. The Intruder Watch program received praise, along with urgings to make it regional in scope, another important step in long-range conference planning.

Finally, there's a certain hard-to-define feel to ham radio today — we sensed it last year, and called it "upbeat." It is there even stronger this year; a feeling of confidence, of satisfaction, of, yes, enthusiasm. Even discussions of unpopular bits of the regulatory outpouring seemed to be more "How do we change it?" than "Look what they've done to us now." In any event, we hope ham radio was satisfying to you last year — and will be even more so, this year of the "Best Regards" — 73!

I A R U News

INTERNATIONAL AMATEUR RADIO UNION, THE GLOBAL FEDERATION OF NATIONAL NON-COMMERCIAL AMATEUR RADIO SOCIETIES FOR THE PROMOTION AND CO-ORDINATION OF TWO-WAY AMATEUR RADIO COMMUNICATION

The Radio Sports Federation of the USSR endorses the following statement and requests its publication.

We Soviet radio amateurs - members and diploma holders of the CHC club - hereby make the following statement:

Having observed the CHC club's activities for a long time, we have come to the conclusion that Mr. Clifford Evans, [K6BX], the CHC club manager, is not keeping to the aims and principles of the club which he has previously declared. Moreover, acting under the screen of membership (recognition earned by members' on-the-air activity) Mr. C. Evans tried to turn the CHC club's policy against that of the IARU. We know that these actions have been condemned both by the IARU and by a number of national amateur organizations.

A particularly disappointing feature is the announcement by the CHC club, without consultation or their consent, that Soviet radio amateurs are its representatives in the USSR radio amateur regions.

Taking into account that the CHC club is actually not an amateur organization and that it engages in divisive tactics and interference in the internal affairs of national radio amateur organizations, thus making its policy contrary to that of the IARU, we consider our further membership in the club incompatible with our association to the International Amateur Radio Union and hereby announce our breaking of all contacts with it and withdrawal from its membership. - UA0GF, UA0EH, UA0FK, UA0IQ, UA1BQ, UA2AB, UC2AF, UC2AR, UC2AW, UC2CS, UC2WP, UC2KAC, UP2UK, UR2BU, UA3BK, UA3FT, UA3GM, UA3NG, UA3KHA, UA3RH, UA3WZ, UW3BX, UA4SM, UB5CV, UB5DQ, UB5DP, UB5ES, UB5FG, UB5EL, UB5PY, UB5IF, UB5KDS, UT5CC, UT5CJ, UT5EB, UT5EH, UA6BV, UA6LI, UW6AQ, UT7FA, UH8BO, UA9DP, UA9ES, UA9EY, UA9JH, UW9CC.

VHF REPEATERS IN GERMANY

To date, most of the vhf fm repeater activity in Europe has taken place in the Federal Republic of Germany. A network of over 70 repeaters provides coverage of nearly all of this densely-populated country, including the city of Berlin. So far, all repeaters have operated in the 144-146 MHz band; however, experiments are now being conducted in the 430-440 MHz range.

While the coverage and equipment are similar to that encountered on two meter fm in North America, some of the technical conditions are quite different. The repeater output frequencies are 1.6 MHz above the inputs, and the effective radiated power is limited to 15 watts; with separate receiving and transmitting antennas at the same site, sophisticated cavity filters are usually unnecessary. Channel spacing is 25 kHz, and maximum deviation is 5 kHz. Tone access is required; however, if the tone is transmitted at the beginning of a contact the repeater will remain open for the entire contact.

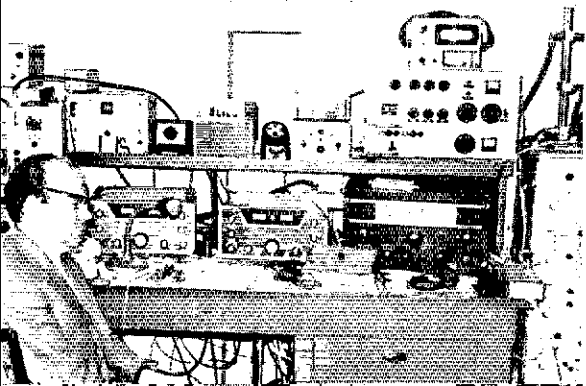
As repeater activity in the rest of Europe increases, the problem of compatible repeater input/output spacing will need to be resolved, 600 kHz being the adopted standard for IARU Region 1.

RSGB DIAMOND JUBILEE -BRISTOL ACTIVITY AWARD

The year 1973 marks the 60th anniversary of the founding of the *Radio Society of Great Britain*. In recognition of this event, and in commemoration of the 600th anniversary of the Granting of the Royal Charter to the City and County of Bristol, radio amateurs the world over are invited to make contact with Bristol, England. A special award will be issued by the Bristol Group of the *Radio Society of Great Britain* for certain numbers of contacts during the period January 1 to August 31, 1973. Details are available from J.A. Reynolds Esq., G3PTO, Contest and Awards Manager, 24 Shaldon Road, Horfield, Bristol BS7 9NW, England.

Herwart, DL1LS is trustee of the DB0ZH repeater.

QST for



DX OPERATING NOTES

Reciprocal Operating

(Bold face type indicates changes since last list.)

United States reciprocal operating agreements exist only with: Argentina, Australia, Austria, Barbados, Belgium, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Finland, France*, Germany, Guatemala, Guyana, Honduras, India, Indonesia, Ireland, Israel, Jamaica, Kuwait, Luxembourg, Monaco, Netherlands*, New Zealand, Nicaragua, Norway, Panama, Paraguay, Peru, Portugal, Sierra Leone, Sweden, Switzerland, Trinidad and Tobago, United Kingdom*, Uruguay, and Venezuela. Several other foreign countries grant FCC licensees amateur radio operating privileges on a courtesy basis; write ARRL headquarters for details.

Canada has reciprocity with: Belgium, Brazil, Dominica, Dominican Republic, Ecuador, France, Germany, Guatemala, Israel, Luxembourg, Mexico, Netherlands, Nicaragua, Norway, Peru, Portugal, Panama, Senegal, Sweden, Switzerland, U.S., Uruguay, Venezuela, and Commonwealth countries.

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.** Argentina, Barbados (only U.S. stations /8P), Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Greenland (XP calls only), Guyana, Haiti, Honduras, Israel, Liberia, Mexico, Nicaragua, Panama, Paraguay, Peru, Trinidad & Tobago, Uruguay and Venezuela. Permissible prefixes: CE CM CO CP CX EL HC HH HI HK HP HR LU OA PY TI VE VO W or K/8P XE XP YN YS YV ZP 4X 4Z 8R and 9Y4. Canadian hams may handle these same type third-party messages with amateurs in Bolivia, Chile, Costa Rica, Dominican Republic, El Salvador, Honduras, Israel, Mexico, Peru, Trinidad & Tobago, U.S., and Venezuela. Permissible prefixes are: CE CP HI HR KOA TI W XE YS YV 4X 4Z and 9Y4.

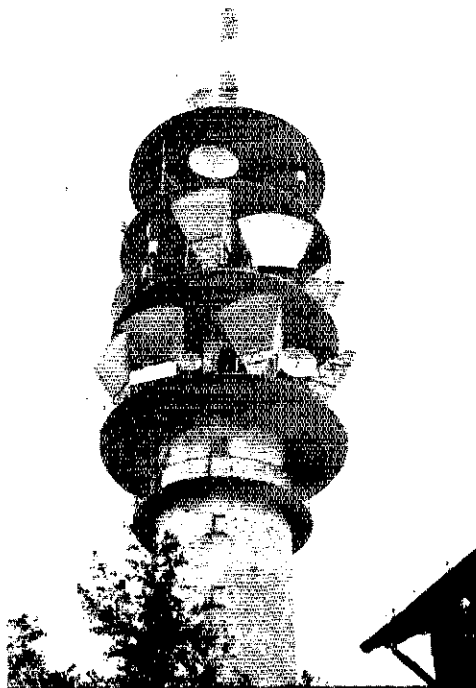
DX Restrictions

Amateur licensees are warned that international communications are limited by the following notifications of foreign countries made to the ITU under the provisions in Article 41 of the Geneva (1959) Conference.

The Director General of the Posts and Telegraphs Department of Vietnam has notified the ITU that there is no objection to communications between amateur stations in other countries and XV5AC. However, communication with other amateur stations in Vietnam (XV or 3W8) is forbidden. Canadian amateurs may not communicate with Cyprus, Gabon, Iraq, Pakistan, Turkey, Khmer Republic (except XU1AA), Vietnam, Libya, and Yemen. Prefixes to be avoided by Canadians are AP TA TR8 XU XV YI ZC4 3W8 4W 5A.

*Agreement includes overseas entities.

**By special agreements, third-party traffic is also permissible with amateurs in Australia and the Federal Republic of Germany for traffic regarding amateur satellites, with 4U1ITU, and with personnel of Project Hope in Jamaica.



No, this isn't a totally amateur installation — but somewhere near the top of this impressive structure are the antennas of the German two-meter repeater DBØZH! The repeater provides coverage of the beautiful Neckar valley from this spot more than 1500 feet above Heidelberg.

FEEDBACK

W4SEKA, author of "Simplified Impedance Matching and the Mac Chart," *QST* for December, 1972, informs us that all *R* and *X* chart values on page 36 are normalized. In other words, all numbers on the chart (except *Q*), i.e., *R*s, *R*p, *X*s, and *X*p, can be multiplied by multiples of ten to extend the range of the Mac chart. This must be done in order to work the first example given in the article.

QST

Strays

Want to contact one of the MARS chiefs? A number of address changes have occurred since publication of MARS brochures. The following are the latest addresses.

Navy-Marine Corps: Chief, Navy-Marine Corps MARS, 4401 Massachusetts Avenue, N.W., Washington, DC 20390.

Air Force: Chief, Air Force MARS, Headquarters, U.S. Air Force (PRCOM), Washington, DC 20330; Command MARS Director (DONM), AFCS, Richards-Gabour AFB, MO 64030.

Army: Chief, Army MARS, HQDA, (DACE-CSC-M), Washington, DC 20310.

QST



Correspondence From Members -

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

THE NEW REGS

● In view of the increasingly complex aspects of FCC regulations, it would seem to me quite in order to have the League publish a thorough-going, complete, legal outline of the whole thing, including frequency charts.

Good Lord! Here the FCC is yet trying to encourage youngsters to get involved in ham radio, and at the same time, and in a second breath, they are gradually attempting to create a market for legal opinion.

One sure way to place road-blocks in the way of increasing youth in our ranks is to make the regulations so complex that the oldest among us (and, brother, I'm *there!*) have difficulty in interpreting what is being written into the law and regulations governing communication. I find myself hesitating (almost) to make a phone call, these days. The day of the phone patch, repeater, *ad infinitum*, has certainly broadened the base of the law! — *M.C. Bartlett, W9MC/WB4OFE, Indianapolis, IN*

● The new repeater rules are certainly sad. The scope of regulation approaches that of the Broadcast Service. The rules certainly prevent experimentation, and discourage licensees from advancing the state of the art. But perhaps I misunderstand the purpose of amateur radio. — *Richard A. Golden, K8LOS, Bloomfield Hills, MI*

● Though I am a relatively new ham, I have been impressed with the fairness and impartiality of the rulings of the FCC for a long time. This observation is borne out, it seems to me, in the recent rulings of the Commission concerning new regulations.

I am overjoyed to be able to use a vfo, and I have provided means to check its frequency. I hope that the adverse comments I have heard on the air to the effect that they cannot properly operate a vfo will not be taken too seriously by other Novices. That is silly. What a General can learn, so can a Novice. It will, however, require new skills and knowledge, and I think it would behoove the higher class licensees to help the Novice acquire those skills he needs, rather than berate him. Let us all help one another. — *Jim Gunn, WN1QNK, Ossipee, NH*

REFRESHING TREND

● The publishing of a QRP article in the lead spot, the inclusion of a worthwhile medium-powered (75 W) transmitter construction article, and the increasing attention to things the amateur can do rather than buy is refreshing. May I hope that this is an enduring trend?

For years *QST* seemed to be "owned" by the electronic playboys, retired bankers and other "applianceers." It is great to see *QST* swinging back to Amateur Ham-Radio, rather than the

"nonprofit commercial radio" that characterized things for so long.

It is not for myself so much as for my many young students and friends in the game that I so rejoice. In a game dominated by expensive, "store-bought" gear, what motivation is there for a young ham who has to do it all on paper-route money? But maybe personal knowledge, diligence and skill will prevail in our game once-again, as it did in the past (say, before WW II.)

Please, let's "keep the change"! — *Charles F. Rokey, W9SCH, Deerfield, IL*

LID LIFTED

● Roger Sklar's "Origin of the Species" under Strays, page 45, November *QST*, asks if anyone can explain the origin of the term "LID." As one who started in the telegraph business in the early 1920s I can assure you I was LID.

In the land line telegraph business it was customary for an operator to complain to his supervisor if the operator at the distant relay office was unable to copy traffic at an acceptable speed. Speed was extremely important to a "bonus operator" as he was paid his bonus per message over a certain preset number of messages per hour during his tour of duty. When the complaint about an operator reached the supervisor at the distant terminal he would plug in a sounder at his monitor board and observe the operation of the circuit. If indeed the operator was poor he would send a message to the other supervisor saying in effect, "IG opr lid on UN-C CQ." Translated this would mean, "Helena, the operator on the Helena channel at Chicago has been lifted (sgd) Supvr Chicago."

In other words "LID" refers to an operator who was so bad that he had to be *lifted* from the circuit.

Incidentally, when I work a YL op, I cannot bring myself to say "88." In the landline Morse profession this was just about the worst insult you could give a man, equivalent to saying "you sissie." There were a lot of other abbreviations that were a lot worse when translated but they didn't seem to have the sting that "88" did. — *H. E. "Doc" Eisen, W7JAC, Portland, OR*

● I'd like to tell my story of the word "LID." We in professional and government radiotelegraphy always referred to a "LID" as a person whose sending, to say the least, stunk. We all started out as Lids. There are pictures available of old-time hand keys (particularly the British) that were on the edge of the operators desk and had a large handle on it that had to be taken into your hand with the hand wrapped around it, making a fist. Thus the expression "he had a good fist." However the beginner (LID) didn't sound like a good fist. He sounded as though he had a cockpit lid in his hand and was banging that on the table rather than his key. Hence, "He's using a Lid," or "He's a Lid," or just plain "LID." — *Otto Freytag, K4QFM, Riviera Beach, FL*

SPIRITED DEFENSE

● I wish to rise to a spirited defense of the use of the letter "R" on cw to indicate "received OK," and not "received" only. On page 129 of the October issue of *QST* it states that the use of "roger" on phone means "received" only and has no proper connotation of "correct, I confirm, I agree," etc. Then it continues, "Similarly on cw R means "Received," nothing else!"

By coincidence the day after reading this in *QST*, I received thru Inter-Library Loan a copy of the June 30, 1927 edition of "Amateur Radio Stations of the U.S.," put out by the Radio Division of the U.S. Dept. of Commerce. After listing calls, names and addresses there is an Appendix page, which says, in part, "International Morse Code and Conventional Signals. (To be used for all general public-service radio communication.)" After the code alphabet and punctuation marks, a dozen or so abbreviations are given for common usage, and one of them is as follows: "Received (O.K.) .-.".

So the use of the letter R for "received OK" has a long and honorable lineage and is indeed legitimate in that sense. Those of us who have used it in that meaning since 1927, as well as more recently licensed operators who do so, should be able to continue with no opprobrium cast as to its being poor or ignorant operating procedure. The Powers that Be spoke to the contrary, as long as forty-five years ago.

This same *QST* article mentions that "our code is the International or Continental code. Not Morse." According to this 1927 U.S. government publication, the correct and official term for the amateur radio code was "International Morse Code." I believe that I remember being taught in early 1927, when studying for my exam, that the above name was to be used by hams, and was differentiated from a second code used by railroad telegraphers called the American Morse Code; but both names contained the word Morse, whether proper or not. Actually, page 12 of my 1968 edition of the ARRL *Handbook* entitles its list of code letters and numerals, etc. "Fig. 1-1 The Continental (International Morse) Code." — *Dot Saunders, W4UF, Englewood, FL*

PICON

● In light of the recent controversy over the proposal to give the 220 MHz band to the CBers, my eyes were opened to something very interesting. In closing a typical amateur vs CB argument, I remarked, "So the ham license may be harder to get, but you sure can do a heck of a lot more with it."

The fellow looked at me sort of funny and said, "So who needs a license?" That's right, friends. Why bother with the code? Why bother with the FCC? Why bother with any of that when all you have to do is plug it in and talk? I asked the guy what he'd do if the FCC shut him down. To that he said, "Waal, Ah'd git me the harrist mothuh of a mobile rig you ever did see, and they'd never find me."

I later found out that only the "fire truck chasers" use call signs, and that any respectable CBer has a "handle" like Rat Man, King Kong, Roadhog, or Jellyfish.

Now there's even something new. For the mere sum of ten dollars any CBer can join a group that

promises to bail you out and give you legal assistance should you get caught. This group encourages its members to use high power and talk skip because "They have a right to." By misquoting the Communications Act of 1934, they say the airwaves are public domain and interpret this to mean that the Citizens Band should be the only radio service on the face of the earth to go completely without regulation.

Radio is public domain, but (again quoting the Act) only in the Public Interest, Convenience, and Necessity. As any broadcaster will tell you, this is perhaps the most important phrase in the Act because it defines public domain. Under that definition, there can be no justification at all for the existence of the Citizens Band in its present state.

So, guys, make some noise. Don't let the 220 MHz band, or any other of our spectrum space be taken from us for use by the idiots presently on eleven meters. — *Ron Kritzman, WA9RPD, Morton Grove, IL*

BARGAINS

● I recently purchased the 1972 *Radio Amateur's Handbook* and I find it the most comprehensive study of communications yet! Even though the cost of *QST* has "sky-rocketed" I am glad to see the *Handbook* at its modest \$4.50 price. I am almost certain that the ARRL sells more *Handbooks* than it does subscriptions to *QST* due to the inflationary rise of membership dues vs amateur radio communications theory. — *Eugene Kramer, WA9TZZL, Freeburg, IL*

[EDITOR'S NOTE: Nope — *QST* circulation outnumbers *Handbook* sales. Although \$4.50 for the *Handbook* represents an increase of 4.5 times the price of the first edition which appeared in 1926 League membership has, during the same period undergone a more modest increase of three times the \$2.50 rate of 46 years ago.

● In spite of the complaints being voiced in Correspondence, I feel that the dues situation is not nearly as bad as many hams make it to be.

I would ask those who complain to consider what they are getting for their money:

1) *QST*. At 75 cents an issue, one year's subscription would run up a \$9.00 bill.

2) Operating aids are available for the price of an eight-cent stamp.

3) Technical Information Service. We pay salary for the staff of the League, and most of us see it come out only as the technical articles each month in *QST*. Part of their job is also to serve us by answering our questions, and if they can't, they'll try to help us find an answer.

Admittedly, I'm only an Associate Member. I hope to have my ticket in a few weeks, and when I do get it, I will be on the air. — *Buck Cheves, Atlanta, GA*

● As a brand new Advanced Class Licensee I have been smugly thinking of what a fine thing I have accomplished.

Just five minutes before I picked up this pen it struck me! I am no longer smug — I am humble. Now I restate my feeling — what a fine thing the *License Manual, Handbook, How to Become a Radio Amateur* — and most of all, WIAW — have accomplished! My grateful thanks to the League. — *John S. Wilcox, WB6STC, National City, CA*

Novice Roundup

(Continued from page 72)

less than 15 minutes at a time. Times on and off must be entered in your log.

3) **QSOs:** Contacts must include certain information sent in the form as shown in the example. QSOs may take place on the 80-, 40-, 15-, or 5-meter bands. Crossband contacts are not permitted. Novices work any amateur stations; non-Novices work Novices only. Valid points can be scored by contacting stations not working in the contest, upon acceptance of your RST and section and receipt of a RST and section/country. A station may be worked only once, regardless of band.

A Novice may operate in the Novice portion of the competition until he receives his General Class license, then he must participate as a non-Novice only.

4) **Scoring:** Each exchange counts one point. Only one point may be earned by contacting any one station, regardless of the frequency band. The number of ARRL sections (see page 6 of any *QST*) + foreign countries worked during the contest is the "total multiplier." Yukon-N.W.T. (VE8) also counts as a multiplier. A fixed scoring credit may be earned by entrants who hold the ARRL Code Proficiency certificates. FCC code credit *cannot* be used in lieu of the above. If an entrant does not hold a ARRL CP Award, he can apply for credit by attaching to his Novice Roundup report a copy of the qualifying run from WIAW or W6OWP for January or February. Cp credit equals the wpm speed indicated on the latest ARRL certificate or sticker held by the entrant. The final score equals the "total points" plus "ARRL Code Proficiency credit" multiplied by the "total multiplier."

5) **Reporting:** Contest work must be reported as shown in the sample form. Reporting forms and a map of the United States will be sent free upon request. Indicate starting and ending times for each period on the air. All NR reports become the property of ARRL and none can be returned. Entries must be mailed to ARRL Hq., 225 Main St., Newington, CT 06111 no later than March 5, 1973.

6) **Awards:** A certificate will be given to the highest scoring Novice in each ARRL section. Multioperator or General-class licensees and above are not eligible for awards. However, a box containing the TOP TEN W/VE higher-class licensees will be incorporated in the results. And should participation warrant, a similar box will show TOP TEN DX entrants.

7) **Disqualification:** Failure to comply with the contest rules or FCC regulations is grounds for disqualification. ARRL Awards Committee decisions are final.

QST

ARRL QSL Bureau

The function of the ARRL QSL Bureau is to facilitate delivery to amateurs in the United States, its possessions and Canada, of those QSL cards which arrive from amateur stations in other parts of the world. All you have to do is send your QSL manager (see list below) a stamped, self-addressed envelope, about 5 by 8 inches in size, with your name and address in the usual place on the front of the envelope and your call printed in capital letters in the upper left-hand corner.

Cards for stations in the United States and Canada should be sent to the proper call area bureau listed below. Recent changes are in bold face.

- W1, K1, WA1, WN1 - Hampden County Radio Association, Box 216, Forest Park Station, Springfield, MA 01108.
W2, K2, WA2, WB2, WN2 - North Jersey DX Assn. P.O. Box 505, Ridgewood, NJ 07451.
W3, K3, WA3, WN3 - Jesse Bieberman, W3KT, RD 1, Box 66, Valley Hill Rd., Malvern, PA 19385.
W4, K4 - North Alabama DX Club, P.O. Box 2035, Huntsville, AL 35804.
WA4, WB4, WN4 - J. R. Baker, W4LR, P.O. Box 1989 Melbourne, FL 32901.
W5, K5, WA5, WB5, WN5 - Kenneth F. Isbell, W5QMJ, 306 Kesterfield Blvd., Enid, OK 73701.
W6, K6, WA6, WB6, WN6 - No. California DX Club, Box 11, Los Altos, CA 94022.
W7, K7, WA7, WN7 - Willamette Valley DX Club, Inc., P.O. Box 555, Portland, OR 97207.
W8, K8, WA8, WB8, WN8 - Columbus Amateur Radio Assn., Radio Room, 280 E. Broad St., Columbus, OH 43215.
W9, K9, WA9, WB9, WN9 - Northern Illinois DX Assn., Box 519, Elmhurst, IL 60126.
W0 - Reggie Hoare, W0OYP, P.O. Box 115, Mitchellville, IA 50169.
K0, WA0, WB0, WN0 - Dr. Phillip D. Rowley, K0ZFL, Route 1, Box 455, Alamosa, CO 81101.
KP4, WP4 - Alicia Rodriguez, KP4CL, P.O. Box 1061, San Juan, PR 00902.
KZ5 - Lee DuPre, KZ5OD, Box 407, Balboa, CZ. Box 407, Balboa, CZ.
KH6, WH6 - John H. Oka, KH6DQ, P.O. Box 101, Aiea, Oahu, HI 96701.
KL7, WL7 - Alaska QSL Bureau, Star Route Box 65, Wasilla, AK 99687.
VE1 - L. J. Fader, VE1FO, P.O. Box 663, Halifax, NS.
VE2 - A. G. Daemen, VE2IJ, 2960 Douglas Avenue, Montreal 301, PQ.
VE3 - R. H. Buckley, VE3UW, 20 Almont Road, Downview, ON.
VE4 - D. E. McVittie, VE4OX, 647 Academy Road, Winnipeg R3N 0E8, MB.
VE5 - A. Lloyd Jones, VE5II, 2328 Grant Road, Regina, SK. S4S 5E8.
VE6 - D. C. Davidson, VE6TK, 1108 Trafford Dr. NW, Calgary 47, AB.
VE7 - H. R. Hough, VE7HR, 1291 McKenzie Rd., Victoria, BC.
VE8 - Yellowknife Centennial Radio Club, P.O. Box 1944, Yellowknife, NWT, Canada.
VO1 - Ernest Ash, VO1AA, P.O. Box 6, St. John's, NF.
VO2 - Goose Bay Amateur Radio Club, P.O. Box 232, Goose Bay, LB.
SW1 - Leroy Waite, 39 Hannum St., Ballston Spa, NY 12020.

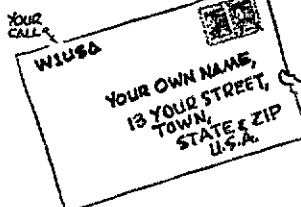
¹These bureaus prefer 4 1/4 by 9 1/2 inch or No. 10 business envelopes.

QSL Bureaus for other U.S. Possessions and for other countries appear in the "IARU NEWS" section of the June and December issues of *QST*.

W-Strays

Using an amateur satellite as an educational tool in schools is the theme of a University of Hartford course offered during the Spring 1973 semester, in cooperation with the Talcott Mountain Science Center. Course work will include use of the Talcott Mountain Oscar 6 ground station. Aerospace Workshop AST 662, "The Amateur Satellite," carries three credits and is open to graduate and undergraduate students in education. Persons interested in enrollment should immediately contact the University of Hartford, 200 Bloomfield Ave., West Hartford, CT 06117.

IS YOURS ON FILE WITH YOUR QSL MGR?





YL news and views

CONDUCTED BY LOUISE RAMSEY MOREAU,* W3WRE

Twenty One

FOR AMATEUR RADIO operators numerals have many associations: call areas, power, signal reports, those five minutes of torture to copy the required number of consecutive letters in the FCC exam, or a qualifying run. Numbers can mean contest totals, a message group count, the confirmations still needed for a certificate, or the figures we record in our log. For "YL News and Views," the numbers 1973, and 21 are special — for the column celebrates its twenty-first birthday this year.

Most of us will remember the beginning of the column devoted to the activities of women in amateur radio, and the reporting of what has been styled the "distaff side of amateur radio," first by Eleanor Wilson, W1QON, who brought it through the growing pains of the formative years, followed by the specialized leads of Jean Peacor, W1IJV, as these two gals reported the work and achievements of women operators world-wide.

The *QST* record of YLs is far older than this column. Far back in the files we find G6YL in the "Calls Heard" department, with Barbara reporting regularly month after month.

October 1933 is well supplied with news of YLs in the listing of Judy Leon, HC1FG, in second place in the DX Test. The "Station Activities" section not only records the fact that Rosie Campbell, W4CDR, was the only YL in Tennessee, it even carried the gal's picture. Full details, and a picture cover the achievement of Jean Hudson, W3BAK, who entered the World's Championship Code Speed Contest, and who won the Class E 20 wpm competition at the age of nine! Jean's record is still unmatched.

Looking back, far beyond the 21 years of an official YL department in *QST*, the reporting of women in radio stretches into the pre-World War One era when the gals were few and far between.

*YL Editor, *QST*. Please send all news notes to W3WRE's home address: 305 N. Llanwellyn Ave., Glenolden, PA 19036.

There are references to the adventures of Edith Randall Thompson in the days of King Spark, and her familiar call "ER." Records show DX YL names, and the strange prefixes of the IARU "intermediates," of Odette Chavez, SB7AB, later BZ7AB, in Brazil; Mme. Jamas, AF1B, who represented Indo-China at a meeting in France; or Mrs. Ulrix, ON4OU.

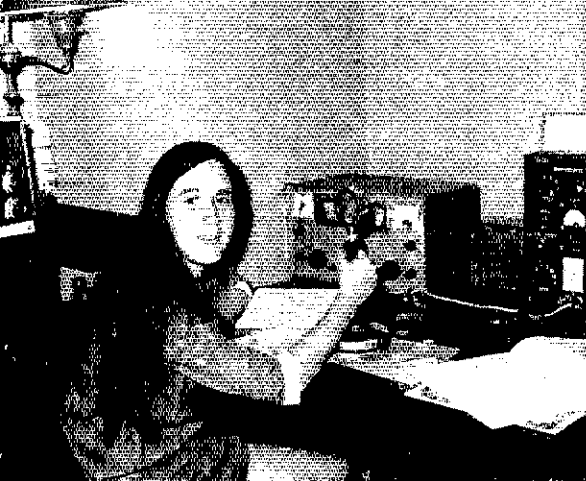
A "Thumbnail Sketch" of W3CDO, in July 1934, was almost an introduction of a YL feature that appeared the following month headed "Reserved for YLs and YFs." This section was not a regular department, true, but with the feature we can backdate YL reporting to an equally famous birthday numeral — 39. Remember the statement of W5CJS? "For women who are liable to be led into matrimony by a ham — and also to encourage more YL operators, whether they be prospective ham brides or not . . . A YL would find out ahead of time what a ham's wife means and make her choice accordingly — and those for whom it is too late would be shown how to reconcile themselves to their fate."

The quotation is better answered by Beth Groves, W5DUR, when she says in the introductory article, "My advice to the OW" (Beth's words, not ours) "is to get yourself a ham ticket, and then you can understand why it is necessary to be late to meals, why wire has to be all over the living room floor, and why it never pays to dust a transmitter."

Whether it be 50 years of reporting YL activity, the 39 since the formal space "reserved for YLs," or the coming of age of "YL News and Views," for the finest article on YL interest and activity who can ever forget the real "glamor" about women in amateur radio, in the delightful fiction "The Lady With Red Hair"?

NYC-YLRL women acted as hostesses of women's activities at the HARC convention, October, 1972. L-R seated: WA2BAV, Eva; W2OWL, Ruth; standing: B22YBA, Chris; Helen Zupan; Ruth Schlitt.





WB4MHX, Barbara Ann Richman (WACIZ photo)

Trillium Nets

Saturday, 1700 GMT, 14.140 MHz, VE3BFN Mgr.
Saturday, 2100 GMT, 3.770 MHz, VE3AYL Mgr.

Trillium Nets operate one hour earlier GMT during the summer months.

At present the Trilliums do not have a cw net in operation. Many new members of the club who are beginners are meeting on the air for code practice in roundtable sessions on Tuesdays at 8 P.M. EST on 7.105 MHz, and Thursdays at 9 P.M. EST on 3.530 MHz. The TOTS plan a formal cw net on one of the two roundtable frequencies, with the other held for practice sessions.

1972 "Howdy Days" Results

Winning YLRL member, HC2YL, with 84 points; top non-YLRL member, WB4NXR, with 56 points.

Other scores: WA7FLC, 83; K4RHU, 82; W6NLM, 73; WA5JFZ, 71; W2GLB, 68; ON4QP, 65; WA9TVM, 59; WA2RRI, 54; PA6PHO, 52; WA3GBJ, 49; K8GMR, 49; W8EJO, 47; WA8VXE, 42; WA8AHU, 36; G8LY, 29; K8VCB, 25; WN0VQL, 6; W2PVS, 5.

A total of 156 women participated in this get acquainted activity that takes the form of a contest to open the fall-winter calendar of activity calendar for women operators.

1972 HARC Convention

NYC-YLRL were in charge of all the women's activities at the 1972 HARC Convention in October. Ruth Schlitt, wife of K2BM, was general chairman of all activity. Madeline Greenberg, W2EEO, was chairman of the Hospitality Room, and with Ruth Siegelman, W2OWL, and Helen Zupan as assistants dispensed thirty dozen doughnuts in the two days of the convention.

Christine Haycock, WB2YBA, conducted the YL forum. The program included the DXpedition of Eva, WA2BAV, and OM George, WA2AQC in Africa. Ruth Siegelman, W2OWL, was presented a citation for her long term work as custodian of Continuous Membership Award of YLRL.

For the non-licensed women there were a series of programs planned to encourage their attendance at these conventions.

VE-YL Nets

CLARA Nets originally scheduled on Tuesday and Wednesday have been discontinued. Both nets have been combined into a single session held on Tuesday at 1900 GMT on 14.160 MHz. The net manager is VE6APP.



TYLRUN Birthday Party

The Texas YL Round UP Net celebrated the Net's 17th Anniversary on November 3-4, 1972, in Dallas, Texas. Women from Oklahoma, Arkansas, Louisiana, and Texas, attended the weekend meeting, with five of the fourteen charter members present.

TYLRUN holds four net schedules each Thursday at the following frequencies and times: 3.940 MHz, at 1400 and 1300 GMT; 7.262 MHz, at 1530 and 1630 GMT. A net certificate is available.

1972 officers are: President, WA5JFZ, Jane Eastman; Vice-president, K5GNG, Viola Block; Secretary-Treasurer, Audrey Beyer, K5PFF.

WB4MHX, Barbara Ann Richman

To paraphrase the familiar quotation: Neither QRN, nor QSB, nor heavy QRM could stay WB4MHX from her Code Proficiency goal. And they didn't, for despite all the slings and arrows that were on the frequency, Barbara, age 12, qualified at the 20 wpm speed level during the October W1AW Qualifying Run. Barbara Richman, WB4MHX, was one of the many truly young ladies who received her Novice license at the age of nine. In 1971 she lost her N when she passed the General Class exam.

Although she can be found operating 2 meter fm simplex to keep in touch with her father when he is mobile, Barbara prefers cw and spends the major amount of her on the air time on 40 meters. A member of WAYLARC, ARRL, and YLRL she holds CP 15 wpm and is waiting for the 20 wpm sticker. She also holds Third Class Radiotelephone permit, with a Broadcast endorsement.

In addition to her amateur radio activities, Barbara enjoys figure ice skating in which she holds three achievement ribbons, horseback riding either western or English saddle, ballet, and is an enthusiastic collector of stamps, gemstones, and foreign and domestic coins.

QST

1972 TYLRUN officers: K5PFF, Audrey Beyer, Sec.-Treas.; WA5JFZ, Jane Eastman, Pres.; K5GNG, Viola Block, Vice Pres.; W5ZPD, Cindy Dougharty, Pub. Chmn. (W5ZPD photo)

The World Above 50 Mc.

1215-1300 2300-2450 3300-3500 4400-5925 6000-10500 11000-27000 30000-7

CONDUCTED BY BILL SMITH,* KØCER

1972 - A Last Look

THE YEAR just concluded shapes up in these pages as one of the most interesting in the history of the world above 50 MHz. Sporadic-E skip on 50 and 144 MHz reached unprecedented heights in number, duration, and distribution of observed openings. The EME path was used successfully on 50 MHz for the first time. Moon-bounce became almost routine on 144 MHz, and it was growing in popularity on 432 and 1296, as well. The first 432-MHz meteor-scatter contact was made. 220-MHz activity showed a healthy growth. The number of stations using the 1215-MHz band grew by leaps and bounds, as did the distances they were covering, as evidenced by a 770-mile 1296-MHz QSO reported below.

Though there were no "new discoveries" in our field in 1972, surely it was a record year for expanding horizons, with accomplishments of several kinds that would have been thought impossible not too long ago. Given the available information on the state of Solar Cycle 20 a year or more ago, who would have anticipated that there would be widespread F-layer and transequatorial propagation on 50 MHz in 1972? There is a tendency to credit this to improved equipment, but perhaps more important is the consistent and effective use of good gear by the likes of ZK1AA and others situated in favored but lightly-populated areas of the world. Their efforts have tended to make 50-MHz reporting in these pages seem more like "How's DX?" than the vhf column. The places and times of reception of the ZK1AA beacon have provided many interesting demonstrations of the DX potential of the 50-MHz band, not only in 1972, but in several previous years.

Let's examine the rise of 1296-MHz coverage more closely. The 400-mile DX record for the 1215-MHz band goes back to 1959, but that was a portable operation. A home-station DX record of 350 miles was set only recently, but WA2LTM predicted in March of this year that this record would not survive 1972, that it might go to as much as 600 miles. On May 27, W1AJR and K4QIF used a coastal inversion to work 420 miles on 1296 MHz. Three months later WA2LTM worked W8YIO, 500 miles. This record lasted only

five days, as K4QIF also worked W8YIO, at 551 miles. In this same month, August, we published our first states-worked totals for the 1215-MHz band. The size of the box in this issue, and the statistics it contains, reflect the rapid developments since.

The big news broke Oct. 26. That night, WA2LTM, Cranbury, N.J., was sure that tropospheric conditions were favorable to the west, so he phoned W9WCD, DeKalb, Ill., for a try on 1296. Contact was established almost immediately, with cw signals S4 to S6, at 2335 GMT. 770 miles on 1296 MHz, and over land! WA2LTM ran 200 watts and a 5-foot dish. W9WCD has a kilowatt and a 7-footer. They remained in contact for 25 minutes, with signals still good.

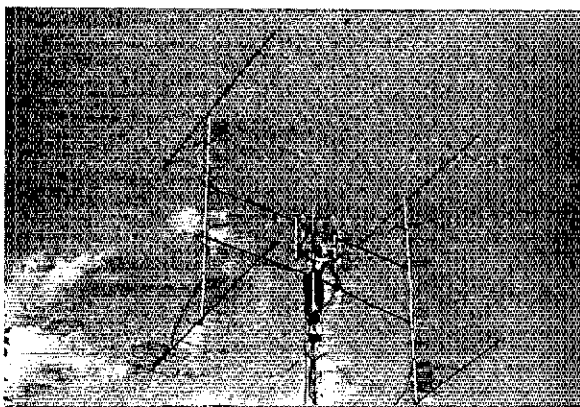
George, W9WCD, thinks this is just the beginning. "After observing tropo on 1296 over the past three years," he writes, "there is no question in my mind that if we get another massive tropo opening such as that of Sept. 16-17, 1970, some well-prepared operator in Kansas will work the East Coast without difficulty." Considering that WØDRL has worked K1PXE on 432 MHz, this seems a reasonable prediction. Doug, WA2LTM, agrees that 1296 may equal 432 in DX potential, eventually. He worked W8YIO five times during the warm weather.

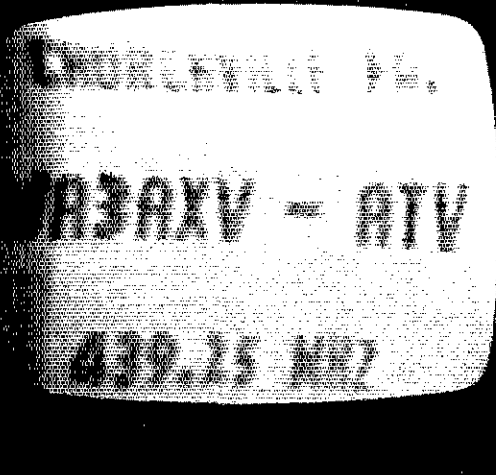
Signals have been heard across the Gulf from Florida to Texas, one-way, on 1296, and there are other paths that conceivably could open up even greater records, so how long will that 770 miles stand up? Low-noise preamps and converters for 1296 are here, and transmitter power generation is getting easier. Needed most: more activity in the right places.

Same for 2300, which is already getting serious attention in several quarters. What will 1973 bring? You tell us. Meanwhile, best wishes for the New Year from KØCER and W1HDQ.

*Send reports and correspondence to Bill Smith, KØCER, ARRL, 225 Main St., Newington CT 06111.

Large arrays grow well in New England, where WA1FFO moves up the 144 MHz states-worked ladder with four 12-element Swan Yagis. In the center is a 40-element 432-MHz collinear. Scale hint: WA1FFO is 6 feet 2!





ATV activity in the 420-MHz band is rapidly growing with the abundance of available surplus equipment. K2RIW receives this nearly snow-free picture over a 120-mile path from WA3AXV.

States Worked Boxes

This month there are many changes recorded in each of the band listings. There have been a few deletions, mostly due to the initial report having been incomplete, and full data not received since. K1HTV takes over the number one slot in his call area on 144, and 432 has three new call-area leaders: W3RUE, W4FJ, and WA6HXW. The 1215-MHz listing is expanded considerably. If I have missed someone, or a listing is incorrect, errors do happen so let me know.

The requirements for listing are simple. Just send a list giving the call of one station worked in each state, the date of the contact, and the greatest distance worked. Do not send QSLs as proof. You are eligible for listing if your totals at least equal those of the lowest-ranked station in your call area. Consideration is also given new operators, depending upon how active they are. This is one reason for the listings: to reflect current activity, as well as past records.

Evaluation of the WA9HUV 12-Foot Dish

Regardless of measurements as to gain, bandwidth, front-to-back ratio, or whatever, the only thing that really counts in amateur antenna work is whether or not a new array works better than the one it replaced, and whether it is enough better to be worth the time and money spent. If you read the description of his 12-foot dish in this column in June, 1971, QST, you know that Norm did an exceptional job of design and documentation. But he still wanted to see how the dish did under the acid test of comparison with its predecessor.

A 64-element 432-MHz collinear at WA9HUV had demonstrated its worth, providing contacts with 17 states, among other things. It was working as well as any antenna of its kind could be expected to work, when it was taken down and replaced by the 12-foot dish. So Norm decided to put it back up, on the same support as the dish, at the same height, and fed by the same line, which is 7/8-inch Heliax. The result is shown in an accompanying photograph. Antenna selection is made with a coaxial switch near the antennas, so the transmission line is essentially the same for both.

2-METER STANDING

K1HTV	36	8	1310	K5WXZ	38	10	1450
K1ABR	35	8	1478	W5WAX	38	10	1310
W1AZK	34	8	1412	W5HFV	38	10	1285
K1WHT	31	8	1300	K5BXG	33	10	1330
K1UGQ	30	8	1370	W5AJG	33	9	1360
K1WHS	29	8	1300	W5UKQ	33	9	1290
W1VTU	29	8	1296	K5PTK	29	9	1330
WA1FFO	28	8	1325	W5LO	29	7	1325
W1JSM	28	8	1100	W5XD	25	6	1265
K1BKK	28	7	1275	W6GDO	18	5	1326
K1MTJ	26	7	1250	W6WSQ	16	4	1390
K1PXE	26	7	1140	K6HAA	13	4	1380
W1HDQ	24	7	1040	K6JYO	13	4	1240
K1RJH	22	7	1450	K6HMS	11	4	1258
W1FZA	22	7	960				
WA1JXN	18	7	990	W7JRG	27	6	1320
W1MX	18	6	850	K7NH	25	5	1290
K1JIX	18	6	800	K7ICW	18	4	1278
				K7VTM	10	6	950
W2NLY	37	8	1300				
W2CXY	37	8	1360	W8KPY	41	9	1310
W2ORI	37	8	1320	K8AXU	38	8	1275
W2AZL	36	8	1380	W8IDU	36	8	1150
W2BLV	36	8	1150	W8YIO	36	8	1100
K2RTH	34	8	1215	W8IDT	36	8	1150
WA2EGK	33	8	1340	K8DEO	35	8	1200
W2CUX	33	8	1334	W8NOH	31	8	1165
WB2WIK	32	8	1080	K8HWW	30	8	1125
WA2CJL	31	8	1160	W8TIU	24	8	1000
W2CRS	30	8	1270	W8LLY	24	8	820
K2CEH	27	8	1200	K8ZES	22	8	675
W2CNS	27	8	1150	K9SDG	42	9	1300
K2DNR	25	7	1200	WA9DGT	41	9	1303
WB2SIH	25	6	1000	W9AAG	41	9	1200
WA2EMB	23	8	1335	K9AAJ	41	9	1200
K2BWR	23	7	1350	K9UIF	41	9	1150
W2DWJ	23	6	860	W9YF	40	9	1050
WA2UDT	22	7	1020	W9BRN	36	9	1260
WA2PMW	22	6	1000	W9PBP	34	8	820
WB2YQU	22	6	850	WA9QE	28	8	960
WB2FXB	21	6	915	W9JDJ	26	8	800
K2YCO	21	7	750				
				K0MQS	45	10	1605
W3RUE	36	8	1250	W0LER	44	9	1440
W3BHG	35	8	1260	W0DQY	41	9	1300
K3CFY	35	8	1200	WA0CHK	40	9	1120
W3GKP	32	8	1108	W0LFE	40	9	1100
W3BDP	29	8	1225	W0EYF	35	9	1380
WA3GPL	26	8	1100	W0ENC	35	9	1360
K3CFA	25	8	1200	W0RLI	35	8	1139
W3HB	23	8	1310	W0EMS	34	10	1320
W3TFA	21	8	1342	W0LCN	33	9	1100
K3OBU	21	7	930	W0RLI	31	9	1115
W3ZD	20	7	850	W0DRL	27	9	1295
W3TMZ	19	7	975				
				VE1AUC	7	2	500
K4GL	39	9	1270	VE2DFO	33	8	1385
W4HJQ	39	9	1150	VE2BZD	23	7	1309
W4WNH	38	9	1350	VE3HW	18	6	800
W4HHK	38	9	1280	VE3ASO	37	8	1290
K4EJQ	37	8	1125	VE3BQN	37	8	1250
K4IXC	36	8	1403	VE3E3Z	33	8	1283
W4VHH	36	8	1100	VE3AIB	29	8	1340
W4CKB	35	8	1440	VE3EVW	28	8	1100
K4QJF	35	8	1225	VE3DSS	27	8	1200
W4FJ	34	8	1150	VE3CWT	27	7	1072
W4AWS	29	8	1350	VE3EMS	24	8	1100
				VE7BQH	12	3	7920
W5UGO	43	10	1398				
W5ORH	42	10	1507	SM7BAE	1	11055	
W5RCI	42	9	1289	VK3ATN	3	310417	
				ZLIAZR	2	211055	

The figures after each call refer to states, call areas, and mileage of best DX. Revised January, 1973.

Comparisons were made of received signals, reports given by operators of stations worked, reception of sun noise, and on a fixed signal source a quarter-mile away. Stations from 8 to 250 miles were used in two-way tests. The most distant

stations showed the dish up best, its margin in areas such as Indianapolis or Cleveland, 185 and 300 miles respectively, being about 7 dB. Stations in the range of 100 to 150 miles averaged about 3 dB better on the dish. Though Norm did not say so, this writer would expect the local reports to be inconclusive. Their variability, presumably because of reflections that add or cancel differently on different antenna patterns, can lead to all manner of confusing indications. Norm also reports, without explanation, that sun noise was invariably 2 dB stronger on the collinear. Our guess is that you'd have to aim up (to eliminate ground reflections) to use solar noise for evaluation purposes, where beam widths and minor-lobe content are different for the antennas being compared.

Incidentally, the material Norm originally supplied on this dish turned out to be in greater demand than you might expect. His complete constructional information was made available in photocopy form, for \$1.00. To date, more than 50 of these have been mailed out. They're still on hand, if you want them at that price. Order from ARRL.

OVS and Operating News

Much of the 50-MHz DX news is datelined Oct. 17-18. At 0006 GMT, the 17th, K8UNV, Patriot, Ohio, heard a voice with Spanish accent on 50.107, which he eventually identified as LU1DMA. There were weak Florida stations coming through at this time also. LU1DMA was worked at 0029, followed by LU2DEK, at 0034. By this time the 4s were much stronger, but no more South American signals were heard. This is the only report of LUs we have for this occasion, this far north. KH6FLD/4, Alexandria, Va., worked W4OJU and WB4BND around 2300 GMT on the 16th. W4s and 5s were in at W1HDQ that night, and there are other scattered Es reports later, but we heard nothing of the South American business in Connecticut.

Over many years it has been observed that trans-equatorial DX tends to peak just before and/or just after ionospheric disturbances. In this instance, it was before. Aurora and aurorally-induced E propagation were so widespread for the next two days that we'd be hard-put to summarize all reports received for this period. One from KØALL, Fargo, N.D., gives some idea of what went on. Ron was waiting for the mail truck to back up to his door, loaded with QSLs, after averaging 35 QSOs per hour for 4-1/2 hours, beginning at 2130 GMT, the 18th. But he's still waiting for his first North Dakota contact!

He may get it from another North Dakota newcomer. WØOOG (ex-W1ZPV) was just getting set up in Langdon at this time. He had only a Heath HW-10 going, but still managed to work a dozen or so stations, beginning at 0105 GMT Oct. 18. As the night wore on (after 2230 CST) activity dropped off, but conditions seemed to improve. At around 1000 GMT, Jim was hearing many a-m signals between 49.8 and 49.95 MHz, the most interesting being identified as "The American Armed Forces Radio and Television Service," on 49.91, which was still in when Jim left for work at 1300 GMT. The beam heading was northwest. Anyone know about this one?

KH6FLD/4 says that the band was open all over beginning about 2120 on the 17th. He worked Oklahoma, Missouri, Wisconsin, Nebraska, South and North Dakota, and Arkansas. Heard were Texas Iowa, Minnesota, and VE1ASJ, through

about 0200 on the 18th. VE1ASJ, Kentucky, and 8s and 1s were in again around 1900 the same day.

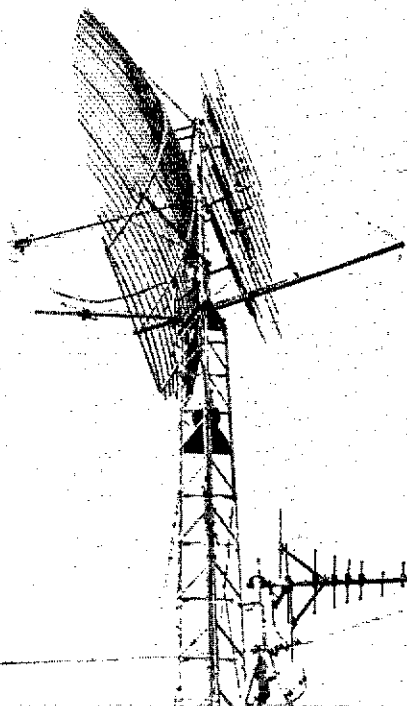
The Southwest enjoyed a surge of 50-MHz DX at the end of October. The KH6EQI beacon, operated by KH6GRU, came through in the Los Angeles area at 2330 GMT (1530 PST) Oct. 31. WA6HXM was unable to break the beacon, so he called K6KSY at work. Mel left for home promptly, and was on the air at 2350, with the beacon rolling in S9-plus. He, too, could not break it, so he phoned KH6GRU at work. Bert is unable to monitor incoming signals at his office, but he went to the station within 10 minutes, and two-way ssb contact was established at 0018 GMT, Nov. 1. Incidentally, the phone number for KH6GRU is now 808-433-4277.

WA6JRA says that KH6EQI worked WA6HXM, K6KSY, WB6WAX, WA6OLE, WA6KLR, WB6IMV, WA6ARC, WA6JRA, and WA6OZC. WA6JRA found JAs unusually weak on 28 MHz around 0000, though VKs were pounding in. This observation, and the WWV information (high solar activity and unsettled conditions) led Sam to check 50 MHz at that time.

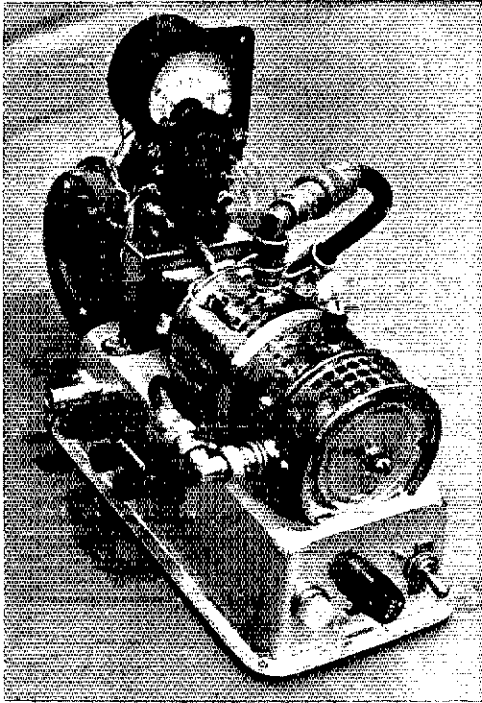
The day previous, Sam had worked JA1UOG on 28 MHz, and Mak supplied the following:

KH6EQI is heard regularly in Japan, whenever there is a Pacific opening to other areas.

JA1UOG has heard ZK1AA, HL9WI, VKs and DUs recently on 6. KL7HMG was heard September 26. September and October were good for VKs,



The WA9HUV parabolic antenna for 432 and 1296 MHz, originally described in June, 1971, QST, now has a 64-element collinear on the same mount, for comparison purposes.



A tin can and bread pan, a soldering gun, a hack-saw blade, scissors, and a set of small sharp drills were all that were needed for W9WCD to build this 1296-MHz tripler/amplifier. A 10-32 screw resonates the 2C39 plate cavity. The rig is self-contained except for 432 drive and a 500-volt plate supply.

who come through (52 to 53 MHz) in the afternoon.

JA1MRS is trying for contacts via Oscar, and asks that US stations watch for him through the satellite.

"The World Above 50 Mc" is read in Japan with much interest, but three to four months late. Our friends in Japan would like to see some sort of worldwide vhf newsletter, that could provide authoritative information of a more current nature. They say that frequencies around 50.11 are very heavily used for local rag-chewing in Japan. Though all emissions are allowed in Japan, 50.0 to 54 MHz, they concentrate on the area just above 50.1 in looking for US stations.

WA6JRA adds some interesting observations on the 10/17 event. He heard K5ZMS S9 at 0209 GMT, followed by WB4ALH, WB4HEI, K4VNC, and WB4WXZ, in that order, 0230 to 0256 GMT. Texas stations reported that LUs were coming through in Florida at that time. (Surely this is the long way around to get news: Florida reports via Texas and Southern California. Maybe those W4s regard LUs as routine, but we certainly do not!)

K7ICW, Las Vegas, Nev., kept a close watch on the 50-MHz band, but heard no ionospheric DX when all the above was going on. WA7FPO, Phoenix, had reported South American signals coming through, apparently TE, around 0000 Oct. 16, but nothing was heard of them at Las Vegas.

Al kept 144-MHz Giacobinnids skeds with W0LER with no results and WA7BBM, Tucson (410-mile obstructed path) with only an exchange of calls, not good enough for communication. October seemed a generally poor month for tropo Al says, though it is normally a good time for tropo in the Southwest. He worked the following

220- and 420-MHz STANDING

WA1MUG	15	5	450	W2OMS	16	5	537
W1HDQ	13	5	450	W2DWJ	16	4	570
K1JIX	12	4	600	K2UYH	15	6	2600
W1AZK	10	3	375	K2YCO	14	6	675
K1BFA	10	3	225	W2CNS	14	6	525
K2CBA	19	7	2650	K2OVS	14	5	600
W2DWJ	15	5	740	WA2EUS	10	4	280
W2CRS	14	5	600	W3RUE	19	7	850
K2RTH	13	5	960	K3IUV	18	5	720
K2DNR	13	5	600	W3UJG	9	4	400
W2SEU	13	5	325	W4FJ	22	7	995
W3UJG	14	5	460	K4QIF	21	7	1065
W3RUE	11	6	480	K4EJQ	19	7	800
K3IUV	11	4	340	W4HJZ	15	5	560
W4UCH	9	5	543	K4SUM	15	5	462
K4IXC	5	3	1115	W4VHH	15	4	750
K4GL	4	2	485	K4GL	11	3	720
W5RCI	10	5	910	K4NTD	9	2	835
W5AJG	4	2	1050	K4IXC	4	2	800
W5LO	2	2	660	W4AWS	4	2	750
W5RCI	19	6	880	W5ORH	13	4	700
WB6NMT	9	5	2650	W5AJG	7	3	1010
W6WSQ	6	4	1142	W5UKQ	6	2	590
W7CNK	6	3	923	W5XSD	5	2	850
W7JRJ	5	3	959	W5GVE	3	1	365
K7BBO	4	3	940	WA6HXW	6	4	7500
K7ICW	4	2	250	W6DQJ	4	2	360
K7HSJ	3	2	400	W6FZJ	2	2	310
W8PT	11	6	660	K7ICW	4	2	225
K8HWW	8	5	550	W7JRJ	2	2	420
K9HMB	12	8	1070	K8DEO	24	8	775
W0EYE	11	5	950	W8YIO	22	7	650
WA0QLP	4	2	923	K8REG	21	7	700
VE2HW	5	2	325	K8UQA	17	7	800
VE3AIB	7	4	450	W8HVX	16	8	660
				W8CVQ	13	7	625
				W8MNT	13	7	600
				W8RQI	10	6	425
				WA8VHG	8	6	625
				W8FWF	8	5	450

420 MHz

K1PXE	18	7	1210	W9WCD	22	9	1725
K1HTV	17	5	610	WA9HUV	17	7	780
W1AJR	16	5	680	W9JIY	15	6	550
WA1MUG	15	5	740	W9AAG	15	5	800
K3EAV/1	14	6	700	WA9NKT	13	6	850
K1BFA	13	5	710	K9AAJ	12	5	425
K1JIX	13	5	620	W0DRL	23	8	1210
W1SL	11	5	400	W0LER	15	5	1000
WA1JTK	11	4	715	W0LCN	13	4	700
W1HDQ	11	4	380	K0TLM	10	5	700
K2ACQ	24	8	925	W0YZS	9	4	650
K2CBA	20	8	2670	W0EYE	7	2	702
W2CLL	20	6	790	VE2HW	6	3	750
K2RIW	19	6	812	VE3DKW	19	7	940
K2VDK	18	6	750	VE3AIB	9	5	600
WA2EMB	18	6	720	VE3EZX	7	5	510
WA2FGK	17	6	745	VE4MA	2	1	420
K2ARO	17	6	740	VE7BBG	1	1	1125
W2BLV	17	6	732				

The figures after each call refer to states, call areas, and mileage of best DX. Revised January, 1973.

144-MHz stations: K6QEH, W6KD, W6DQJ, W6WKO, WA7UDV and W7HP. Raising the antenna from 35 to 50 feet at K7ICW seems to have had little effect on these long tropo paths. Relatively small changes in height probably have little or no effect on the horizon, as seen from Las Vegas, especially in the direction of California stations listed.

On 220, K7ICW has installed a garbage filter to knock down Channel 13, which is 2 1/2 miles

away, in line to the Los Angeles area. K6IBY and K6YNB, 225 miles, are partially readable on ssb. K7ICW is now running skeds on 221.94 MHz. They have not yet determined what time of day or night is best for 220, though on 432 morning skeds are definitely better. Al has run tests on 432 at various hours with W6DQJ. The rig at K7ICW is a K2RIW amplifier, with 300 watts output, feeding a 19-element WØEYE Yagi at 65 feet.

If you think a-m operation on 6 is dead, look at the list of nets in the Philadelphia area furnished by WA3KFT: Mobile Sixers, 50.55, 9 P.M. Sundays; Bears Net, 50.76, 8:30 P.M. Mondays; Delaware County Public Service Net, 50.64, Wednesdays, 7:30 P.M.; GE Net, Thursdays, 9 P.M., 50.598; MRT Net, Saturdays, 7 P.M., 51 MHz.

The polarization argument still lives. WA6UAM, Jan Jose, reports "quite a drive locally to get 2-meter boys horizontally polarized," noting that ssb ops on 145.05 MHz are doing very well with horizontal. Paul, a QRP enthusiast, would like to see more miles-per-watt information published, the power to be input to the final stage. Figures for WA6UAM: 144 - 300,800 miles; 220 - 75,000; 1215 - 1500. Paul suggests a box, but we doubt that KØCER would buy that!

Here's a 50-MHz note we missed in tabulating the DX reports earlier in this section. K7GSE passes the word that W7FN, Mercer Island, Wash., worked ZK1AA on 6 Oct. 15.

W2QBB says that tropo DX on the vhf bands was below normal in the fall of 1972, tying in with a temperature record four degrees below normal, and no "Indian Summer." Jim keeps a running weather log to compute atmospheric refractivity. W2QBB was the author of the definitive modern QST article on tropospheric propagation, information from which appears in all editions of our *Radio Amateur's VHF Manual*.

WB4KGW, Pensacola, Fla., sends along some 220 news that has nothing to do with vhf DX - but it's the kind of thing we could very well have more of on 220. Using a Twoer converted to 220, Ron had his first crossband QSO, 220 - 50 MHz, with WA4JNA. Even though the WB4KGW output on 220 was only about 50 mW, this success is not exactly a surprise, in that the two stations are only 1-1/2 miles apart. The important thing is that it started things moving on 220 in the area. Now, WB4KGW, WA4JNA, WB4ZPC, WB4BSZ, and WB4DHL all have 220 gear going. They're all still low power, mostly converted Twoers, but with better antennas they are now getting around the area with good signals, and gaining valuable experience in solving vhf problems. There are other things in our field than DX communication, and such local use of a vhf band is something that could work out well in many other places. There are lots of ways to get started. The five pages of news and tips regarding this band, contained in the October issue of *Great Lakes 220-MHz News*,

New EME Record for 2300 MHz

K4RJ, who was the eastern end of the first EME QSO on 2300 MHz, with W4HHK two years ago, has extended the distance record for this band to over 2000 miles. On Nov. 22, Bill worked W6YFK, from 0619 to 0646 GMT, via the moon, on 2304 MHz. We hope to have more details next month.

1215-MHz STANDING

K9AQP/1	7	3	300	W5LDV	1	1	290
WA2LTM	12	6	770	K5PUF	1	1	290
W2OMS	8	5	537	W5AJG	1	1	235
K2JNG	8	4	305	K5LLL	1	1	235
K2UYH	7	4	265	W5HPT	1	1	235
WA2VTR	6	4	330	W8YIO	5	4	551
K2YCO	3	2	350	W9JIV	4	3	300
K3IUV	7	4	320	W9WCD	3	3	770
W1SFF/3	7	4	260	WA9HUV	3	2	220
K4QIF	6	4	551	W9JTP	3	2	165
K4NTD	2	1	350	VE2HW	1	1	260
W4VHH	2	1	350				

Listing revised January, 1973.

shows that this kind of thing is going on in many quarters. Publisher: Jim Labo, WB8IDD/KØOST, Box 145, Okemos, MI 48864.

K1PXE, Milford, Conn., says that he has worked WA2LTM "several hundred times" on 1296 MHz, since their first QSO on that band over a year ago. His gear, mostly supplied by WA2LTM and K2JNG, includes a converter and preamplifier using a KDS500 first stage, a 7211 tripler, delivering 25 watts, and a 29-inch dish. Pete has worked W2OMS, K2DZM, W2DWJ, K2UYH, WA2SVG, WA2VTR, W2NEA, K3IUV and W1QXX, in addition to the two above, on 1296 MHz, for seven states. He is also on 220 (80 watts output, cw and a-m), and is best known as coholder, with WØDRL, of the 432-MHz overland record. He has 13 states on 220, and 28 on 144, his most recent 2-meter additions being K5BXG and W4IXC, for Oklahoma and Florida. Oh, yes - in case you didn't know, Pete is a blind ham.

KSUGM, Dallas, ran 432-MHz ms skeds with WA6EXV on Oct 8. He heard two good bursts and many pings. They were both using time sequencers (5 seconds) designed by KSUGM. He will run on 432 with any interested party. He and W5AJG/W5HN work Houston regularly mornings on 432. The 230-mile path is near-solid on 432 ssb.

K8HWW, Sterling Hts., Michigan, found tropo good to the South in late October. He heard W8YIO working W5RCI, and then finally got him, too, at 0340 GMT, Oct. 27, for state No. 31 on 144. Clem also caught the widespread aurora of Oct. 31 on 144, working 10 states on the buzz, plus VE3. He tried 220 with K1PXE, when 144-MHz signals were good, but they heard nothing on the higher band. There was also nothing to be heard on 220 during the excellent tropo to the south.

WØMOQ, Lisbon, Iowa, says that the aurora of Oct. 31 and Nov. 1 brought in 2-meter signals from New England to the Dakotas, and as far south as Oklahoma.

At WA2UDT this was a long session, with 2-meter signals still rolling in at 0700 GMT, when he quit. He heard, but could not work, KØWLU and WØMOQ, both weakly. Beam headings for best signals varied considerably, from N to WNW.

Two-meter fax seems to be gaining ground. An unsigned letter (happens oftener than you might think!) from Staten Island, says that 145.26 MHz has been adopted as a "standard" frequency for this mode in the NY area. Experience shows that a signal 12 dB or better above the noise is needed for good fax copy. Address of the writer: 215 Bedford Ave., Staten Island, NY 10306.

(Continued on page 98)

FM REPEATER NEWS

AT THE RECENT California Amateur Relay Council 2-meter frequency coordination meeting the following resolution was adopted: "The CARC Technical Committee is directed to enlist the aid of the ARRL in making equipment manufacturers aware of the need for improving the filters in receivers sold for amateur use; the receivers should meet commercial narrow-band specifications, especially if "split-split" channels are to become practical. The manufacturers should also be made aware of the need for accurate specifications, especially receive bandwidth specifications."

The ARRL certainly agrees with this resolution and as a first step the following letter is being sent to all amateur fm gear manufacturers, both in the USA and Japan:

Gentlemen:

It has become a matter of increasing concern to us that much of the currently available amateur 2-meter fm equipment is not compatible with present-day operating standards. In connection with this thought, we would like to make the following recommendations to all manufacturers, USA or foreign, and to the importers and distributors who handle such apparatus.

1) In the interest of maximum effectiveness of reception, provide all fm receiving equipment with i-f bandpass filters designed for reception of fm signals whose deviation amounts are between 5 and 7 kHz. The 15- and 30-kHz bandpass characteristics still common to many pieces of new transceiver equipment are totally unsuitable for channel separation in most areas of the USA, and because most amateur repeaters have adopted the commercial standard of 5-kHz deviation.

2) Provide all fm transmitting equipment, regardless of power class and documented FCC Type Acceptance, with harmonic filtering at the PA output terminal. Such suppression measures should assure that all harmonics are down in amplitude from the desired transmitter output frequency by 30 dB or more. Spurious output energy from other causes should be down by an equal amount.

Concerning item 1, the marketability of compatible fm receiving equipment should be far greater than would be the case with obsolete circuitry. One possible alternative to equipping the

receivers with narrow-band filters would be to make available as an option, or as a modification kit, a narrow-band filter for wide-band receivers.

Relative to item 2, amateur TVI creates a serious public-relations problem, and we have discovered that severe TVI can be caused by some FCC type-accepted 1- or 2-watt handi-talkies from distances of several blocks away, even in primary TV signal areas. Additional problems have arisen from spurious energy being radiated from certain U.S. and imported solid-state 2-meter fm transceivers. In the latter example there has been severe interference to high-band police and fire department radio equipment.

It is therefore the deep concern of the ARRL that manufacturers of amateur fm transmitting and receiving equipment provide quality equipment to their consumers. We hope that our request will be given serious consideration.

Cordially,
Doug DeMaw, Tech. Editor, *QST*

California Goes 600 kHz

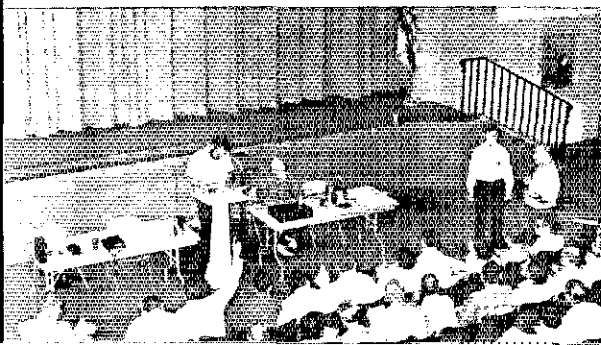
Aside from the release of Docket 18803, probably the big news in the repeater world is the conversion of the California repeaters to standard 600 kHz separation for 2-meter operation. At *QST* publication time, the Northern California repeaters listed below should be operating on the frequencies shown. Only open repeaters are listed. Any readers proposing to put a repeater on the air in Northern California should contact the California Amateur Relay Council, Jon J. O'Brien, W6GDO, 6606 Fifth ST., Rio Linda, CA 95673.

And for Southern California -- The following information was provided by the SEC for Los Angeles, Bill Carpenter, WA6QZY. Nearly all of the repeaters listed are now operating on the frequencies shown.

Use It or Lose It

At the Northeast Repeater Association meeting in Valley Forge, Pa. in October the repeater members discussed the problem of frequency allocations. One important point to come out of the meeting, and one that we believe every association should observe, is the problem created by individuals or groups holding repeater frequencies *but* not using them. The NERA members agreed, with no dissenting votes, that any channels being held, but not used, must be released by the holder after due notification. In some portions of the country there is a great demand for channels. The NERA action is one that frequency coordination groups should give serious consideration. --
WHCP

Who ever said hams can't agree on anything? Here is a portion of the crowd of over 100 repeater users representing 40 repeaters in the Southern California area. The meeting lasted from nine in the morning until late in the evening. The final result was an agreement for standard 600 kHz input/output separation for 2-meter repeaters in the area. W6KW chaired the meeting. Skipp Clark, WB6TXX, asst. chairman is at the mike. WB6TXX did a great job of leading the group to the final plan that was adopted. (Photo Credit: Dan Halpert)



<i>Input</i>	<i>Output</i>	<i>Call</i>	<i>Area Served</i>	<i>Output</i>	<i>Input</i>	<i>Call</i>	<i>Area Served</i>
146.22	146.82	WB6AAE	Oakland/Bay Area, Sacramento Valley	147.00	146.73	WB6RSK	Pomona Valley
146.16	146.76	K6CBP	Auburn/Sacramento, Sierra Foothills	147.06	146.79	K6SYU	Orange County
146.04	146.64	W6CPK	Clear Lake/Lake County	147.03	146.82	W6FNO	Greater L.A.
147.66	147.06	W6CX	Rocky Ridge/San Francisco Bay Area	147.06	146.82	WB6TSO	San Luis Obispo
146.34	146.94	WB6DGG	Mt. Pierce/Eureka Area	147.09	146.82	W6ZGC	Barstow
146.94	147.48	WB6DGG	Mt. Pierce/Eureka Area	147.12	146.85	W6GALV	San Bernardino County
146.19	146.79	WB6FDT	San Francisco/North SF Bay Area	147.12	146.85	WB6IWF	Thousand Oaks
146.10	146.70	K6GWE	San Rafael/San Francisco Bay Area	147.12	146.88	WA6SIN	San Fernando Valley
146.34	146.94	WB6HYL	Meadow Lakes/San Joaquin Valley	147.12	146.88	K6QEH	Coverage not known.
146.28	146.88	WA6ILA	Mt. Oso/Sacramento & San Joaquin Vlys	147.12	146.91	WB6VQD	Greater L.A. Area
146.28	146.88	WB6NDJ	KPFA Site/San Francisco Bay Area	147.12	146.94	WB6GUA	Palmdale
146.28	146.88	WB6NOZ	KPFA Site/San Francisco Bay Area	147.12	146.97	WA6ZZE/	L.A.
146.16	146.76	WB6OPG	Blue Ridge/South San Joaquin Valley	147.12		WB6SZO	
146.28	146.88	WB6OPG	Blue Ridge/South San Joaquin Valley	147.12			
146.16	146.76	WB6OQS	Mt. Chual/San Francisco Bay Area	147.12			
146.13	146.73	WB6PVS	Sonoma Mtn/Sonoma County (directional)	147.12			
146.25	146.85	K6QFO	Pise Mtn/San Mateo & SF Bay Area	147.12			
146.10	146.70	WA6RTM	San Miguel/San Luis Obispo & SJV	147.12			
146.34	146.94	K6SWS	Oakland/San Francisco Bay Area	147.12			
146.31	146.91	WB6SXC	Sonoma Mtn/North San Francisco Bay	147.12			
146.22	146.82	W6TO	Meadow Lakes/San Joaquin Valley	147.12			
146.13	146.73	WA6TSM	Black Mountain/San Francisco Bay Area	147.12			
146.22	146.82	WB6TSM	Cuesta Peak/San Luis Obispo	147.12			
146.04	146.64	WA6UFE	Loma Prieta/San Francisco Bay Area	147.12			
146.34	146.94	WA6UGS	Wolf Mountain/Sacramento Valley	147.12			
146.34	146.94	K7UGT	Slide Mountain/Reno-Lake Tahoe	147.12			
146.94	147.48	K7UGT	Slide Mountain/Reno-Lake Tahoe	147.12			
146.19	146.79	WB6ZQI	Sacramento/Sacramento Vicinity	147.12			
146.37	146.97	WA6ZQI	Mt. Toro/Monterey Bay Area / SJV	147.12			
146.01	146.61	WA6ZYH	Sacramento/Local repeater	147.12			

Above listings are for northern California; southern California repeaters are listed below.

<i>Input</i>	<i>Output</i>	<i>Call</i>	<i>Area Served</i>
146.01	146.61	WB6ZDI	Western L.A.
146.04	146.64	WB6WLW	San Diego
146.07	146.67	WA6FLH	Western L.A.
146.10	146.70	WA6TIC (RTTY)	L.A. Area.
146.13	146.73	W6IN	San Fernando

Simplex frequencies: 146.40, 146.43, 146.46, 146.49, 146.52, 146.55, 146.58, 147.42, 147.45, 147.48, 147.51



How's DX?



CONDUCTED BY ROD NEWKIRK,* WØBRD

How:

Happy New Year? For the most part.

Among this month's art complement you'll note some picturesque QSL panels. You should have seen 'em in color - very beautiful. Yet very sad. All unclaimed layaways. Somebody failed to supply their local ARRL QSL. Bureau Manager with self-addressed stamped envelopes for too long a time. Limited storage space and filing facilities force unpleasant liquidation of oldies. Can't hold 'em forever, fellows.

The cards pictured are part of a DXCC's worth quickly culled from pounds and pounds of colorful trophies necessarily consigned to the incinerator by our Sixland Bureau branch late last year. Probably a small percentage were unclaimed because of QSO callsign errors resulting from sloppy operating and/or poor conditions. Most, however, undoubtedly were valid confirmations. It's a shame they couldn't be delivered.

Appearing regularly in *QST* are complete run-downs on ARRL QSL Bureau branch addresses along with instructions on the simple procedure involved. If you've ever worked DX at all you ought to keep an s.a.s.e. (self-addressed stamped envelope) on file. We just hate to see QSLs destroyed, even those apparently unneeded or unwanted. It hurts senders even more, as well as the careless W/K/VEs who obviously find plenty of time to work DX but never the few minutes for the minimal paperwork required to take advantage of a perfectly free service. No strings attached, not even ARRL membership.

So here's a *must* DX resolution for this new year and all to follow: Keep your hard-working ARRL QSL Managers supplied with s.a.s.e.! 'Twill make the new year happier all around.

† † †

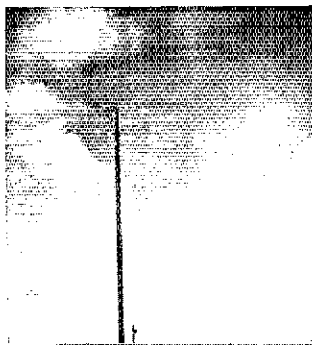
What:

Notwithstanding our 40-meter groushings of last month the "How's" mailbag insists that DX still
*c/o ARRL, 225 Main St., Newington, CT 06111.

abounds there. It's just that circumstances make the stuff so much more difficult to work than it ought to be. DX grayhairs among us easily recall when the 7-MHz range was a night time thing of beauty filled from end to end with international two-way communications. But there we go again. Let's count our blessings and sample 40-meter DX available recently mentioned by correspondents, first on

40PHONE: CEs 1HU 1JX 4ME 8AA, CN8HD, COs 2DC 3JS, CPlJV, CRs 4BC 5SP 6TP 9AK, CT2AK, CX1BBR, DU1EJ, EAs 6BC 8GZ 8HJ 9AI, ELs 2CB 8I, EP2s JB TW WB, ET3JH, FG0AFC/FS7, FL8HM, FPSAA, GM5ATZ, GW3YBN, HC2TV, HKs 3LT 0BKX 0STA, HRs 1KF 4SPR, HV3SJ, JA2BAY, JD1ADG, JW1EE, JXs 6VO 7HL, JY1, KB6DA, KJ6CF, KC4USN, KP4s DDS DJE DLW, KZ5s PW WH, LU1s 1ADT 1KAO 2DN 6DZR 7AJF 7AJG, OA4OS, OD5EJ, OHs 9QH 0NI, ON5CW, OX3EN, OY5NS, OZ7JK, PJ1AA, PYs 2PZK 2QT 7BIH 7BRN, PZ1AH, S21IK, SM7BIC, TGs 8IA 9QQ, TT2s JIC OE RT, TR8VE, TU2DO, UC2CS, UG6AO, UH8IL, UK9s ABA CAE, UW9WR, VKs 2AVA 3HW 7GK 9TB, VPs 1TL 2AA 2LX 2SG 2VAU 2VY 7BL, VRs 1AA 1W 4EE, VS6DO, WA90TH/TF, XE1s EH IJ IIO IJK, YAIOS, YNs 1RMP 5NQ 9LSC, YO2BB, YVs 4AGP 6JB 7GX, ZC4s BC BJ HC, ZD8s RR RW, ZLs 1AQ 2BCG 2BT, ZPSAR, ZSs 1MH 4AL 6MP, 3A2EE, 4U1TU, 4X4KL, 5N2s AAN ABG, 5W1AU, 6Y5s CB DL, 7Xs 2MD 7Y, 9E3USA, 9G1s AG DY WW, 9Hs 1GE 1HE 5D, 9L1GC, 9Q5BG, 9Y4s KR T VT and VU, all mostly just below 7100 kHz except for the western hemisphere variety.

40radiotelegraph buffs account for such cw specimens as CF1BN, CM2AM, COs 2AR 2BM 6JH, CP1EU, CRs 6AI 7BN, CTs 1MK 2BJ, CX8BBH, DL8MM, EAs 4MR 5FO 7RI 9EO 9EU, EL2DG, FB8XX, FG7TG, FK8BQ, FO8CR, FP8s AP CT, G8HX, GCs 2LU 3ZES, GM3JDR, HAs 4XN 8KAF, HB0NL, HC2HM, HIs 3PC 7OMR 8FED 8NMP, HKs 5CTH 7XI 0BKX, HM1BB, HSs 1AGK 1AHM 4AGN, HV3SJ, 1Is AOH ABT, JA1HNP, JD1YAA, JH1JGX, JX6CP, KSQFH/VQ9, KB6DA, KCs 4DX 6SK, KG6JBS, KL7s HBT MF, KP4UW, KS6s DH DY, KX6s BB BQ, LAs 4LG 6UW, LU1s 1ZA 3WBB 6DKX 6SC, LZs 1KSD 2KRE, OEs 1GFW 9AHI, OD5AA, OHs 1VR 2BCI 3WW 0AL, OKs 1APV 1TA 3TFE, OX3ZO, OZ2NU, PA0s RE ZEZ, PYs 1DVG 2FPW 4BUL 7BPE, PZ1AJ, SMs 2AGD/CE0 2BYC 5ACS 6CKU, SPs 2EPU 3PL 5EXA, SVs 1CH 0WTT, TFSAW, TG5VW, T12MV, TU2s DD DO, UAs 1KAE/1 2EC 3ACH 3QBF 0CF 0FBA 0FBO



VR1s PA, W and AC (WB4LDK, W6BHY and WB6IKI) supply this sunswept QTH of the Month, remote Canton island in the Phoenix group. Bert, Jim and John also sign WB4LDK/KB6, KB6s DA and CU from the same spot. VR1PA formerly operated OX5BA, VR1W was ZD8Z and 9Y4AA, and VR1AC is ex-KX6JD. That 70-foot TH6DXX is backed up by inverted-V dipoles for 40, 80 and 160 meters.

YR2ER **UM8** **ZE1CW** **YNTND** **EL2AJ** **CN8BB** **ZS60S**
UA9KAZ **DM6MAO** **VP2VL** **OE1M**
FK8AU **UP2OE** **F08BJ** **HL**

0QAO, UBSs EAT MZ NAO, UC2s CS IL OAC RZ, UH8BY, U18AAB, UJ8JA, UKs 1ABA 1ATG 1ZAC 2LAB 3XAI 5UAR 9LAG 0CAT 0FAC, UL7s GAW GW, UO5OAG, UP2BX, UQ2s GBW GCB, UR2TAX, UTSAA, UWs 3AR 3IO 0FB. VKs 2BQ/th 2DO 2SA 3MR 4PB 7GK, VO1HI, VP2s A KX ST SAH, VR1s A AA, VS6s DO EN, XEs 1HJ 2BG, XW8EV, YB3AA, YN1AA, YOc 2BB 2BO 3AC 6MZ 7AWN, YUs 1AJF 2CK 2TWT 3CDL 3DJK 4AAW, YV5s DRC DMM, ZC4BI, ZDs 3Z 9BC, ZEs 1AC 5JJ, ZKs 1AA 2DX, ZLs 1BEG 1OI 2AFH, ZSs 1A 2MI 5AN 6ZE, 3A0s GA GF, 4M5A, 4S7DA, 4W1AE, 6Y5DL, 8P6s AE AG BU DR, 9G1HE, 9H1s BM BX, 9K2BQ, 9L1s GC JT and 9M2CN, not all staying in the Extra subband. ZK1AA, for instance, has a pet spot around 7100 kHz. Aformentioned 7-MHz recommendations come courtesy Ws 6AM 7YF 9LNO, K2HYM, Was 2APG 9ESO, WBs 4SXX 4UKA 9GGD 0AAM, WN4ZYQ, VE7BBL, Mr. K. Muller and the clubs press. Got 'em all! On the wall?

"contest" on QSLs for such activities because separate logs usually are involved. No info here on 9A3 or other ET3 QSLing. (W4NJF) . . . My management of EL2DG QSLing since September is based on the customary s.a.s.e. from W/Ks, s.a.s.e. plus IRCs from others. (WB4SRX) . . . Anyone still in need of a deserved QSL for my late-'60s TY5ATD and 5N2AAX operation is invited to reapply here. (WB4SJT) . . . In response to cards missent to my address be advised that I have no QSL arrangements with EA9EO. (K4FYD) . . . No QSLs have arrived via the GARS BUREAU for me in almost a year. QSL *only* via WSEGH. (9G1WW) . . . In behalf of my late husband, W3HYY, I intend to carry on as QSL manager for ELs 7B and 8C. I hope to receive my own amateur license soon. (Mrs. Joseph Parvis, Route 2, Hanover, PA 17331) . . . My QSL assistance to FL8DS began October 1, 1972, October 10, 1972. I also handle confirmations for JA3IG, TU2BB and TY8ABB. (WB4SPG)

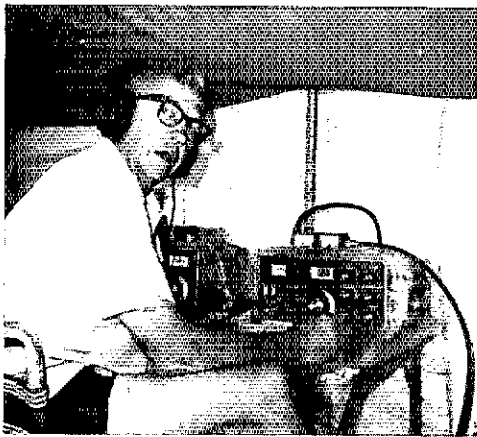
† † †

Where:

AFRICA - I am constantly pestered for QSLs from ZD9 stations for which I hold no logs. Please advise your readers I am in possession of the following records only: ZD9BO, operator Sandy, from May 20, 1970, to November 20, 1970; ZD9BR, operator Les, from November 19, 1970 to November 10 1971; and ZD9GA, operator Les, from November 11, 1971, to June 16, 1972. I'm keen to complete this job, so those needing QSLs for QSOs during the specified periods are urged to supply self-addressed envelopes (s.a.s.e.) plus International Reply Coupons (IRCs) for fast response. (ZS2RM) . . . Callsigns 5N2s AAF AAK and ABG are pirated frequently, especially on 20 meters. 5N2AAF has long returned to G3JKO. (5N2ABG, NARS) . . . Angola's double-X label got a work-out by XX6FL at Launda's International Fair in October. Operator Lee of ET3USE accepts QSLs via WA4AGT. (DXNS) . . . I manage QSLs for FT3USZ, 9F3USA and when logs come through, 9FAUSA. It is important that the name of the Ethiopia operator be included on each QSL accompanied by the usual self-addressed stamped envelope (s.a.s.e.). Correct Greenwich time and date of QSO are musts! It will also help to state

OCEANIA - VR6TC should be back on Pitcairn now convalescing from boat accident injuries after treatment in New Zealand. Tom is months behind in his QSLing, of course, but let's be patient. (WA2DXJ) . . . The VK6HD reported worked by most Europeans on 160 lately is spurious. G2JL and HB9CM caught the real one. (VERON) . . . Log shipments from ZK1MA left twenty percent of manager W6KNH's QSL backlog unaccounted for. Clyde is attempting to run down missing records. (WCDXB) . . . Six Pago Pago QSOs over five years finally produced a QSL from KS6CY operated by KS6CO. (VE7BAF) . . . K2UAN says W2LCA disclaims connection with VR2AN QSL matters. (W4WFL/1) . . . Those still needing QSLs for contacts with ZK2DX, A35JH and 5W1AL are invited to reapply with s.a.s.e., or s.a.e. plus IRCs, to my address. Some previous requests apparently have strayed. (WB5BHN) . . . VR2DI logs from March 23, 1968, to March 30, 1970, are in my possession. Bill was back in Australia from the latter date until May 21, 1972, when I resumed his QSLing under 3D2DI. Unless Canadian postage is supplied on s.a.s.e. I require s.a.e. plus IRCs for direct reply. Logs are received from Suva monthly. (VE6TK)

PARAGUAY **ZP5JN** **PITCAIRN ISLAND** **VR6TC** **SVLHARD** **JW-20K** **EA40**
11ANN **CR0TP** **3DL**
SOVIET RADIO STATION **LZ1KPG** **ce5fq** **IFULA** **HA 4 YK** **DUNAUJVAROS** **YV3E**
VP8KV **PJ0DX** **SP8B**



VK9JW's Mellish Reef radiotelegraphy last July was in the able fist of VK4FJ. Roy really needed that headset to block out howling 30-40-knot winds constantly buffeting the six-by-six operating tent. (Photo via W4VPD)

EUROPE - A large box of cards via ARRL from Box 88, Moscow, recently arrived at our Eightland Bureau branch. Included are bounced W/K QSLs which were refused delivery in Russia because of their religious motif. (W8CFG, CARA) . . . Courteous inquiries to the secretary at Box 88 including QSO data have jarred needed U.S.S.R. QSLs loose for me. One UK2 came through with four cards for the same QSO! (W2AXR) . . . Thirteen thousand UK1ZF1 QSLs are said to be entering bureau channels for your Franz Josef-land pleasure. (NTDX) . . . Portugal's CT1s switch to CT4, CT7, etc., now and then, suffixes unchanged. CT7UA, for example, is really CT1UA. (DXNS) . . . September's 3A0GK on 20 and 40 cw was ungood. (3A2EE) . . . All QSLs will be answered, direct if s.a.s.e. are provided. (WA3GHC/TF) . . . A visit to HV3SJ confirms that W6KNH still does Brother Ed's QSLing for W/K QSOs, HPO others. (K3RPY) . . . Those HB9X-visitor calls are reissued yearly and they are not renewable. I was HB9XFJ in 1969, HB9XKX in '70. (WB4SJT) . . . EC3MQ tells me someone apparently usurped his callsign in September. (W1RML)

NORTH AMERICA - "QSLers" applauded in correspondence from Ws 1RML ISWX 3IF 4UD 7YF 8UUM, Ks 3NYI 3QAP 8PYD, WAs 2DXJ 2SHR 8OBG, WBS 2PIN 8FLE 9DRE, WNs 2EOD 6OSS and VE7BAF for painstaking paste-board punctuality: A2CAB, CE3ED, CPEU, CR5AJ, CT1VX, CX5BJ, EAs 5BS 7ON, ET3s USA USC, FG7XL, FM7AD/ES7, FP8CW, G4JZ, G15UR, HBs 9ANS 0UE, HL9VQ, HM5EE, IT9AF, JE1HUT, JH1s VOE WIX, KA9DL, KC4AF, KG6AKR, KL7HIK, KP4MO, KS6s CO CY, KV4AA, LX1FS, M1B, MP4MBQ, ON5NT, PYs 1AFA 2WH 0DVQ, SV0WJJ, TL8U, VO2AH, W3ABC/HC1, WAsYSI/HK6, WAsFAB/KC4, WB5BUQ/KL7, WP4DPI, XW8s BS FV, YB5AAQ, YV5BPJ, ZDs 3D 8AB 8UN, ZE1BL, ZL3KK/c, ZS5FC, 3B8CZ, 3X1P, 5M4A, 5VZYH, 6W8AL, 7P8AC, 9H1HE and 9Y4VU, together with QSL aides Ws 2LGU 2RHK 4N1F 5ADZ, K2BPP, WAs 1HAA, 3HUP, WB4GTS, VEs 2DCY 3FCL 3GHL and G3LQP. Any QSLers been especially kind to you lately? . . . Halp! The following parenthesized brethren seek assistance in tracking down absent affidavits from holdouts indicated: (W6AKM) JT1AM; (W6EOL) VO2DK, VS5RG,

XZ2UX; (W6KNH) BV1US '57-59; (W8YMB) FR7ZL, MP4TDY, UH8DL; (K4SD) FA8GK, HP1LB, OJ0SUF, OY9LV, 3V8AH, 9HICZ, 9M80EA; (WA3ERG) CX1AA, KG6JAR, OA4QN, OJ0SUF, PJ2NR, PZ5RK, SVIDZ, TU2s AF BX, ZP5RD, 8P6BU; (WA3GHC/TF) CM6HT, C0s 2FA 2FC 7AI, E1s 4TRF 7BD, HK4DE, PJ3AS, SZ0BV, DJ6QT/5U7, 9H1s R CL; (WA4EPH) KX6FU; (WA4RXS) 5N2AAZ; (WA0TH) CE0AE, CR7FM, DU1AP, JX6RL, KW6EJ, PZ1BX, VP2GBC, ZD7DI, 9I2MG; (WB4SRX) CR7LE, TZ2AC, XE1s FFC IJ TK, ZE4JW, ZP5JX; (WB4UKA) I1UP/7P, KR6PO, 7Z3AC; (WN1OMK) BY5AR; (WN6OSS) KASRO, UA9OH, XE1FFY; (VE3CUI) FM7WT; (VE7BAF) HS1AM '69, KJ6BY '70 and 6Y5AV '70. Any alp? . . . Wish all Barbados stations QSLd as reliably as 8P6DR. (K2HYM) . . . HH9DL contacts by W3HIZ last autumn can be confirmed via Bert's home QTH. (DXNS) . . . Mexico's 6D-F-G-I-J and XI prefixes saw October contest action. QSL to XEs of the same suffixes in most cases. (LIDXA) . . . Many QSLs are received here for DX activity unknown to me. Are they possibly meant for W9FIU? (W9FRU) . . . I'll be glad to catch up on outstanding KP4DJ QSL needs from the home QTH. (WB4FOT) . . . Note that W4HGW, who managed my QSLs when I operated VP1DX in December, 1966, is not connected with the current VP1DX. My old British Honduras QSOs can still be confirmed via my address. (WA4YZC)

ASTA - All VU2AAA-VU25AAA logs are on A hand here and more arrive from Norm monthly. I have relieved W3FDU as his QSL manager. (K5LIW) . . . Promises, promises. *Where* are my JA QSLs? (WN6OSS) . . . Reminder: 9C9s are EP2s of like suffix. (DXNS) . . . QSOs reported with HL9VL between September, 1970, and October, 1972, are invalid. I hold logs for my operation under that call from September, 1969, through September of '70, and I have just reactivated the station as of October, 1972. (HL9VL)

SOUTH AMERICA - QSLs for all HD8IG Galapagos contacts have been filled out and are ready for issuance direct or via bureau upon request. (W3ABC) . . . Venezuela's variant prefix as in 4M4UA was used by YV4UA in recent contest action. YX5AJ was actually YV5AJ with another variation. CVs and CWs are CXs of the same suffix as a rule; CV8BBH equals CX8BBH. (DXNS) . . . Here's the monthly catalog of suggested routings but remember that each specification is necessarily neither "official," accurate nor complete. . . .

A2CAQ, P.O. Box 108, Orapa, Botswana
A2CCY, R. Furzer, P.O. Box 298, Francistown, Botswana
A2CJP, P. Johnson, P.O. Box 52, Gaborone, Botswana
CP1EU, M. Long, Utah State U. Sp., USAID/Bolivia, APO New York, NY 09867
CP7GM, N. Sustach, Ramon Rojas 717, Tarija, Bolivia
CT1s AEP CNE JAM (to CT1s RV PK HB)
CT2s AEP JAM (to CT2s AP AK)
CT3s AEP CNE JAM (to CT3s AN AB AX)
CWs 2CS 3AA (to CXs 2CS 3AA)
EL5C, P.O. Box 277, Monrovia, Liberia
F6s AJW/SU7 AYK/SU7 (to F6AJW)
FG0AF/ES7 (to W3HINK)
FG0AMC/ES7 (to F2QQ)
FG0AMF/ES7 (via K2KGB)
FH8CH, P.O. Box 177, Moroni, Comoros
FL8OM, P.O. Box 574, Djibouti, T.F.A.I.
FY0RU, P.O. Box 336, Cayenne, French Guiana
HP1XTW, E. Chism, P.O. Box 139, Balboa, Canal Zone
IY8UNM, P.O. Box 13016, Amman, Jordan
K5CIT/KH6, J. Locascio, 98-1325 Akaaka, Aiea, HI 96701

KA9DL, F. Lehrman, P.O. Box 167, APO San Francisco, CA 96281
 KG6AKR, Apra Harbor Radio Club, P.O. Box 169, FPO San Francisco, CA 96630
 KH6HCM, G. Elliott (W7UXP/4), 29840 SW 172nd Ave., Homestead, FL 33030
 KH6HHN, G. Masunari, 1366 Akiahala Pl., Kailua, HI 96734
 KH6HLK/KH6 (to KH6HLK)
 KL7DZU, G. Harris, USCG, Box 47, FPO Seattle, WA 98777
 OA6CV, G. Brumley, Box 825, Arequipa, Peru
 OH2s BH/6W8 MM/6W8 (via OH2NB)
 PZSCW, W. Cook, P.O. Box 1810, Paramaribo, Surinam
 TU2s BB DQ (via WB4SPG)
 VK9KE, c/o A. Whitmore, 7 Fair Isle Dr., Nuneaton, England
 VP2LX, P.O. Box 638, Castries, St. Lucia, W.I.
 VP2SQ, P.O. Box 671, St. Vincent, W.I.
 VP8MS, P.O. Box 137, Port Stanley, Falkland Islands
 VQ9HCS, H. Strickley, P.O. Box 84831, Mombasa, Kenya
 VQ9R, P.O. Box 193, Mahe Seychelles
 WA3GHC/TF, M. Hollingsworth, NSGA Box 14, FPO New York, NY 09571
 WB5BUQ/KL7 (to WB5BUQ)
 YA1s BYS RHK (to WA2BYS, W2RHK)
 YJ8EE, J. Sapir, c/o Radio Station, Santo, New Hebrides
 YV1AVO, P.O. Box 3, Punto Fijo, Venezuela
 ZD3s X Y Z (via OH2NB)
 ZD9s BO BR GA (see text)
 ZF1s GW SF VD, West Palm Beach ARC, Box 6834, Southboro Stn., West Palm Beach, FL 33405
 ex-ZK2AF, W. Christie, 328 Mt. Albert Rd., Auckland 3, N.Z.
 ZK2BD, P.O. Box 37, Niue Island
 3B8DX, Box 54, Port Louis, Mauritius
 3V8CA, P.O. Box 283, Tunis, Tunisia
 4M4AGP, R. Sullivan (W0YVA), P.O. Box 6226, Shirlington Stn., Arlington, VA 22206
 5Z4NQ, Box 76, Kijabe, Kenya

VP1DX (see text)
 VP2MAH (via W4GSM)
 VR2AN (see text)
 VR2DI (see text)
 VR3AC (via K3RLY)
 VU2AAA (via K5LIW)
 W4GIW/VP7 (via K4CDZ)
 XD1AK (to XE1AK)
 XI1IK (to XE1IK)
 XT2AC (via DJ6QT)
 XT2AG (via F6AJQ)
 XX6EL (via CR6LA)
 YA1GTZ (to K2GTZ)
 YXSAJ (to YV5AJ)
 ex-ZE1CY (to A2CCY)
 ZF1GS (to W4BRB)

ZL1BN/A35 (to ZL1BN)
 ZS5PG (via K6AQV)
 3D2DJ (via VE6TK)
 3V8BD (to DJ4DW)
 3X1P (via SM0KV)
 4M4UA (via W6CUF)
 4W1BC (via G3SUW)
 SR8AT (via W4DEN)
 5T5BH (via OH2NB)
 6P1J (to XE1J)
 6G1AA (via W2GHK)
 ex-7Q7CY (to A2CCY)
 9C9TW (see text)
 9H1C (via W9SCD)
 9K2CA (via W5KKZ)
 9L1ITU (via G3DYY)

These postal offerings come courtesy Ws 1CUT 1CW 1RML ISWX 1YL 4WFL/I 6AM 6BHY 6GSV 6KNH 7LR 7YF 8UUM 9IL Ks 2HYM 3CL 3QAP 3ZMI 4SD 8PYD 9MKX, Was 4RXS 9UCE/6 Wbs 2PJN 8ELE 9DRE, WN6OSS, KH6BZF, VE7BAF, Columbus Amateur Radio Association *CARAscope* (W8ZCQ), *DX News-Sheet* (G. Watts, 62 Bellmore Rd., Norwich N.72T, England), Far East Auxiliary Radio League (M) *News* (KA2LL), Florida DX Club *DX Report* (K4KQ), International Short-Wave League *Monitor* (E. Chilvers, 1 Grove Rd., Lydney, Glos., GL15 5JE, England), Japan DX Radio Club *Bulletin* (JA3GZN), Long Island DX Association *DX Bulletin* (K2KGB), Newark News Radio Club *Bulletin* (M. Witkowski, Rt. 5, Box 167, Stevens Pt., WI 54481), Nigeria Amateur Radio Society *News* (5N2ABG), North Texas *DX News* (W5SZ), Northern California DX Club *DXer* (Box 608, Menlo Park, CA 94025), Southern California DX Club *Bulletin* (W6FJJ), VERON's *DXpress* (PA0s INA TO), West Coast *DX Bulletin* (WA6AUD) and Western Washington DX Club *Totem Tabloid* (WA7JCB). More, more!

† † †

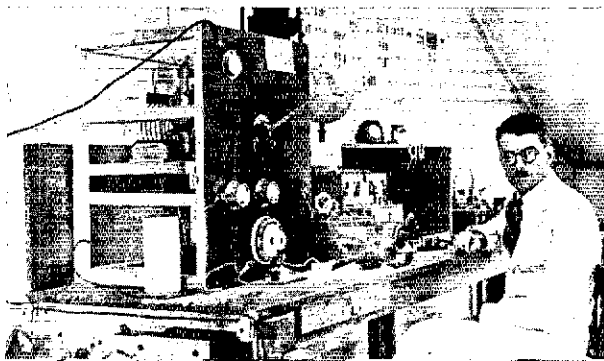
Whence:

NORTH AMERICA - Got tired working everything I hear so I replaced my NCX-3 with an Argonaut. Nine countries and 41 states on 28 MHz with five watts input so far. QRP adds a whole new DX dimension to a wonderful hobby. By the way, KP4ATS tells me he's leaving Puerto Rico after a 19-year visit. (WA9QJW/9) . . . A recap of 160-meter WACs certified since May 22, 1962, in order: G3OQT, W2s KOT IU, K6DZC DL9KRA, G16TK, Ws 0NWX 9PNE 1HGT, OK2PDN, GM3YCB, HB9NL, OK1ATP, HB4CM and W6RW. No. 1 went to W1BB back in '53. (W4WFL/1) . . . October 9th was great for my 160-meter dipole on 10-meter cw. Worked all continents but South America. (K8LIQ) . . . Country totals per band here 160 through 10 meters, are 43,206, 251, 341, 292 and 265. I'd like to see a special award for 1.8-MHz DX. (W4QCW) . . . In addition to the new ARRL DXCC Honor Roll pins I propose

AP2BS (via PAS)
 CN8HD (via DL9WC)
 CR3AD (via K3RLY)
 CT2BH (via K8NGR)
 CT2BJ (via WA3GCS)
 CT7SH (via CT1VE)
 CT7UA (see text)
 CV8BBH (to CX8BBH)
 DA1AA (via WA5VWH)
 EA9EO (see text)
 EL2DG (via WB4SRX)
 ELs 7B 8C (see text)
 ex-ET3GB (to OA6CV)
 ET3USB (via WB4UKA)
 FL8DS (via WB4SPG)
 GD5BBG (via K4TSJ)
 HB9XTJ (to WB4SJT)
 HB0UE (to HB9UE)
 HB0XMK (to DJ1BF)
 HH9DL (see text)
 HI3EI (via W2KF)
 HI3JES (via W2KF)
 HL9UH (via WB6RIU)

HL9VL (to WA7ESD)
 HL9WI (via WA5ZWC)
 HT0A (via DL30H)
 HT0V (via YN1VMD)
 IG9BAF (to 11BAF)
 JE1HUT (via WB0BQG)
 JY6FC (via K6AQV)
 JY7YL (to K3ZZS)
 ex-KA7GM (to KH6HHN)
 KA8RO (via KH6HIL)
 KL7HNN (to K3ZMI)
 KP4DJI (to WB4FOT)
 LU1Z (to K4MZU)
 SY1MA (via WA1HAA)
 TN8BK (via JA4BLY)
 TY8ABB (via WB4SPG)
 TY0ABD (to DJ6QT)
 TZ2AC (to DJ6QT)
 TZ2MM (via OH2NB)
 ex-VK1RJ (to VK9RY)
 VK9GO (to VK2ATZ)
 VK9XW (via VK6RU)
 VK0RC (via WIA)

XV5AC is radiating the first Vietnam QSOs in years but F8FD fired up this impressive DX ensemble in Saigon nearly a half century ago. Richard recalls 80-meter cw QSOs with France in 1924, phone contacts a few years later. In May of '28 he was operating marine mobile on a voyage from China to Marseilles. F8FD built his first receiver in 1910 and still enjoys DXing. You may have worked him during his most recent DX-pedition to Corsica. (Photo via W5UNF/6)





DU9FB, you must agree, runs a well staffed DX outpost at Davao. Fernando and daughter Maricel are frequently available on 14,200-14,250 kHz. (Photo via WB6RJP and W3WRE-WB6BBO)

lapel displays for 200 and 300 countries. (K1DRN) . . . KP4s DHD and DIW provided gear and other assistance enabling me to roll up three kiloQSOs as FG9AFC/FS7 in October. I used a 3-element beam on 10, 15, and 20, doublets for 40 and 80, T4XB and R4B. One trip highlight was the sighting of a UFO over San Juan (honest!) and the lowest lowlight was the bout of stomach trouble that terminated by eight-day DXcursion. (W3HNK) . . . I'll be signing KL7HNN for the next three years. (K3ZMI) . . . One-sixty cw recently gave me EI9I, Gs 3RVM 3YUV 4AKY, HB9NL, OKIATP, PYIDVG, eight U.S. sevens and a couple of sixes. (WA1GXE) . . . Here's a New Hampshire Novice regularly available on 21,100-21,125 kHz. Returned to ham radio after a 12-year layoff. When my code speed gets back up there I hope to get my old K1PTO call back. (WN1QEV) . . . After a USAF discharge this month I'll head toward my old Kentucky home. I surely appreciate all the radio friendships made while DXing in P.R. as KP4DJL (WB4FOT) . . . October on 80 cw opened for me with a WAC featuring DLIRK, LU2DKG, UH8AE, VE1ZZ, CR6CT and 9L1GC. (W1SWX) . . . Fifteen's been very tricky but 40 is beginning to steady down with nice long skip. (WN2EOO) . . . My 80 watts and vertical are at the mercy of unstable 14-MHz conditions. (WB8FLE) . . . The 10- and 15-meter DX virus claimed another victim - me. (WA4EPH) . . . After a long day's lawn-mowing under dire threats of parents a new country on 15 sure perks up the sagging spirit. (WN6OSS) . . . Twenty's still good here, offering a wide selection of cw goodies. The Pacific crop is down but Europe and South America pickings remain interesting. (VE7BAF) . . . If every contest entry, award application endorsement, etc., must be scrutinized because of possible falsification, then amateur radio from that aspect cannot be far from CB. (WA2HZR) . . . Fifteen-meter pileups grow fewer

but fiercer. (K4SD) . . . Made 200 contacts as W0AAD/HR6 from Swan Island in September. WA2CPO starting things off. Permission from Tegucigalpa is easier to obtain than transportation. Also tried some pile-ups as 'ZF1AD. (W0AAD) . . . Demonstrated my Swan kW mobile at a recent Long Beach club gathering and I'm offering some Rhombic Acres for sale. (W6AM) . . . Worked VK3AIH and 9J2MA cw to ssb on 15 for two new ones while awaiting QSLs from UK0KAC and 9XSVL. (WN81OT) . . . Hams played a big part in the Mexican-1000 Off-Road Race this November in Baja California. (K6ICS-XE2ICS) . . . There's an International Reciprocal Operators Club forming at Box 11, Medway, MA 02053, for amateurs interested and qualified. (W4WFL/1) . . . Ten opened for Europe five weeks ahead of last season. Another quirk of this most curious sunspot cycle? (K3CL, ex-K3CU) . . . Sixteen hours as VP2EW got me thirty countries in August. (K5JZN) . . . Lightning made my vertical a horizontal and burned up my TR44 control box. (WB2ZHM) . . . Got out of the service and arrived home with no gear a couple of years ago. The DX bug bit again in October, 1970, and I'm now up to 174/150 with an HT-44, SB-200, SX-117 and Hustler on 15 and 20 meters. Yes, you certainly can work DX with a simple vertical! (K9HLW) . . . Just returned to the air after a 15-year lapse and three harmonics. The XYL presented me with an FT-101 last Christmas so I'm up to my ears in DX again. (VE1GJ) . . . I agree there have been drastic changes in the DX game since 1947, the year I was licensed. Still like old 20 cw but I give 10 and 40 occasional attention. (K2VMX) . . . Looks as though nobody has yet bettered W6KG's six-minute WAC as 5L2KG back in '67. (WCDXB) . . . WA7JCB moves from veep to club bulletin editor and our membership has grown to 131. (WWDXC) . . . Northern California DX Foundation is newly formed with charitable objectives. Officers include W6BH pres., W6ISQ v.p., W6MAV secy. and K6KQN treas. with W6HVN, K6DC and WA6AUD trustees. (WCDXB) . . . Manager K6AO reports California Awards Nos. 204 through 221 won by CT1LN, GC2FMV, GW3NWV, JAs 1CC 1DFQ 1OMH 1WPX 8AWH, KC6WS, K64EQ, OK1KTU, SM6DHU, UW3BX, YB0AAN, YO6DL, ZL1LL, 5W1AU and 7X0AH since October, 1971. (NCDXB)

QST

World Above

(Continued from page 91)

W3BLC; visiting Denmark, has come up with interesting 1296-MHz news. He says that OZ9CR first heard his EME echoes on 1296 MHz Oct. 31, though he had worked W2NFA via EME previously. OZ9FR worked English amateurs on 1296 MHz Oct. 5. At 1940 GMT a contact was underway with G8AZM, after first making connections on 432, when the rig at G8AZM broke down. At 2024 OZ9FR worked G4BEL, and at 2255, just before the band went out, G8BYF. The longest of these paths is about 720 km. OZ9FR was running a 1.6-meter dish, fed through 15 meters of RG8, with 2 watts from a varactor tripler. The band must have been pretty good that night!

Now, just a line from the writer, if I may. Bill Smith, K0CER, was called away suddenly, shortly before copy time, so your "retired" VHF Editor took over the principal part of the column job this month. I've checked over every edition of this column since starting it 33 years ago this month, but this is the first in a long time where I've done the compilation of it. Though we seem to be lacking in November news (probably because of mail accumulation at K0CER) we hope to be back in the K0CER groove again next month. — W1HDQ

Operating Events

de W1YL

JANUARY

1 through July 16, NRL 50th Anniversary, see this issue.

4 **W6OWP Qualifying Run** (W6ZRJ, alternate) 10-35 wpm at 0500 GMT on 3590/7090 kHz, 10-35 wpm. This is 2100 PST the night of Jan. 3. Underline correct minute of highest speed copied, certify copy made without aid and send to ARRL for grading.

6-7 **VHF SS**, p. 54 Dec. **Friendly Firebird QSO Party**, **Hollywood ARC Operation's Day**, p. 69 Dec.

10 **WIAW Qualifying Run**, 10-35 wpm at 0230 GMT on 1.805 3.580 7.080 14.080 21.080 28.080 50.080 and 145.588 MHz. This is 2130 EST the night of January 9. Underline one minute of top speed copied, state no aids used (typewriters OK), sign and mail to ARRL with your full name, call (if any) and complete mailing address.

13-14 **CD Party**, cw. This is a quarterly event for League appointees and officials, notified separately by bulletin. Check with your SCM (p. 6) to see if you can qualify for an appointment. **YU 80-Meter DX Contest**, p. 69 Dec.

16-18 **OOTC QSO Party** cw, p. 69 Dec.

20-21 **CD Party phone**, **Arkansas and Louisiana QSO Parties**, p. 69 Dec.

23-25 **OOTC QSO Party** phone, p. 69 Dec.

27-28 **Simulated Emergency Test**, p. 49 Dec. **French Contest** cw, p. 69 Dec.

FEBRUARY

3-4 **DX Competition**, phone, p. 55 Dec. **Ten-Ten International Net Contest**, members only, full 48-hour period GMT. Exchange name, QTH and 10-10 number. Score 1 point for each member contacted, 1 extra point for each of the following: DX member, YL-XYL, Chapter Head. Appropriate certificates. Logs must be sent to Grace Dunlap, KSMRU, Contest Mgr., Box 445, La Feria, Texas 78559 and must be received by March 15. Enclose an s.a.s.e. for copy of the results. **VHF Space Net Contest**, from 6:00 pm to 6:00 pm your local time. Single or multiop, power classes 1-25, 25-100, 100-1 KW watts input. Trophies for first and second place in each power class. A special trophy to Novice Class. Club aggregate scores welcomed, trophies awarded. Each complete QSO counts 2 points, each different zip code worked is a new multiplier. Each contact on a different band counts 2 points (zip codes count just once). All modes of operation, except repeaters. All stations submitting logs will receive a participation certificate. Logs must be postmarked no later than Feb. 28. Send to: Tony Slapkowski, WB2MTU, Box 909, Sicklerville, NJ 08081.

3-11 **Novice Roundup**, rules this issue.

7 **W6OWP Qualifying Run**.

10-11 **QCWA QSO Party**, the full 48-hour period GMT, sponsored by the Dallas Chapter. Only members are eligible for the QCWA certificate and plaque donated by QCWA Hq., only contacts with members count toward the award. Overseas members should call about 10 kHz high or low of the following congregating frequencies: cw, 3580 7080 14080 21080 28080; phone, 3980 7280 14280 14345 21380 21445 28580; rty, 3595-3600 7095-7100 14095-14100 21070-21075 28070-28075. (Please note the listed cw frequencies are used by WIAW for code practice and cw bulletins.) One point for each QCWA member contacted, repeats on other bands do not count. The sum of your contacts multiplied by the sum of states, VF provinces, maritime mobiles and countries (other than U.S./Canada). D.C. counts as a states multiplier. Your log should read: numbers, date/time group, call of station contacted, QTH, freq., RST, name and QCWA membership no. Mail your log to L. F. Heithecker, W5EL, 1409 Cooper Dr., Irving, Texas 75061 to reach him by March 9.

10-11 **WAZDNR's Operations Day**, sponsored by the Colonie Central H.S. RC, from 1300 GMT Feb. 10 to 0100 GMT Feb. 11. Suggested approximate freqs.: 3920 3725 7275 7175 14.28 21.31 21.375 21.120 21.150 28.550. QSL to WAZDNR, Colonie Central H.S. RC, 100 Hackett Ave., Albany, NY 12205. **John Moyle Memorial National FD Contest**, VK National FD, from 0600Z Feb. 10 through 0800Z Feb. 11. Though essentially a VK event, overseas stations are welcomed. A certificate will be awarded to the two overseas stations who make contacts with the greatest number of VK portable/mobile stations. Report promptly to the WIA, Contest Mgr., Box 638, Brisbane, Queensland, 4001, Australia.

11 **Frequency Measuring Test**, open to all, begins with a callup at 0230 and 0530 GMT Feb. 11. (Remember, this is the evening before, local time!) The periods for measurement start at

0237 (80 meters), 0245 (40 meters) and 0253 (20 meters); for the late run, 0537, 0545 and 0553, respectively. Each measuring period lasts 5 minutes. Submit your AVERAGES for each 5-minute period which will be compared with the umpire's averages during the same period (the umpire is a professional frequency measuring laboratory). Tell how many readings you took to form your averages. Approximate frequencies for the early run are 3512, 7075 and 14.118 kHz. Late run frequencies are 3534 7077 and 14.082 kHz. Your log must be RECEIVED by Feb. 22 to qualify for the QST report of the competition. WIAW will start transmitting the official readings February 23.

15 **WLAW Qualifying Run**.

17-18 **DX Competition** cw, p. 55 Dec.

24-25 **YL/OM Contest** phone, p. 99 Dec. **French Contest** phone, same basic rules as for cw shown on page 69 Dec.

MARCH

1 **W6OWP Qualifying Run**.

3-4 **DX Competition**, phone.

10-11 **YL/OM Contest** cw, **Worldwide VHF Activity Contest**.

16 **WIAW Qualifying Run**.

17-18 **DX Competition** cw.

19 **CWA High-Speed Qualifying Run**.

24-26 **BARTG Spring RTTY Contest**.

26 **WLAW Morning Qualifying Run**.

June 9-10, **VHF QSO Party**.

June 23-24, **Field Day**.



VHF QSO Party

(continued from page 64)

WN8MGO	4-4-1-B	WB9AXH	170-34-5-B
W8HR	2-2-1-B	W9DJI	152-38-4-A-B
WB1/8 (WA8s FLK MOA		K9BAG	72-18-4-B
WB8GZE)		K9HMB (+K8s BBN GMR)	
	7917-180-39-ABCD		29,870-377-71-ABCD
	Ohio	K9YHB (WA9s FID QHI IMC)	
K8LEE	12,750-255-50-AB		7668-207-36-ABD
W8KPY	6321-147-43-AB		Indiana
K8SUB	3570-119-30-A	K9UVI	4752-132-33-ABC
W8SAM1	3072-96-32-AB	K9ZNK	380-38-10-B
WA8PF8	3068-118-26-A	WB9AUI	280-35-8-B
K8YYK	2286-127-18-AB	WB8HC/9 (WB8s GEU GEW GEX GFA)	
K8ZE8	1340-53-20-ABCD		8316-189-44-AB
W8FEH	940-47-20-B		Wisconsin
W8MEM	624-48-13-A	W9DJI	1300-65-20-AB
K8UQA	620-31-10-D	WB9GRE	689-53-13-AB
W8JRN	238-34-7-AB	K9RIE	495-45-11-AB
W8IPT	153-11-5-B	WA9HCZ/9	374-34-11-B
WB8CI (+K3ZPT K8s ORT RRM YSD W8s WMH WXT WB8s LEX GMZ)	40,000-504-76-ABCD	W9DJI	112-15-2-ABC
WB8EL/8 (+WA8WLR)		WB9FUY	16-3-2-B
	3450-150-23-A	K9DKW (+WA9SRW)	
W8BI (WB8PW WAS2UQ)			7254-186-39-AB
	2064-86-24-AB		0
WB8NCA (+WB8s KQB NJI)			Iowa
	1584-99-16-AB	K9MST	4216-136-31-AB
WB8BZK (+WA8s RJF WGI)		W8MOQ	896-64-14-B
	1-1-1-A		Kansas
	9		1976-76-26-A
	Illinois	WA9VIV	574-41-14-B
W9YVF	2592-108-24-B	W8ZJY	40-9-4-ABD
W9JGV	2520-126-20-B	WB8DRI	
K9UYK	1890-105-18-B		Minnesota
K9DTB	1674-93-18-AB	W8OHU	1044-56-18-8D
WB9IQE	1302-62-21-AB	W8RLI	765-51-15-B
W9IVL	1148-82-14-B		Missouri
WA9QPM	700-100-7-B	K9TLM	24-36-80-28-ABD
K9FEH	670-67-10-B	WA9CNS	1250-50-25-AB
W9IFA	588-43-14-B	K9WYN	300-20-15-A
W9QOG	580-58-10-AB		Check Logs
W9DJZ	312-52-6-B		WA1LFA, W8HYD.
WB9HJL	309-56-6-R		
WA9KRL	295-59-5-B		
K9DNW	260-52-5-AB		
W9ABA	224-28-8-AB		
WB9JED	195-39-5-AB		



Operating News

GEORGE HART, WINJM
Communications Manager
ELLEN WHITE, W1YL
Deputy Communications Mgr.
ROBERT L. WHITE, W1CW; DXCC
GERALD PINARD, *Training Aids*

More on Getting It Right. Our lead items in the October issue of this column brought quite a response most of it disagreeing with the statements made. To disagree is anyone's privilege, of course. However, some of the disagreements reflected misunderstanding, and in case others had similar misunderstandings, which is probable, they ought to be cleared up. To the extent that any such misunderstandings were caused by ineptness in writing or in taking too much for granted, our apologies. Let's take the items one at a time.

. . . . And Pandemonium Reigned

As a whole, you'll find the 265,000 licensed amateurs in the U.S. a gentle people, filled with the milk of human kindness, thoughtful, helpful, considerate, self-sacrificing, cooperative and broad-minded (no, not *that* kind of broad!). But like that nice guy Dr. Jekyll who in a matter of seconds, after drinking a beaker of bad juice, became a horrible fiend, some of us forget our sane attributes as ham operators whenever we imbibe some DX juice and turn into maniacs — pushing, fuming and spitting at one another on the air.

When a piece of rare (juicy) DX comes along, some operators, in their mad desire to chalk up this new "country," forget themselves completely, and what do you hear? Bitter, angry exchanges, cursing, a total lack of consideration for anyone else and absolutely no cooperation whatsoever, like a bunch of wild animals clawing and snarling at each other, with all signs of good breeding and sanity obliterated.

A psychiatrist could analyze this strange behavior and perhaps could come up with a medical cure, but since I'm just a college prof I'm going to offer a simple common-sense suggestion:

"Dear Mr. Rare DX: When calling the USA, please firmly state which district you want to work first and then go 'round the clock' covering all ten districts. Absolutely refuse to acknowledge any operator who breaks in before his turn is called, and TELL HIM SO! Please do this for those of us, the vast majority, who still consider ourselves ladies and gentlemen."

DXing is to many of us the acme of ham radio excitement. Let's keep it that way with the application of common sense and just a little restraint. — K3FDL.

On the use of QRU, very little discussion. A few felt that Q signals should not have a negative meaning without the question mark, and that "somebody goofed" when devising this signal, but not much we can do about that. QRU? has asked a positive question and QRU has meant a negative answer for decades; we ought to be getting used to it.

The response to the use of R and "Roger" was a little more vociferous; again it was mostly agreement with the interpretation but disagreement that it should be this way, especially since everybody uses "Roger" as an affirmative. Common usage often dictates correctness, but in the case of R we can't seem to go along with this form of intellectual degradation — that is, accepting something as correct because so many use it incorrectly. Someone correctly pointed out that R is also used as a decimal or as a colon in time designations.

When we get to the "Morse" code, lots of argument. We were just passing along WINF's observation, which seemed to be borne out by ARRL's *Radio Amateur's Operating Manual*, page 29*. Sure, everybody calls it the International Morse Code — even FCC, even ARRL, even . . . , just about everybody. Some people (and QST, too!) just refer to it as "Morse." This makes old-time telegraphers shudder. Others carefully point out the differences between the American or Landline Morse and the Continental Code or International Morse. Everybody seems to have a slightly different concept. Our historian, WB6BBO (back at W3WRE by this time), who should know, carefully avoids the appellation "Morse" in her expose on the subject in the *Operating Manual*. Maybe she knows something we don't?

But we really caught it on the matter of ending signals, and we'll eat a little crow on this. Not much, just a little. We were talking about "ARRL Ending Signals," remember? These have been recommended since 1945 or so and have been widely distributed in ARRL literature. Most of our correspondents stated, quite correctly, that in ITU procedure AR means "end of transmission" and K means "invitation to transmit," so that, according to internationally accepted radiotelegraph procedure, AR K means, in essence, "I have completed my transmission and now invite you to transmit," and that there is nothing contradictory about that! We humbly agree. But after World War II, amateurs expressed an interest in devising some prosigns to be used at the end of transmissions to indicate to a

*You mean you don't have a copy? Better get one, only \$1.50 postpaid.

WIAW FALL-WINTER SCHEDULE (Oct. 29, 1972-April 29, 1973)

The Maxim Memorial Station welcomes visitors. Operating-visiting hours are Monday through Friday 1 P.M.-1 A.M. EST, Saturday 7 P.M.-1:00 A.M. EST and Sunday 3 P.M.-11:00 P.M. EST. The station address is 225 Main Street, Newington, Conn., about 7 miles south of Hartford. A map showing local street detail will be sent upon request. If you wish to operate, you must have your *original* operator's license with you. The station will be closed on Nov. 23, Dec. 25, 1972; Jan. 1, Feb. 19, Apr. 20, 1973. Please note that all times-days are in GMT. Specific operating frequencies are approximate and indicate general operating periods.

GMT	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
0000	.....	.....	.....	.....	RTTY Bulletin ³	.....	.....
0030	←-----	CODE PRACTICE DAILY: 10-13-15 wpm				-----→	.....
0100	.....	.....	.....	.....	CW BULLETIN ¹		.....
0120-0200 ⁴	.....	.....	3.7 Novice ⁵	14.080	7.080	7.15 Novice ⁵	3.580
0200	.....	.....	.....	.....	PHONE BULLETIN ²		.....
0205-0230 ⁴	.....	.....	3.990	50.120	145.588	1.820	21.390
0230	←-----	CODE PRACTICE DAILY: (35-15 wpm TThSat, 5-25 wpm MWFsSa)				-----→	.....
0330-0400 ⁴	.....	.....	3.580	.....	1.805	.....	3.580
0400	RTTY Bulletin ³	.....	.....	.....	RTTY BULLETIN ³		.....
0430	Phone Bulletin ²	.....	.....	.....	PHONE BULLETIN ²		.....
0435-0500 ⁴	.....	.....	7.280	3.990	7.290	3.990	7.290
0500	CW Bulletin ¹	.....	.....	.....	CW BULLETIN ¹		.....
0520-0600 ⁴	.....	.....	3.7 Novice ⁵	7.080	3.990	7.15 Novice ⁵	3.580
1400	.....	CODE PRACTICE ¹ (5-25 wpm MWF, 35-15 TTh)				.....	.....
1800-1900	.....	21/28 CW ⁷	21/28 SSB ⁸	21/28 CW ⁷	21/28 SSB ⁸	21/28 CW ⁷	.....
1900-2000	.....	14.290	14.080	14.290	14.080	14.290	.....
2000-2100	.....	7.080	7.290	14.095 RTTY	7.290	7.080	.....
2100-2130	.....	21/28 SSB ⁸	21/28 CW ⁷	21/28 SSB ⁸	21/28 CW ⁷	21/28 SSB ⁸	.....
2130	.....	CW Bulletin ¹		CW Bulletin ¹		CW Bulletin ¹	
2200-2230	.....	7.150 Novice	21.125 Novice ⁴	7.150 Novice	21.125 Novice ⁴	7.150 Novice	.....
2230	.....	RTTY Bulletin ³		RTTY Bulletin ³		RTTY Bulletin ³	
2300	.....	CPN ⁶	7.095 RTTY ⁴	3.625 RTTY	14.095 RTTY ⁴	CPN ⁶	.....
2345	.....	.....	CN ⁹	.....	CN ⁹	.....	.....

¹ CW Bulletins (18 wpm) and code practice on 1.805, 3.580, 7.080, 14.080, 21.080, 28.080, 50.080 and 145.588 MHz.
² Phone Bulletins on 1.82, 3.890, 7.290, 14.290, 21.390, 28.590, 50.190 and 145.588 MHz.
³ RTTY Bulletins sent at 850-Hertz shift, repeated with 170-Hertz shift; frequencies 3.625 7.095 14.095 21.095 and 28.095 MHz.
⁴ Starting time approximate. Operating period follows conclusion of bulletin or code practice.
⁵ WIAW will tune the indicated bands for novice calls, returning the call on the frequency on which called.
⁶ Participation in section traffic nets.
⁷ Operation will be on one of the following frequencies: 21.02, 21.08, 28.02, 28.08 MHz.
⁸ Operation will be on one of the following frequencies: 21.270, 21.390, 28.590 MHz.
 Maintenance Staff: W1s, Q1S, WPR.

WIAW CODE PRACTICE

35-30-25- 9:00 AM EST TTh 1400 TTh
 20-15 6:00 AM PST

WIAW transmits code practice according to the following schedule. Approximate frequencies are 1.805 3.58 7.08 14.08 21.08 28.08 50.08 and 145.588 MHz. For practice purposes the order of words in each line may be reversed during the 5-13 wpm transmissions. Each tape carries checking references.

Speeds	Local Times/Days	GMT
10-13-15	7:30 PM EST dy 4:30 PM PST	0030 dy
5-7½-10-13-20-25	9:30 PM EST SnTThS 6:30 PM PST	0230 MWFsN
5-7½-10-13-20-25	9:00 AM EST MWF 6:00 AM PST	1400 MWF
35-30-25-20-15	9:30 PM EST MWF 6:30 PM PST	0230 TThS

The 0230 GMT practice is omitted four times a year on designated nights when Frequency Measuring Tests are sent in this period. To improve your fist by sending in step with WIAW (but not over the air!), and to allow checking the accuracy of your copy on certain tapes, note the GMT dates and QST practice text (from the issue 2 months previous) to be sent in the 0230 GMT practice on the following dates.

- Jan. 8: It Seems to Us
- Jan. 16: Correspondence
- Jan. 19: League Lines
- Jan. 25: ARPS
- Jan. 31: World Above
- Feb. 5: YL News

casual tuner-acrosser the status of the transmission or the QSO, as the case may be. Rightly or wrongly, the following were adopted and have been ARRL-recommended procedure ever since:

- AR - I have just called someone, hoping to make contact, but contact is not yet established.
- K - I invite any listening station to call me or break in.
- KN - I am in QSO and do not wish to be called except by the station with whom I am in contact.
- SK - I am terminating a contact.

CL - I am closing my station and will not reply to any calls.

Operating Aid 14 (just ask, it's yours for a s.a.s.c.) explains this procedure, along with phonetic alphabet, time conversion chart and the RST system. They are also in the *Handbook and Operating Manual*. The ITU definitions, where there are any, still apply in general use as prosigns, but in amateur use as *ending signals*, they have the above connotations, so when you hear them after identification (exception: SK is used *before* identification) at the tail end of a transmission,

New A-1 Operators, Nov. 1972

WA9K GK W9IMQ DJ1TC DM2BPF
OK2PAE.

you will know whether the station you hear is ready to be called, is in the midst of a QSO, has just called another station, has just completed a contact, or is leaving the air. Isn't that useful? Some of our correspondents seem to think it is unwieldy and contrary to ITU prescribed procedure. If a majority think this, changes are in order. Meanwhile, can't we all use amateur procedure when we're operating as amateurs?

Awards. Seems we are getting a lot of suggestions for new awards, these days. Maybe it's time to re-examine the overall subject in the hope it will keep us from going "off the deep end." Awards are fine, if they represent a worthwhile accomplishment, but if the only reason we have them is because someone wants them, is this a good enough reason? Should we have awards just for the sake of awards, without any really substantial reasons for them otherwise?

The matter comes up because a sizable portion of your headquarters staff is now engaged in processing award applications and/or issuing awards already, and many suggestions for new ones are constantly being received and studied. Do we really need all the awards we now have? Do we really need the many more that are always being proposed? It is a sad fact of administrative life that, once you start issuing an award, it is very difficult to cease doing so; or, to put it another way, it is better to be cautious in the first place than to find yourself saddled with something only a small handful are interested in or can qualify for.

The original purpose of awards was primarily incentive. That is, BPL was to encourage traffic handling, RCC was to avoid stereotyped QSOs, A-1 Operator was to encourage better operating, code proficiency for better cw, etc. Not until comparatively recently were many awards created just because they gave amateurs something to do, and after a large number had done it (e.g., DXCC) a demand developed for awards for the awards-winners. Nothing creates a demand for services more than the successful or popular administration of a service, and when it comes to the awards business, your ARRL has been in it a long time.

Awards just for the sake of awards? We think not — or at least we must drop an old one for every new one. Awards to promote or encourage some worthwhile activity that will be a benefit to amateur radio? By all means. So when you suggest a new award, don't just say, in effect, you want it because you want it, or because you think it would be popular. Give a good reason why you think it would make amateur radio a better service to have such an award. Sure, your ARRL is responsive to membership wishes, but its primary purpose is to preserve and enhance the amateur service. This purpose is not going to be achieved if you make headquarters primarily an award-issuing entity.

WINJM.

OCTOBER CD Party - High-Claimed Scores

The following high-claimed scores are those received at Hq. by November 15. From left to right are shown the call, claimed score, number of contacts, number of multipliers and operating time.

- WA1PID

CW	W4OZF	101.680-	323-62-10		
WA5LES	263,500-	770-68-20	W8DQL	98,515-	318-61-7
W3IN	233,280-	723-64-17	W7TML/1	94,400-	320-59-9
WA2SRQ	229,450-	700-65-17	WA3RDU	92,110-	298-61-12
K4SXD	224,070-	673-66-19	K8KU (WB9E) (CV, opr.)	90,585-	297-61-9
W4NQA	218,085-	645-67-15	W7TML/1	84,700-	304-55-14
W7TML/1	216,745-	647-67-19	K3HXS	82,500-	272-60-8
K4AMC	213,510-	642-66-20	WA5VDH	75,400-	243-61-9
W6BIP	209,550-	628-66-20	WA2MPC	74,100-	254-57-7
WA9BWy/9	198,575-	607-65-19	WA9AUM	72,960-	253-57-7
W2FVS	188,760-	567-66-16	WA1PID	63,840-	224-57-11
WA9AUM	173,580-	520-66-12	WA4JQS	60,770-	200-59-4
WA2WLN	173,100-	570-60-20	W3IN	60,500-	215-55-7
W4UQ	168,960-	505-66-13	WB6ZVC	60,320-	201-58-7
W1AX	164,775-	500-64-10	K4FU	60,085-	194-61-10
W9AQW/8	160,335-	509-63-16	WA0YAK	58,500-	195-60-14
WB5BHN	159,250-	486-65-13	W0BWT	57,460-	215-52-6
WB8RPY	155,000-	500-62-18	W4NQA	57,230-	190-59-8
W4OZF	154,940-	503-61-14	W5QNY/VE3	55,220-	189-56-7
W7GHT	141,240-	422-66-14	K6QPH	54,590-	200-53-7
WA1PID	137,340-	433-63-9	W7GHT	54,000-	200-54-9
K7NHV/7	136,960-	421-64-11	WB4QFH	53,300-	198-52-5
W5QNY/VE3	134,540-	430-62-12	K4BAI	48,175-	200-47-10
WA2MPC	131,100-	432-60-11	WA1NLD	47,000-	200-47-
WA6JVD	130,020-	390-66-15	VF1ASJ	46,575-	203-45-14
WA0WEZ	129,930-	420-61-8	W6DKQ	42,665-	161-53-9
K6KCB/5	127,050-	385-66-17	W1AX	42,585-	160-51-5
WB4RUA	126,315-	396-63-16	W5QZG	41,820-	150-52-5
W8ONK	125,375-	380-65-12	WB6DZV	40,810-	147-53-1
WA2AFL/4	123,220-	399-61-14	WB8AYC	39,250-	153-50-5
WA1QHU	121,830-	387-62-17	W9KXK	38,340-	139-54-11
W6NKR	117,000-	353-65-12	WB4WCM	36,990-	131-54-7
W5RUW/4	115,595-	375-61-8	WA5FTT	34,450-	126-53-7
K1IUS	111,510-	373-59-19	W5RE	33,600-	133-48-4
WA0VDX	110,400-	341-64-8	VE5JJ	33,480-	121-54-12
W3GRM	109,740-	349-62-11	K9LUN	33,250-	128-50-7
K2KIR	107,970-	359-59-7	W2FVS	33,000-	140-44-5
WB4OMG	103,395-	332-61-9	K4T7N	32,880-	137-48-7
K3HXS	102,885-	357-57-15	WA3JLG	32,800-	157-41-20
W3ADE	102,300-	323-62-14	WA3GAY (WA3LMY, opr.)	32,390-	153-41-10
W9YB (WB2RKK, opr.)	101,561-	326-61-4	WA0MLE	31,000-	118-50-4
W8DQL	100,800-	315-63-7	W6DGH/2	30,100-	133-43-7
WA5VDH	100,050-	342-58-8	WA1KVI	30,000-	150-40-12
			WA4FTW	28,350-	131-42-3
			KZ5GW	28,200-	114-47-8
			K9GEL	27,600-	116-46-10
			W4YZC	27,140-	111-46-6
WA0TKJ	149,820-	450-66-15	WA1PHF (WB2CHO, opr.)	26,660-	108-48-7
WA5LES	145,920-	451-64-18	WA6CYP	25,970-	104-48-4
WA9BWy/9	137,475-	419-65-14	WB2OYV	25,160-	131-37-11
WA1QLS	112,000-	400-56-19			
WA2SRQ	103,300-	345-60-12			

NOVEMBER 11 FMT RESULTS

The November 11 Frequency Measuring Test brought in a total of 68 entries representing 1081 individual measurements. Entries received after the announced date of November 22 are not listed (that's the day WIAW started carrying the results of the test). The umpire measured frequencies for the early run at 3526.631 and 14101.500 kHz. No measurement was obtained for 40. The late run checked out at 3550.430 7046.235 and 14058.677 kHz.

Apologies for the goof in the October announcement. Inadvertently your editor picked up the incorrect GMT period. (As W8BU says, it only proves we're human!) Hopefully, the WIAW announcement at the erroneous times alerted the crew to the correct schedule.

Interested in an appointment as an ARRL Official Observer? If so, check with your SCM (see page 6). Plan now to participate in the February 11 FMT. Full rules Operating Events, this issue.

HONOR ROLL

This top listing is the standing of the frequency measuring leaders. In consideration of the minimum possible error due to doppler and other unavoidable factors, we credit as of equal merit all those reports computing 4/10ths parts per million (or higher) accuracy. A participant must submit a minimum of two measurements to qualify for this listing.



DX CENTURY CLUB AWARDS



Radiotelephone listings follow the general-type "New Member" and "Endorsement" listings - October 1-31, 1972

New Members

KR6IX	212	HS1ADX	123	JA2DNA	109	SM5RN	106	VE3ACU	103	YU1NPF	101
PY2FTQ	195	9Q5PA	121	K1WVX	109	WA2ROA	106	DK6EW	102	IA1EVM	100
W3FUM	160	JH1MPX	119	WA9RRN	109	K81FK	105	K0HL/LR	102	K6KBL	100
F5TL	145	W2QXA	119	EA7KF	108	SM7ECX	105	KP4DM/5	102	K6KO	100
I7TGT	137	DJ4TE	116	JAI1MQM	108	WB2MAN	105	DK3FS	101	WB2GFI	100
WA8MHW	134	K6RK	114	K5IZM/4	108	K9MWA	104	VE7UM	101	WB4LLT	100
JA5EYV	126	VO1EJ	114	SWIAU	108	WB9BJO	104	WI1XI	101	WA5PWW	100
DJ4TJ	123	YU4EJC	112	K6VL	107	OK2BLI	103	WA2CCR	101	WA7MCK	100
										4X4VF	100

W2UBJ	212	W2CUC	171	DL8XL	120	F3IJ	108	W7CUJ	104	K4BKF/6	101
WA3PCC	204	PY2FTQ	141	WB5DLX	120	I6PFI	108	W2LF	103	WA6WWC	101
W2PIX	202	I7TGT	175	I2ZUW	119	YV5DTH	108	WB6AUQ	102	F3LT	100
DL3VD	200	WA8MHW	134	K6RK	113	SWIAU	108	WA0WSS	102	F5SH	100
KX6EJ	197	SM6OD	132	HM1EJ	110	W0YVA/4	106	5B4ES	102	WB9ETQ	100
WA9WMI	182	JA3LKB	125	W9EJ	109	EA7AD	105	K2GBC	101	9Y4MH	100

Endorsements

In the endorsement listings shown, totals from 120 through the 240 level are given in increments of 20, from 250 through 300 in increments of 10 and above 300 in increments of 5. The totals shown do not necessarily represent the exact credits given but only that the participant has reached the endorsement group indicated.

W4LYV	340	W9DE	280	WA8TDY	240	W2GTL	200	K2GBC	160	W3DS	140
SM5BCE	325	WA9LZA	280	WA9SLD	240	WA4LDM	200	K7EQM	160	W5LTY	140
SM0AJU	320	ZP5CE	280	JA1HRQ	220	WB45UJ	200	VE3GJH	160	W6GRY	140
SM0CCE	320	DL7EG	270	JA3BG	220	WB4UYD	200	W1HV	160	W7GYP	140
K6GLC	315	VE4SK	270	JA3BT	220	W5UNF/6	200	WA2VDA	160	W9TXF	140
SM6AEK	315	WB2NDU	270	JA3KWJ	220	W6LV	200	WB4TUP	160	YU2CBM	140
JA7AD	310	W4CRW	270	K67KA	220	W9VVB	200	W5IB	160	CE3YO	120
K5LIL	310	DJ4PI	260	K6WD	220	H8LC	180	WB6WOA	160	JA1QER	120
WAHA	310	KL7MF	260	W7DH	220	K3CNN	180	WA47BPS	160	K3RFB	120
JA1DFQ	305	W2CUC	260	K8UHB	220	K4ZYU	180	K8EJN	160	K3ZOL	120
K2LGI	305	W3BRB	260	K9ZXG	220	K8QYG	180	W9FVD	160	VE3BVD	120
OH2QQ	305	W5HCJ	260	W3NNK	220	VE3BHZ	180	W9KDX	160	V72FO	120
WA8ZOF	305	DK1YK	250	W4KJL	220	W2NYU	180	W0HHB	160	W1RFV	120
WA9NUQ	305	U1AND	250	W5KHP	220	W2ZO	180	DL7DX	140	WA1EVX	120
DK3PO	300	K5FKD	250	W8GOC	220	WA2DHF	180	HB9AAH	140	WA1NCK	120
OZ1LO	300	K9WJU	250	WA8CIA	220	W5IRG	180	K1DEX	140	WA1OIO	120
VE3GMT	300	W2URJ	250	WA8GPX	220	W8MXO	180	K4ELV	140	W3UI	120
WA3IUV	300	W3LB	250	DK3FD	200	W9POC	180	K6UQO	140	W3ZBW/4	120
WA4FTW	300	HB9KC	240	F3CB	200	WA9AUM	180	KGZMB	140	WA4RTX	120
DL1MD	290	JA1AAT	240	K6UJS	200	WA0TLT	180	K9GSG	140	WB4OXD	120
K2AGZ	290	K6SDR	240	K9GEL	200	CR6E1	160	KP4DLW	140	WB4SXX	120
W5DL	290	OK2DB	240	K0BEA	200	DJ2IW	160	SM4FMO	140	WB4UKA	120
W6MUM	290	SM3BNV	240	K0ZXE	200	EA3NA	160	SM6BZE	140	W5AEEM	120
SM6CJK	280	SM7ACB	240	KA2AI	200	I2CZQ	160	W1RML	140	W5LUGE	120
W7LZF	280			KG6AB	200	JA3MGX	160	WA2EXP	140	W6QFF	120
W8CFG	280									WB6EJV	120

W5HE	315	WA3HGV	290	JA1AAT	240	JA9BMG	300	K7GEX	180	WA3RCE	140
EA7GF	310	GL1MD	280	KZ5JF	240	KL7MF	200	LU2CF	180	W5SCBJ	140
KH6BB	310	W8CFG	280	W4BFR	240	W1IYN	200	OK2DB	180	W6LV	140
LA7Y	310	JA1DFQ	270	W6TTS	240	W1CCS	200	VE3DGX	180	W6PHN	140
HR1KAS	305	ZP5CE	270	W9DE	240	W2OVC	200	WB2EZU	180	WA9ROU	140
W21XA	305	W6A0I	260	WA9SLD	240	W3NNK	200	XE1CI	180	JA1ANG	120
WA9NUQ	305	CR4BS	250	I1BRN	220	WB45UJ	200	JA3MGX	160	JA6GDG	120
I8YRK	300	VO1CU	250	SM7ACB	220	W7LZF	200	VE3GJH	160	K7TIC	120
SM6AEK	300	WA5TYU	250	W1M2B	220	W8GMX	200	W9MBQ	160	K8RRQ	120
VE3GMT	300	W9LAA	250	W2GA	220	W8SET	200	WA0HZP	160	WA4NRE	120
WA8ZOF	300	DK1YK	240	DK3PZ	200	CT1ZW	180	HB9BR	140	W8NPF	120
DK3PO	290	DL3VX	240	FY7AE	200	I1AND	180	WA2VDA	140	WA9YEW	120
										W0HRY	120

W4QN W4VWS W5FMO WA5NYY W5QLO W6CBX W6RQ W0HII W0HIVL W0MDL K0RPH W0WHE W0WNY.

In the following tabulation, error percentage can be determined by moving the parts-per-million decimal point (the figure shown in parentheses) 4 places to the left. Class I OOs must demonstrate an average accuracy of better than 71.4 parts per million. Class II OOs must show at least 357.2 ppm.

(.6) W1PLJ W4AAD K6MZN, (.7) W2AIQ, (.9) WA8MHC, (1.0) K2RZT W9VOX, (1.2) W0PIY, (1.6) K9BGL, (1.7) W9GJI W0BF, (2.0) W8GRG, (2.3) W6FR, (3.0) W9MTT, (3.5) W9KQ, (4.5) W5OS, (4.8) W6ME K0RJS, (5.4) KV4HW, (5.8) VE3FVV, (6.2) W1DDO, (7.1) WA4YVQ, (7.4) Ireland, (8.7) WA3JSZ, (8.8)

K4JK W5PDC, (9.5) K6EC, (10.1) W7FIS, (10.3) WA5SUF, (13.7) W4HU, (14.1) WA1BE, (14.3) W3ADE, (15.1) K0AZJ, (15.4) W1AYG, (15.9) W3BF K3LPP, (16.2) WA9VDJ, (17.0) K0TCC, (18.1) WA1PHF, (19.0) WA1LNF, (24.0) K2LGI W3GN, (27.0) W3FA, (31.0) WB4MLI, (31.1) W9WYB, (31.9) W4WQ, (36.3) W9GF, (42.4) WA3JHB'S, (45.3) W2BIJ, (63.0) WA0ELO, (76.3) W6AIF, (93.7) WB9AHJ, (181.8) K1EPL, (733.2) WA4JQS, (2016.8) Ratiff.

FMT Feedback

Please note that the September FMT Results, shown on page 121 of the November issue, should show K6EC at 3.3 ppm. Nice going, Ev!



Station Activities

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, Roger E. Cole, W3DKX - SEC: WA3DUM. RM: W3EEB. PAM: WA3GSM. PSHR: WA3GSM 63, K3KAJ 56, WA3DUM 44. K3NCL and John Dean, Jr., took 1st place in transmitter hunts at First State ARC in Wilmington and Mavericks ARC in Dover. Runners-up were K3JRX and WA3PCC at Wilmington and WA3JWY at Dover. W3FEG is heading his Winnebago for Fla. and will witness the Dec. Cape Kennedy Moon Shot enroute. E3KAJ is chasing DX with a tri-band quad up 35-ft. WA3HGV needs 3 confirmations to make 300 DXCC and is adding a two-element 40-meter beam to the antenna farm. WA3IID is concentrating on Africa on 21.355. WA3CDV and W3IUO are back on the air after hospital sessions. With increased QRM because of time changes, effective use of RF and Audio gain controls will help receivers give their maximum selectivity. DTN QNI 154 (36 diff.), QTC 38/35, DEPN QNI 36, QTC 8/6. Traffic: WA3GSM 177, K3KAJ 66, W3DKX 39, W3EEB 26, WA3DUM 23, WA3IID 19, WA3HGV 12, W3GTZ 8.

EASTERN PENNSYLVANIA - SCM, George S. Van Dyke, Jr., W3HK - SEC: W3BFF. RMs: W3EML, K3BR, K3MVO, K3PH, W3CDE. WA3AFL. PAMs: K3BHU, WA3PLP. OBS reports from WA3AFL, W3ZNM, WA3KFT, K3BHU, W3CBH, W3ID, OVS reports from W3CL, WA3KFT, WA3PCS. OO reports from K3NSN, W3BFF, K3RDT, W3FTG, W3ID. PSHR: WA3JGM, K3OIO and WA3QOZ. BPLs: W3CUL, W3VR, W3EML, K3NSN and WA3QOZ.

Net	kHz	Operates	QNT	QTC	RM/PAM
EPA	3630	7 P.M. Dy	348	297	K3BR
PTTN	3610	6:30 P Dy	139	65	WA3AFL
PN	3960	5:30 P M-F	693	537	K3BHU
EPA&PTN	3917	6:00 P Dy	452	175	WA3PLP

The time change didn't bother any of the nets! W3EML says TCC traffic up a little but could stand a lot more. WA3JGM looking for more traffic so how about originating some fellas. WA3ATQ digging in for a hard winter in the Poconos. WA3BSV was awarded life membership in Penn State ARC. WA3JQLG has his SB-102 fixed and is looking for the gang late at night on 80. RF Hill ARC scored second place in 5 transmitter class. WA3JMN has a Fax net going on 6 meters and looking for more interested hams. 50.7 MHz. Traffic reports are up but news reports are down. How about letting me know what you or your club is doing so others can read about it. Hope you all had a very Merry Christmas and a Happy New Year. Traffic: (Oct.) W3CUL 2390, W3VR 948, K3NSN 810, WA3QOZ 654, W3EML 517, WA3JGM 380, K3PIE 246, WA3MQP 168, K3BR 114, K3OIO 108, WA3ATQ 54, WA3AFL 42, WA3KWU 40, WA3CFU 36, K3BHU 34, WA3SEI 33, WA3LWR 30, WA3PHQ 26, W3VAP 17, WA3BSV 16, W3ADE 14, W3CBH 13, WA3QLG 13, W3OY 12, W3CL 11, WA3CKA 10, W3BUR 8, K3MVO 8, WA3PLC 7, WA3KCM 6, K3KTH 6, W3CDB 5, W3BNR 4, W3LC 4, WA3BJQ 2, W3OML 2, W3EU 1, W3FTG 1, W3ID 1. (Sept.) WA3CFU 6.

MARYLAND-DISTRICT OF COLUMBIA - SCM, Karl R. Medrow, W3FA - SEC: K3LFD. MDD: W3EZY. MDCTN: W3FCS. MFPN: W3LDD. The Antietam Radio Assn. elected WA3CUC, pres.; WA3QON, act.; W3SQA, secy. and bag man. The Md. Termites start the season off with K3QMD, pres.; WA3CPP, vice-pres.; K3LFD, secy.; WA3HEN, keeper of the purse. The American Univ. is starting a club, AUARC, with WA2QON, pres., reports WB2NOM/WA3TOM, veep. They plan big activity in Public Service. K3LFD gave the live wire Md. Mobilizers the scoop on ARSPC. WA3EOP is a proud MEPN topper. His MYL is about to become a WN. W3FZV is another indoor antenna man doing big in the CD parties and a mean NCS on MDD. W3BHE is looking forward to his OBS job for Western Md. The Gaithersburg hamfest was almost 2500 strong with

WN3RCI and WN3RIY helping at the ARRL booth. It was a pleasure to see you at Gaithersburg. Look for Cumberland Novices on 3745 week nights. W3FCS doing lots of patching as a work diversion. K3BA is CVTN Net Mgr. WA3IV is an overworked fone NCS. W3OKN is at full speed on those NE nets. W3ZNV is a regular on the late MDD session. W3QU made it through Oscar 6. Says it is about like working Tibet on 20 on Sat. afternoon. WA3RDU was pleasantly surprised at his election to Dir. MEPN. W3JZY reports the first snowfall on his mountain top. WN3RCI has half his year goal of BPL cards behind him. WA3LQV shows big activity on 40 meters. W3ABC has WG3SFC all set for Apollo 17. W3CDQ maintains regular sked with W4PPQ and takes her DX in stride. W3TN has power supply short licked. W3EOV looking for astrologers. WN3RY says that General is coming soon. W3LBC sold his sbs and yows cw forever. K2SSX/3 is getting trained at Pax River. W4RHM/3 is right with him in the same area. Nov. net activity had MDD report 53 sessions, QTC 160 and QNI 367. MDCTN had 43 sessions, 73 messages and QNI average of 12.3. The MEPN ran 82 messages, 81 informals in 21 meetings and with 230 check-ins. W3ADQ is a new OPS. WA3GKN showed his trailer at Gaithersburg. W3ZSR, W3DHS and W3GFC teamed up with all of us to get a zoning ordinance for Prince Georges Co. changed in favor of amateur radio. Traffic: (Oct.) WN3RCI 267, W3TN 201, W3FA 71, W3QU 71, W3OKN 65, WA3AFQ 55, W3FCS 54, WA3EKK 53, WA3MSW 48, K3BA 33, WN3RIY 33, WA3LOV 32, K3GZK 28, W3FZV 26, W3LDD 24, W3EOV 17, K2SSX/3 16, W3GRM 15, WA3IV 9, WA3EOP 5, W3ABC 4, W3ZNV 4, WA3RDU 3, W3JZY 2. (Sept.) W3ABC 13, W3HFX 2.

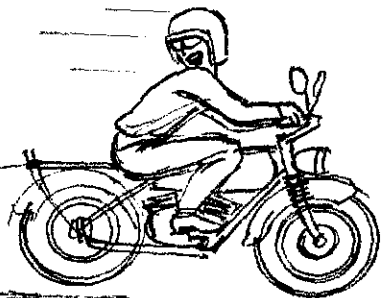
SOUTHERN NEW JERSEY - SCM, Charles E. Travers, W2YEP - PAM: WB2FJE. RM: W2II.

Net	Freq.	Time	Sess.	QNI	T/C	Mgr.
NIPON	3930	Su 6	5	97	32	WB2FJE
NJEPTN	3950	M 6	31	584	271	WA2EVH

The GCARC reports a successful fall parade in Woodbury, where the club sponsored a float whose theme was "Snoopy in QSO." Glad to welcome back WA2WLN. It is a pleasure to announce the appointment of WA2NKV as an OO. WA2CZA is a recent OPS and ORS appointee. You are reminded of the forthcoming SEI. Be prepared. If you are not a member of the Emergency program contact your SCM as soon as possible. There are appointments available for ECs as well as operators to man strategic locations as per direction from your EC. Your SCM or Sec. can assist you if you need help in this regard. Disasters of one sort or another strikes any time at any place. Do your part. Be ready and prepared to help. Traffic: WB2VEJ 223, WA2CZA 79, WB2UVB 62, WA2FGS 28, WA2BIX 22, WB2HMU 22, WB2FJE 17, W2ORS 14, WA2GBR 12, W2YPZ 8, W2IU 5, W2ZI 5, W2II 4, K2JJC 4, W2KGM 4, WA2WLN 2.

WESTERN NEW YORK - SCM, Richard M. Pitzeruse, K2KTK - Asst. SCM: Rudy Ehrhardt, W2PVI. SEC: W2CFP. To clarify the new scheme of reporting traffic - all traffic reports sent on the air should be sent to W2PVI, the Asst. SCM. If you mail your report on a Form 1, mail it to me directly. This has worked real well the first month and I hope it can continue. To clarify a couple of other points - if you make PSHR, you must send me the breakdown (or if on the air, send it to W2PVI) as well as the total PSHR points. Appointments are now renewed with a neat little sticker, it is NOT necessary for you to mail me your certificate. But please let me know IN WRITING when your appointment becomes due for renewal. If you would send an SASE along, it would be a great labor saving device and would save Hq. some postage. I will NOT renew appointments automatically. It seems to me that if you are interested in keeping your appointment you could at least send me a note indicating same once a year. W2QBB reports anyone looking for his first CD party score, would do better looking from the bottom up. W2RUT received his ESS certificate. W2MTA tells that NYS cleared 416 messages with 883 check-ins for Oct. WN2EDN has a new Hy-Gain vertical. K2HWI celebrated his ARRL Life Membership with a Yaesu FT-101. WA2CEA also has ARRL Life Membership. WA2OMN reports the Cayuga County RACES drills are the 3rd Tue. of each month at 7 P.M. local on 147.27. W2DSS celebrated his 80th birthday. K2CC says that RTTY now is a reality at Clarkson. W2VRS has a new beam on 20. W2EMX built an eight

K5RTA says...



"The Drake TR-22 is A TOUGH LITTLE RIG..."

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Gentlemen;

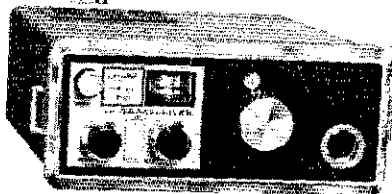
Just have to drop you a note and tell you what a tough little rig the TR-22 is. I have been using mine mobile in the car and on my motorcycle and portable at the office.

Yesterday, I had it strapped to the luggage rack on the motorcycle and was working motorcycle mobile on the way to work. Unfortunately, I took a new road that turned out to be rougher than anything I had previously been on with the radio. I suddenly caught sight of the TR-22 in the rear view mirror bouncing along the pavement behind me. I was doing about about 40 MPH and was dragging the TR-22 by the mike cord. I drug it for at least a block before I stopped.

The carrying case was pretty torn up and the antenna was snapped off right at the case. I returned home and hooked it up in the car and it works like it always did.

The TR-22 certainly lived up to all the expectations I had for it after owning the TR-3 and RV-3 for many years.

Gene C. Berrier



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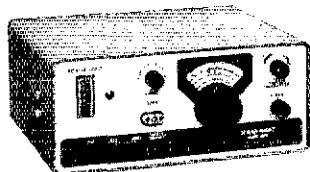


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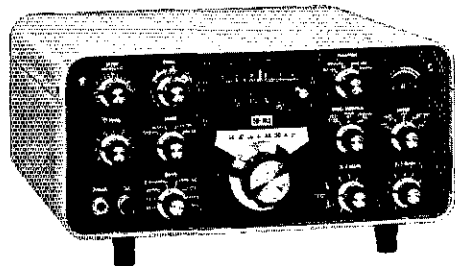
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A high-performance 3-band CW transceiver covering the lower 250 kHz of 80, 40, and 15 meters. 75 watts input for novice class, 90 watts for general class. Provisions for VFO transmitter control with Heathkit HG-10B 80-2 Meter VFO. 25 lbs.



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World's most wanted rig. 180 watts PEP SSB, 170 watts CW. Front panel selection of built-in 2.1 kHz or optional CW crystal filters. Solid-state LMO. 0.35 uV receiver sensitivity. Fixed or mobile operation with optional Heathkit power supplies. 24 lbs.

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- New 2½-Digit Multimeter
- New economy 30 MHz Frequency Counter

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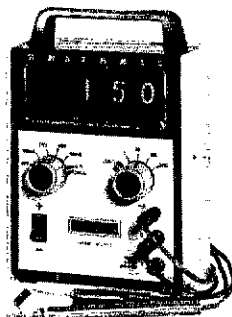
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NEW IM-1202, 2½-Digit Multimeter...\$79.95*

A compact, solid-state multimeter with digital readout — and priced for the average ham. Has four overlapping ranges to measure voltages from 10 mV to 1000 V on DC (either polarity), 10 mV to 700 V rms on AC, 10 uA to 2.5 A on AC or DC current. Five resistance ranges measure from 1 ohm to 2 megohms. Front panel polarity switch reverses inputs without changing lead. 6 lbs.



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Gives you 1 Hz to over 30 MHz counting on a full 5-digit readout with 8-digit capability. The lighted overrange indicator makes misreading virtually impossible. Stable time-base circuitry assures accuracy better than ±3 ppm from 22° to 37°C. Diode protected J-FET gives improved triggering over 100 mV to 150 V input range. Solid-state circuitry mounts on one large board. Another accessory you can count on — from the hams at Heath. 6 lbs.



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digit frequency counter. WB2CZC has been attracted to 160 meters. WN2FHX worked LU, TF and 40 states on 40 meters with 40 watts. WB2STM puts out a good mobile signal from Gowanda. W2RUF/Perk has a few ears this month. Ex-K2EUJ is now K4ECH in St. Petersburg, Fla. Congrats to WA2TOX on his new General. WN2AKY is giving his new ticket a workout. One of the top RTTY stations of WNY, W2TKO has moved to Boston. WA2GRP has been transferred to G-Land. BPL this month goes to WB2NRK. Traffic with the * indicating PSHR: (Oct.) WA2ICU* 403, W2OE 261, WA2ELD* 206, W2RUF* 191, WB2EEX* 102, W2MTA* 90, W2RQF* 67, W2FEB 63, WA2PUJ 55, W2RUT 45, W2MSM 44, W2FZK 34, K2JBX 29, WB2VYM 28, K2CC 27, WA2TLB 26, W2EAF 24, WA2HSB 18, W2DBU 15, W2GLB 14, K2KTK 12, WA2LUF 12, K2IMI 11, WA2ABL 10, WA2OMN 9, W2PVI 7, K2DNN 5, WB5EHD/2 3, WB2NRK* 171, W2FR* 157, W2HYM 144, WA2AYC* 118. (Sept.) WN2FHX 1.

WESTERN PENNSYLVANIA - SCM, Robert E. Gawryla, W3NEM - SEC: W3KPI. PAM: K3ZNP. RMs: W3LOS, W3KUN, WA3IPU. WPA CW Net meets daily on 3585 kHz at 7:00 P.M. KSSN meets Mon. through Fri. at 6:30 P.M. on 3585 kHz. It is with deep regret that we record the Silent Key of W3LKR. The Etna RC of Pittsburgh announces the following new officers for the next year: K3HZL, pres.; WA3GJU, vice-pres.; W3TZW, secy.; WA3CHC, treas.; W3OVM, dir.; W3GXF, act. mgr. The Presque Isle ARC reports new officers of their club as follows: K3TUP, pres.; W3NGI, vice-pres.; WN3PUJ, secy.; WA3KKT, treas. The Steel City ARC also has new officers for the coming year as follows: W3SDV, pres. K3OYR vice-pres.; K3YVN, rec. secy.; W3YD, corr. secy. W3ZDW, treas. Congrats to WA3SLX on passing his General Class exam. SLX also is Editor-in-Chief for the Presque Isle ARC newsletter. It was also learned that the PARC code and theory classes have licensed over 70 hams in the last two years. Nice job. WA2ONT has been appointed traffic manager for K3CR, the radiotele station of the Penn. State Univ. ARC. W3CB is ex-W2QC. WPA’s gain and 2RN traffic net’s loss. WN3SZX is Net Mgr. of Old Boys Novice Net OBNN. W3NKM and W3LMO are busy chasing low band (80/40) DX for 5BDXCC. Good luck fellows. W3VEO is playing around with QRP and WA3GJU has a new 301.1 linear. Don’t forget to upgrade your class of license when you renew. Public Service Honor Roll for Oct.: WA3OQR 47, W3LOS 39, W3NEM 39, W3YA 34. WPA had 31 sessions, 400 stations QNI and handled 238 messages. Traffic: WA3OQR 227, W3NEM 170, W3KUN 164, W3YA 162, K3CR 154, W3LOS 111, W3CB 88, W3MJ 58, K3HCT 32, K3ZNP 23, W3ATQ 19, WA3IYA 18, WA3LDA 18, WN3SZX 16, K3SN 14, W3SN 11, WN3SVC 10, WA3PMI 6, W3IDO 2, W3LOD 1.

CENTRAL DIVISION

ILLINOIS - SCM, Edmond A. Metzger, W9PRN - SEC: W9RYU. PAMs: WA9CCP and W9PDI (vhf). RM: WA9ZUE. Cook County EC: W9HPG.

Net	Freq.	CMT/Days	Yrs.
IEN	3940	1400 Su	14
ILN	3690	0300 Dy	14
		2330	
NCPN			90
III PON	3915	1300 M-S	510
		1800	
III PON	3915	1430	
III PON	145.5	0200 MWF	14
III PON	50.28	0200 M	
ILNN	3720	0100 Dy	

W9AES assumed managment of the 75-Meter Interstate Single Sideband Net Oct. 1. A new chapter of the Quarter Century Club has been established in Bloomington, Ill. Contact W9CFV for further details. A reminder from W9HRY that the 9RN meets at 7:45 and 9:30 every night on 3640 kHz. Everyone is invited to check in. New Tech. is WB9KYM. W9EY is recovering from a broken leg and ankle. WA9MJJ and W9CYT are continuing regular 220 MHz activity in the Chicago area. W9LIW is enjoying a new Yaesu transceiver. The Lakeview Amateur Radio Assn. of Chicago is sponsoring monthly 6-meter hunts and WA9DBJ, WA9DDS and WN9GKM are Oct. winners. Contact WB9FRX for information. K9DRS is back on the air with a tribander on a 72-ft. tower. The 40-meter club is operating in Ill. and WB9HAD, WB9BSZ, WB9HYK, WB9IFE, WB9FMC, WB9FVG, WN9JIN, WN9JXN and WN9JVD are the active members. The Ill. Novice Net has just completed its first month of operation. This is a fine net to increase your cw and those interested should check in or contact WB9HEC or WB9GSS for details. WA9LFL, K9CGD, K9CSE, WA9LVB and WA9YHN participated in Third annual Downers Grove Youth Development Service Bike Rally. Our sympathy to families and friends of former W9AYO and K9RNG who recently passed away.



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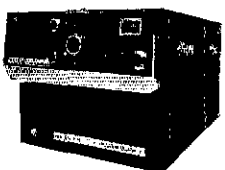
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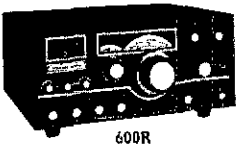
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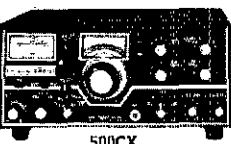
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W9AYO was an organizer of the Central Ill. Radio Club (Bloomington) and for many years was radio engineer for the Ill. State Police. K9HNG was known as Mr. RTTY and was known throughout the country as a great teletype authority. WN9KLV is a new Novice licensee. With the upcoming implementation of a daytime NTS (and most likely conducted on 2 meters) daytime operators are needed. Those who care to check into this new system are urged to contact WINJM or W9HRY 9RN manager. The WAS award was received by WB9KHK - all on cw. K9GDI, WB9DVV, WA9OVD and WB9FFC were elected as the new officers of the Northwest ARC. K9ZKN, WB9DXP, WA9PLL, W9BVM, W9FFP and W9PRN are the newly-elected officers of the Sangamon Valley RC, Inc., (Springfield). With this report I am completing my 17th year as your SCM. It has always been a pleasure to hear from you and to meet with an eyeball QSO and also to represent the League at your many functions. This I will continue to do so keep the mail coming in. Traffic: (Oct.) W9NXG 242, WA9ZUE 143, WB9FVG 128, WA9OBR 75, W9IXV 70, W9AES 65, WB9FHI, 47, W9LNO 34, W9OYT 34, WB9FLP 25, WB9HEG 23, WB9JFK 19, K9WMP 11, W9PRN 10, K9DQU/WB9AIF 6, W9TAL 6, W9QQG 5, WA9LHU 2. (Sept.) WB9HFG 94, W9OYL 48.

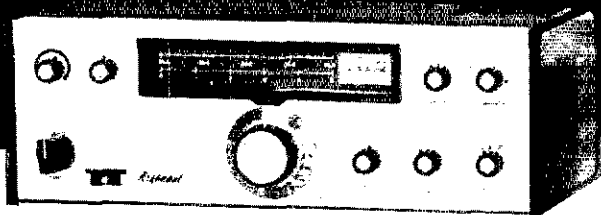
INDIANA - SCM, William C. Johnson, W9RUQ - SEC: W9FC. RMs: WA9EED, WB9EAY, W9FC, W9HRY. PAMs: K9KTB, W9HWR, W9HWR, W9PMT.

Net	Freq.	Time(Z)/Days	Tfc.	Mgr.
ITC	3910	1330-2300 Dy 2130 M-S	328	K9KTB
QIN	3656	0000-0300 Dy	124	WA9EED
IPON	3910	1245-2130 Su 2000 S	22	WB9AHI
IPONCW	3740	0000 Dy	38	WB9AHI
(PON)VHF	50.7	0100 M-W-Th	27	WA9ULH
(PON)VHF	50.2	0200 Dy	10	W9MIZ
Hoosier VHF			39	W9PMT

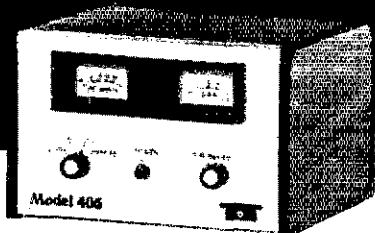
With deep regret I report the passing of W9GZH. IPON VHF SSB nets time 0000Z W-Th; 0400Z F-Sa; 0300 CW Su-M-F. WA9TJS reports the Clark County ARC provided 2-meter communication for the Jeffersonville March of Dimes Oct. 22. WA9OKK reports Madison Co. AREC Net had 3621 check-ins for the past year. Don't forget the Annual Lake County Banquet to be in Feb. 1973, for details contact W9EGQ. Indiana Repeater Council was hosted by the Michigan City ARC Oct. 15. The LaForte ARC elected WB9BSL, pres.; WA9ZDN, vice-pres.; WA9HHA, secy-treas.; WA9GOP, repeater tech.; WA9ZDN, editor. Hoosier Hill ARC held their annual Hamfest and Picnic at Spring Mill State Park Oct. 8. The 1st meeting of the Ind. Amateur TV & UHF Club had W9AI and W9BUQ as judges on Homebrew equipment. New appointments: WA9VDJ as OO; K9HDP, W9OWZ as ORS. The Red Cross mobile van is ready for operation with the call WA9LGO. Check your license for date of expiration. AREC membership is beginning to pick up in Marion Co. QIN Honor Roll: W9EI, W9QLW, WA9ED. All Ind. amateurs should contact their local Red Cross to let them know you are ready to assist in any emergencies. Amateur radio exists because of the service it renders. Traffic: (Oct.) WA9EET 226, W9FWH 154, K9KTB 103, W9QLW 72, WB9AHI 70, W9EET 69, W9BUQ 45, WB9KQ 38, K9HDP 38, W9PMT 30, K9RPP 30, W9HRY 26, K9HYZ 25, W9KWB 24, WA9OHX 24, K9YBM 23, K9KFM 22, WA9ULH 20, WB9HOT 19, K9FZX 18, WB9BAP 14, K9CXY 14, W9DZC 14, WB9JJO 11, WB9EQY 9, K9DIY 7, K9ILK 6, K9RWQ 5, W9HWR 4, W9RTH 4, WA9AUM 3, W9COU 3, K9IQY 3, WA9TOU 3, WA9OKK 2, K9PNK 1. (Sept.) K9FZX 87, W9QLW 41, WB9BAQ 11, W9FC 7, W9HWR 5.

WISCONSIN - SCM, Joseph A. Taylor, W9OMT - SEC: W9NGT. PAMs: K9PHI, WA9OAY, WA9QKP, WA9PKM. RMs: W9UCR, K9KSA. Net statistics: WBSN QNI 1205, QTC 135; WSSN QNI 12, QTC 1; BWN QNI 467, QTC 326; WRN QNI 18, QTC 0. Oscar 6, the 2- to 10-meter repeater satellite is up and we have received several reports of successful results. WA9MCC worked Conn., Md., Calif., VE2 and 6Y5 through it. Oct. QST carries details of the Satellite. W9QYH has a new beam rotator up and is piling up an impressive DX record. The members of the Green Bay Repeater group are busy putting together a new 144 MHz and 450 MHz machine which promises to cover most of the northern part of the section. K9UTQ is constructing a new shack in order to make room for new Jr. Op due in Mar. K9PHI has a new HR-2A for mobile and will be on later with a new 2-meter base station. W9NRP reports 7 OBS for Oct. Sharpen up your traffic handling. W9CXY expects better year for holiday traffic. K9RIZ, EC for Manitowoc County sent in a nice newspaper clipping from the Manitowoc paper on a recent emergency exercise in that county. Your SCM is happy to receive publicity and reports of this nature to forward to headquarters. I would also like to remind ECs to forward their monthly reports to our SEC, W9NGT. We had three sessions of several

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weather this month, most of the traffic was handled on the repeaters throughout the state. Traffic: W9CXY 297, W9DND 180, W9MFG 117, K9FHI 74, K9KSA 42, W9AYK 36, W9RZW 31, WA9OAY 27, W9NRP 24, W9KRO 22, W9GF 12, K9UTQ 6, WB9DAN 1, K9GSC 1.

DAKOTA DIVISION

MINNESOTA - SCM, Casper H. Schroeder, WA0VAS - SEC. KU 3LAV. RMs: W0ZHN, WA0YAH. PAMs: K0FLT, WA0HRM. With deep regret I report the passing of W0COA. WA0RRA has been appointed trustee for W0ZSW, the call at Assi-Heights in Rochester for Pico-Net. WA0VTZ now has 20-meter antenna. SP5ME visited various hams in area during his stay in the Twin Cities. WA0VB furnished transportation. Winona Radio Club starting novice classes. Traffic: (Oct.) WA0VAS 755, WB0CNM 197, W0BUC 170, WA0TFC 155, WA0GRX 123, K0ZRD 114, K0CSE 110, WA0VYB 107, WA0RRA 94, WA0YWA 91, WA0IAW 90, WA0VTZ 76, W0WFA 71, K0PZ 67, WA0NE 62, WB0DZA 56, WA0YVT 56, WA0YAH 50, K0FLT 45, WB0HOX 43, WA0RKY 39, WA0CCA 38, WA0KQU 29, WA0VUP 29, WA0ATX 28, WA0HRM 24, WA0MZV 23, WB0FMR 20, K0EDS 19, WA0LB 19, W9LON/0 15, K0GNI 15, WB0FMT 13, WA0VHX 12, K0ORK 10, K0ZBI 10, WA0ZVS 10, WA0YER 9, WA0JPR 8, K0MVF 7, K0SXQ 7, WA0YGE 7, WB0FBN/0 6, K0CCG 3, K0WXH 3, WB0CNE 2, W0UMX 2, K0ZXE 2, WN0GKH 1. (Sept.) W0BOB 14.

NORTH DAKOTA - SCM, Harold L. Sheets, W0DM - SEC; WA0AYL. OBS: K0PVG. OO: W0BF. RM: WA0MLE. 2-meter activity continues to be the point of interest with WA0UNA, WB0FDT on with new rigs. WR0AUI is a new Tech. licensee. WB4AYN/0 reports working on a surplus 2-meter rig and also reports some good DX on 10 and 15 meters. WB0AUB a new Conditional is operating with an NCX-3. WB0LOR is a new call in Newtown. W0ROE is upgraded from General to Advanced. Congrats. WA0DLB again is active with an HW-12. WA0VJT putting out a good signal with new antenna. WB0BPS has a new transmatch going. W0CGM has an 80-40-meter vertical in operation. We hear that W0CPS is going ssb with a new Swan 500CX. WA0MLE and WA0ELO continue to do their stuff on TEN checking in 32 and 21 sessions respectively. The NDCW net has been extended to operate Mon.-Fri. 3748 kHz at 2150 CST. More are participating all the time. WA0AAD, WA0HUK, WA0UNA and W0BF are helping as NCSS. Now that the fall work is done let me know of club and individual activities throughout the state. The YL WX Net is going but should pick up now that cooler WX is here. WA0WLP switched to a new Arctic Cat! K0PYZ reports new YL calls WN0LRJ and WN0TM. The Dakota Feedback ARC reports WN0TID at Park River and WN0ITE at Lankin. Congrats.

Net	KHz	CST/Days	Sess.	QNT	QTC	MFR.
Grain River	1990	0900 Su	5	74	3	W0CDO
PON	3996.5	0900 Su 1830 S-S	14	379	78	W0SJB
YL WX	3994	0730 M-F	22	280	241	WA0GRX WA0MND
RACES	3996.5	1750 M-F 1830	24	722	43	WB0ATI
ND CW	3748	2150 M-F				WA0MLE WA0RLO

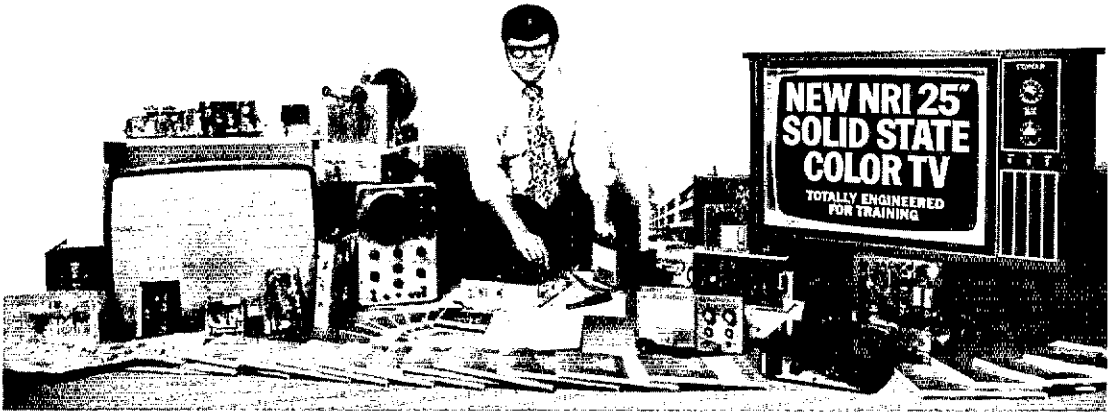
Traffic: WA0MLE 211, WA0ELO 128, WA0RWM 102, WA0SUF 55, W0CDO 22, WB0FDT 22, WA0SJB 16, W0DM 15, WA0JPT 9, W0BHT 5, WB0CCA 4, W0MXF 2.

SOUTH DAKOTA - SCM, Ed Gray, WA0CPX - SEC; WA0OVR. RM: WA0TNM. PAM: WA0YAK. Net Mgr.: W0ZWL, W0HOJ, WA0VRE, WA0YAK, W0NEO and WA0TNM. It is with regret we report that W0RRN former South Dak. SCM for many years passed away as a result of heart attack while on vacation. Tony also was responsible for countless individuals getting into amateur radio in conjunction with the Sioux Falls ARC for so many years. K0CXL has been making regular contacts with Antarctica for the past several months handling phone patch traffic into Rapid City. WA0DEM, W0DVB and W0NWK of Deadwood and Lead have started an amateur radio club in that area. They are working with a group to help them secure their amateur license and also are working on a repeater for the northern hills. Net reports: Morning Net - 495 check-ins and 66 formal; NJQ Net - 492 check-ins and 9 formal; Early Evening - 529 check-ins and 14 formal; Late Net - 1350 check-ins and 33 formal. Traffic: WA0UNE 130, W0HOJ 66, WA0ROK 20, W0DVB 3, W0OFP 2, WB0DAH 1.

DELTA DIVISION

ARKANSAS - SCM, Jimmie N. Lowrey, WA5VWH - SEC; WB5CEL. RM: W5EJ. PAM: WB5FDP. Because of changes in phone frequencies on Nov. 22 OZK has moved down 25 kHz to

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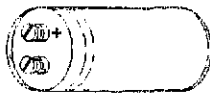
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3765 which will still be 10 kHz below the extra band on 75. Congratulations to WBSEWH on passing her General. Ex-W5VFW has obtained his original call of a few years ago and now is W5LRA. I hope every one had all of their antenna projects finished before cold weather and are ready for a winter of hamming. Little short on news this month since I have been out of the state for the past five months so more next time.

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Razorback	3995	0030 Dy	WBSEDP
OZK	3765	0100 Dy	W5EJJ
CAREN	146.34/94	0200 F	W5RXU
Ark Phone	3937	1200 M-S	W5LRA
Ark PON	3925	2130 M-F	W5OEO
Teenage	3995	0045 WF	W5SDWH
Ozark	3995	2330 M-S	W5ZKE
DX Info	3995	0045 T	W5SYM

Traffic: K6KCB/5 212, W5EJJ 72, W5SPD 20.

LOUISIANA — SCM, John R. Rivoire, KSAGI — Asst. SCM: Louis Muhleisen, Jr., WB5AEH. SEC: WA5OLU. RM: W5GHP. Nominations are open for La. section "1977 ARRL Member of the Year" award. WWRS is issuing awards for recruiting ARRL members. Drop a card to P.O. Box 927, Metairie, La. 70004 for complete details. BRARC's Greater Baton Rouge State Fair Amateur Radio Exhibit was a big success. Congrats to chmn. K5HHQ and the BRARC gang. Thibodaux ARC recently held a "Dutch Treat" supper. Congrats to W5WMU for his terrific score in the ARRL DX Test; to W5OB newly-elected 5th District Dir. for OOTC. JARC's "Oktoberfest 1972" was a terrific success. W5YYG is the new "Dots-N-Dashes" editor for GNOARC. Congrats to DDXA for fine effort in Oct. DX contest. WB5AEH recently presented ARRL affiliated club charters to DDXA pres. W5WFW and NOVHFC pres. W5KND. Congrats to W5FRQ for WAS and a 15 wpm endorsement. W5GNM recently graduated W5UCS in Alex. Whoever does the best job of sending me monthly news during 1973 will receive an ARRL La. Section Award (Wall Plaque)! Congrats to W5PVE new State Dir. for Navy MARS. W5VUH has installed at FT-101 in his El Dorado. W5SCIC has accepted a Central Area TCC appointment. W5LXI breaking in an R4B and 14XB. W5AQQB and XYL are in their new QTH. W5WMU reports his Nov. operation from VP1MU. W5SWBZ very active on LAN. W5CEZ spending most of his time on Army MARS. W5MI recently met with George Hart at the Central Area Staff meeting in St. Louis. Recent visits: OARC, DDXA. JARC's "Oktoberfest"; BRARC's Fair exhibit. Don't forget the La. QSO Party this month! LAN meets on 3.615 MHz cw 6-30 P.M. and 10 P.M. daily. Traffic: W5MI 130, W5GHP 100, W5SCIC 86, W5SWBZ 31, W5FRQ 28, W5CEZ 12, W5YN 6.

MISSISSIPPI — SCM, Walker J. Coffey, W5NCB — Asst. SCM: Gene McCahey, WA5JWD. SEC: W5FHH. PAMS: W5JHS, W5KEY, K5MDX. RMs: W5AZYW, W5BDEK. Appointments: W5FML, OBS; W5CAC, K5YTA, ORS; W5CAC, OPS. W5VJ got his spark rig on the air in 1910; W5BW, licensed in 1914, got his first ARRL appointment in 1915, signed in ink by Hiram P. Maxim. W5HJB and W5NCB were licensed in 1923, W5ANP in 1924 while W5AO, W5GS and W5WZ were licensed in 1926. We are so happy to see the increased participation in operating activities. Our muscle is with the club organizations. Why not organize one in your area? MSU Club is working toward affiliation, thanks to W5WUX. Please help us keep the Novice Net going by checking in with us. CGCLN is going strong under leadership of W5AZQP. W5FHH invites your participation in SET exercises.

Net	Freq.	Time(Z)Days	QNT	QTC	Mgr.
MTN	3665	0045 Dy	130	88	W5AZYW
MNN	3733	2400 MWF	25	4	W5BDEK
GC5BN	3925	0030 Dy	-	-	W5JHS
CG5CHN	3935	0100 Dy	1614	151	W5AZQP
MSPON	3970	2345 Dy	323	115	W5AGVOIS
MSBN	3987.5	0015 Dy	989	123	W5AUIH

Traffic: W5SBM 200, W5AZYW 161, W5EDT 76, W5NCB 67, W5AMZ 60, W5WZ 47, K5YTA 45, W5AGVO/5 34, W5EIN 33, W5BUE 19, W5BDEK 14, W5FHH 14, K5YPR 9, W5BW 5.

TENNESSEE — SCM, O.D. Keaton, WA4GLS — SEC: WB4ANX. PAMS: W4FPF, K4MQI, WA4EWW, WA4NEC. RM: W4ZJY.

Net	Freq.	Time(Z)Days	QNT	QTC	Mgr.	
TPN	3980	1245 M-F 1400 SSuH	31	1575	56	W4FPF
TSSBN	3980	0030 T-Su	26	1257	69	K4MQI
FTPN	3980	1140 M-F	21	485	24	WA4EWW
FN	3635	0000 Dy	29	241	127	W4YCV
TNN	3720	0000 Dy	20	166	44	W4B4UG
ETVHFN	50.4	0000 TThS	9	51	0	W4B4OG
TTVHFN	145.2	0000 WF	8	31	0	W4B4ZG
KVHFN	50.7	0100 T	3	10	0	W4B4MPJ

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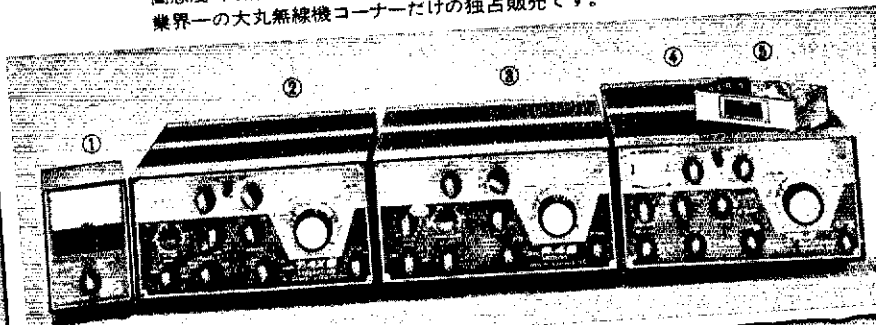
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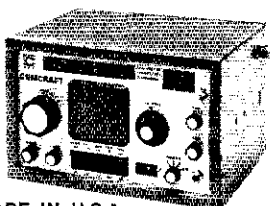


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	146.88					
TCN	3980	0200 Th	4	47	0	W4CYL
TPON	3980	0030 M				WB4BHZ

The CW Honor Roll for Oct.: WB4VZO, WB4USG, WB4YCV, WN4YDY and W4ZJY. It is again time to prove our capabilities in handling emergencies through the SET exercises to be conducted the last of the month. Let's all get geared up and improve our readiness as much this year as we did last year, get that emergency equipment ready early. The Tenn. Amateur Ten Meter Operator Society's new pres., W4EAY, will be taking office the first of Jan. I urge all amateurs in the Tenn. section to keep our Dir. Max Arnold, informed as to our wishes for his actions during this year, we have been lacking in matter in the past. Traffic: WB4YCV 340, K4CNY 134, WB4USG 120, W4ZJY 76, WB4YCV 65, W4OUG 59, WB4NIR 52, WN4YDY 36, W4WBK 17, WB4MPJ 7, WB4TPS 7, WB4ANX 6, W4CYL 5, K4UMW 5, WA4EWW 4.

GREAT LAKES DIVISION

KENTUCKY — SUM, Ted H. Huddle, W4CID — SEC: WA4GHO. Endorsements: K4AVX and WA4VZZ as ORSs; K4TRT and WA4AGH as OPSs; K4UNW and WA4JQS as OOs; K4AVX as EC; W4BEJ and K4MAN as PAMs. BPLs: W4BAZ, WB4WCM and WA4JQS.

Net	QNI	QTC	Net	QNI	QTC
KRN	389	29	KYN	328	286
MKPN	572	70	KNTN	268	85
KTN	1414	187			

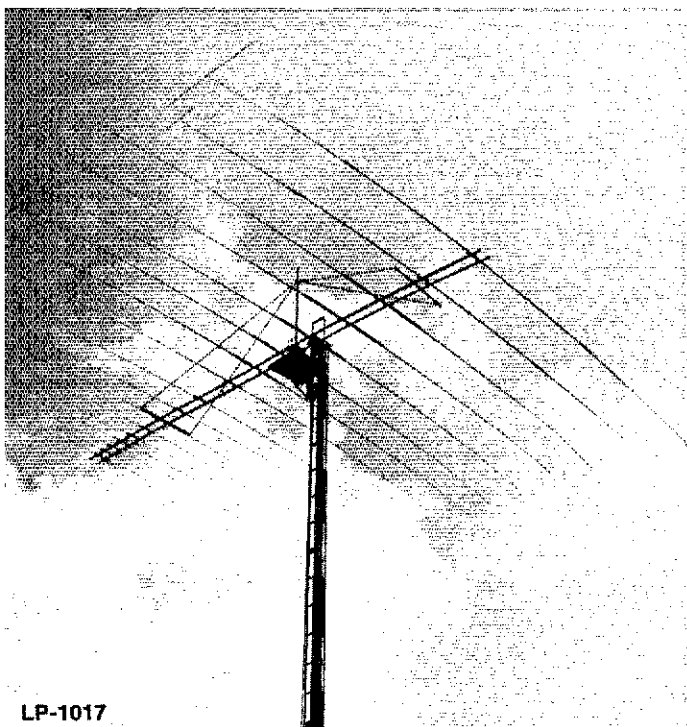
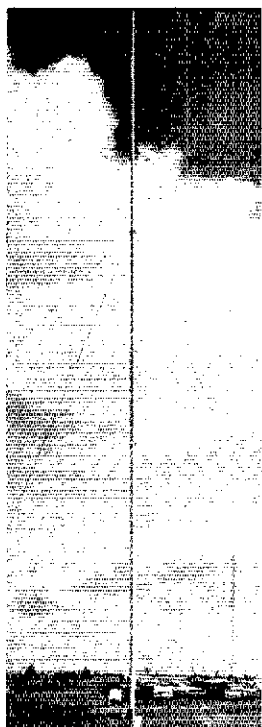
The annual pre-SET meeting will be Jan. 21 in Louisville at the Holiday Inn NE. Monitor the nets for further details. WN4BYO is a new Novice in Owensboro. K4UNW and K4TXJ now have emergency power. WN4ZMK has been ONLING KNTN mobile. DK8SQ visited the Kentuckiana RC at their Oct. meeting. SEC WA4GHQ urges eCS to get their monthly reports in early so he can get the Ky. report in for the OST ARPSO column. Traffic: WB4WCM 507, WA4JQS 357, W4BAZ 242, WB4ZSA 144, W4CID 80, K4MAN 66, K4UNW 63, WB4ALIN 61, WA4ENH 54, WB4IOD/2 51, WB4AIN 49, WB4EOR 48, WA4GHQ 45, W4CDA 33, W4NBZ 23, W4OYI 18, WB4YAF 16, WB4REN 14, K4LOL 12, K4TXJ 12, K4AVX 11, WA4AF 9, K4HOE 7, W4IOZ 7, K4YCB 7, WN4ANN 6, WA4AGH 5, K4VAI 5, W4GKTN/4 5, WB4TZS 4, K4QHZ 3, WB4NYO 2.

MICHIGAN — SCM, Ivory J. Olinghouse, WBZBT — Asst. SUM: H. Peter Terml, WBKZB. SEC: WBMPD. RM: WB1YA, W8WVL, W8RTN, K8KMQ, W8GLC. PAMs: K8PVC, W8BKH, W8BHQ. VHF PAMs: K8AEM, W8WVV.

Net	Freq.	Time/Days	QNI	QTC	Seas.	Mgr.
QMN	3663	2300 Dy	1293	400	93	WB1YA
WSSB	3935	0000 Dy	739	88	31	K8PVC
BR/MEN	3930	2230 S/F	797	80	27	W8BKH
UPEN	3920	2230 Dy	667	47	33	W8BHQ
GLETN	3920	0230 Dy	984	131	31	WB8AXI
PON	3955	1600 Dy	890	302	31	K8LNE
PON/CW	3645	2400 M-S	150	25	25	VE3DPO
Mi.6M	56.7	0000 M-S	213	22	23	W8VXE
Mi.Nov.	3720	2230 Dy	42	10	15	W8BJAD

SW Mi. 2-meter, net held 5 sessions with 70 QNI and 2 QTC, W8CVQ Mgr. The SW Mi. 6-meter weather net held 4 drills with 60 QNI, K8ZWR Mgr. The Wolverine VHF SSB Net is building up with 3 states checking in. Oct. totals were QNI 53 in 5 sessions. Net meets Sun. at 0200 on 50.115 MHz. Regret to report as Silent Keys W8MB, W8VRY and W8PFO. New officers elected at MCRC — W8BFD, vice-pres. and W8BJFC, treas. New officers for MSUARC are W8VBV, pres.; W8AEV, secy.-treas.; W8ZAV, chief op. W8CTY has started Novice classes again this fall for SVARA. W8MQT is building solid-state QRP rig. K8QDZ in 2-meter am. W8BNY is new General at Hazel Park. K8ADL has new Advanced Class ticket. W8KUP is working 40 cw with an HW-16. W8LKL is now General Class. W8MGE is assembling an HW-102 and W8MFG is assembling an HW-101. W8BJJ has a new Advanced ticket and new OBS certificate. Amateur of the Month for P.O. Net is W8BDJS and the Special Award goes to W8FBG. Traffic: (Oct.) K8KMQ 345, W8WZF 322, W8BPM 216, W8BJAD 213, W8IBX 152, WB1YA 132, K8DYI 104, W8GLC 95, K8LNE 86, W8MO 84, W8ZB 81, W8TZZ 76, W8BVB 65, K8PVC 55, W8BPPY 53, W8SJM 49, W8NOH 47, W8BJP 44, W8WVL 42, W8BNV 41, W8KHB 41, W8BHO 40, W8FBG 38, W8LXY 35, W8RFP 33, W8BKW 33, W8BJJ 28, W8UJ 27, W8BZ 26, W8BDJ 24, W8FXR 21, W8OJL 21, W8RXT 21, W8WVV 21, W8BZ 21, W8OW 20, W8ACW 18, K8JED 17, W8BRT 16, W8BDJ 16, K8GXV 15, W8UFS 15, W8VXM 15, W8BHO 14, K8GOL 13.

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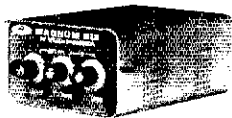
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OHIO - SCM, William E. Clausen, W8IMI - Asst. SCM: Kenneth L. Simpson, WA8ETX. SEC: W8OUU, RM: WA8WAK. PAM: K8UBK. VHF PAM: WA8ADU.

Net	QNI	QTC	Secs.	Freq.	Time(Z)	Mgr.
OSSBTN	1910	835	82	3972.5	1530/2100	K8UBK
BN	657	402	61	3577	0000/0300	WA8WAK
O6MtrN	483	54	31	50.16	0200	WA8ADU
OSN	277	64	31	3577	2325	WA8WAK
BN RTTY	132	37	25	3695	2300	W8SZU
NOVICE	56	9	14	3720	2245 SuTTh	W8BKKJ

BPLs for Oct. went to WA8ETX, K8NOW and WA8HQ. WB8EDU is the new EC for Marion, Hardin and Wyandot Counties. W8MGI has replaced K8DHJ as EC of Stark and Carroll Co. We regret to report that former SCM W8CIO joined Silent Keys. K8FHU announces the results of the Ohio QSO Party: Top three Ohio stations were W8UMD (Treaty City ARC with ops WA8TGX and W88GUE) with 19,864; W88AYC with 13,632; and W8CXS with 10,692. Out of state top three were W89FKL, 2520; WA0TKJ, 1768; and W3ARK, 1617. W8ETW had a visit from JA4IFQ, radio operator on a Japanese ship docked at Cleveland. Congratulations to new Extra Class W8GQD and new Advanced Class W8BAYC, Kent State Univ. ARC new officers are W8BDGW, pres.; W8NLVZ and K3RVR, act. mgrs.; W8BHTU and WA8RCN, stn. mgrs.; W8NLMC, secy.; K8ZFB, treas. Former BNR manager WA8YUB is now an ensign on the U.S.S. Ticonderoga. EC W8BAUK reports ARPSC members provided communications for the Galion Jaycees Oct. Fiesta Parade using the .25/85 North Central Ohio Repeater. W8MCR and W8CHT are on the planning committee for the new daytime eighth region net. K8ONA's Ham Antenna column reports the Buckeye Belles Net has moved to 3980, Tue, at 8 P.M. The Apricot Net provided mobile communications for the downtown Cleveland Christmas parade on Thanksgiving. The Treaty City ARC visited the RCA transistor plant in Findlay. Southwest Ohio AREC and the Queen City Emergency Net jointly provided communications support for the M.D. fund drive. New officers at Brookhaven H.S. (Columbus) ARC are W8BIUH, pres.; WA8WQW, vice-pres.; W8RJDJ, secy.-treas. W8EMK reports W8FQY is a Silent Key. OBS W8EDU, the Case-Western Reserve ARC, has new officers: WA8RXM, pres.; WA3MSZ, vice-pres.; WA9CTH, treas.; W8NTHV, secy. The Scioto Valley ARC newsletter reports the club, in association with the local CD unit provided "goblin patrol" and "bike-a-thon" communications in Chillicothe. Franklin Co. RACES, led by K8HF and W8JJE, also provided Halloween patrol communications. Central Ohio AREC was active in the Fall Phobia road rally and the Cancer Society's bike-a-thon. New officers of the Canton ARC are W8BDGO, pres.; W8BJVT, vice-pres.; W8GYR, secy.-treas.; W8OYV, editor. At K8OLK, Lancaster and Fairfield Co. ARC, new officers are WA8LTO, pres.; W8BJNT, vice-pres.; WA8NFT, secy.; WA8SSI, treas.; W8BECK, act. mgr. Contact your EC now and volunteer for the SET Jan. 27 and 28. Traffic: W8CLT 303, WA8ETX 249, K8NOW 249, W8PJM 227, WA8YLW 200, WA8HGH 182, WA2ASM/B 176, W8BKKI 160, WA8HQ 143, WA8WAK 141, K8MLO 134, WA8MCR 112, WA8DWL 110, W8BCKZ 107, WA8UPI 105, W8QZK 91, K8UBK 88, W8EJL 86, WA8ETW 85, W8RALU 77, W8JD 73, W8BAYC 67, W8DDG 55, W8BFXD 55, W8BBLH 53, WA8WPO 52, W8BFT 50, W8ENI 48, WA8VWH 47, W8BMKZ 46, W8GVX 45, W8WEG 45, W8SUS 43, WA8VKF 42, W8MOK 39, WA8SD 36, WA8BCX 35, W8REEZ 35, W8BJGW 35, W8BNRC 35, W8BKKV 34, W8BHUP 33, WA8NOQ 32, W8VIT 28, W8BHI 25, K8DHD 25, W8BKVU 25, K8BPK 24, W8CHT 24, W8BGR 24, W8URT 24, W8OE 23, WA8SS1 21, W8GOE 19, WA8YB 19, W8BEG 18, WA8YB 18, W8ARW 16, WA8BGE/8 15, W8BAJC 15, W8VND 15, W8LZ 14, WA8STX 14, K8IDI 13, W8NAL 12, K8CKY 11, WA8FCO 11, K8BYR 10, K8ZFR 10, W8ETU 9, WA8KPN 8, WA8MH 8, W8BDNZ 7, W8DYF 6, W8OUU 6, W8VYU 6, WA8MHO 5, K8BNL 5, K8GRA 5, WA8ZYE 4, K8ZYF 3, W8LAG 2, K8OYR 2, WA8LAM 1.

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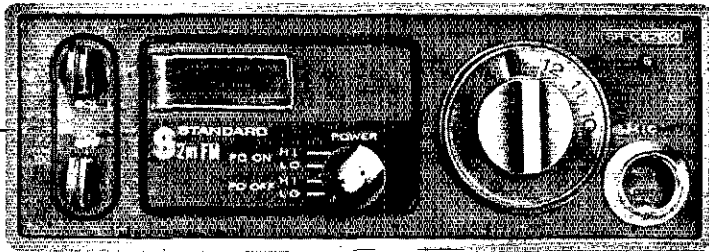
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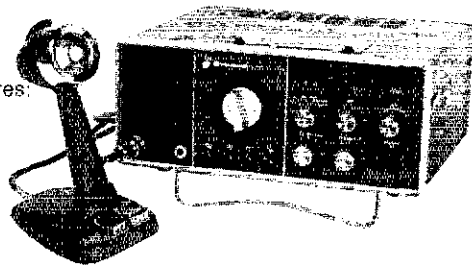
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County ECs for Dutchess and Putnam Counties as of this writing (Nov.). Get in touch with W2URP and fill out our County roster. Registrants for AREC see Dec. QST for your SEC's name. Overlook Mt. ARC new officers: K2HA, pres.; WA2RUW, vice-pres.; WA2SVH, secy.; WA2WGS, treas. Schenectady ARA had annual flea market and auction, with WA2AHC and WA2AZH auctioneers. Harmonic Hills ARC heard a talk on and tested members' hearing acuity; also held annual auction. Busy month! Westchester ARA heard W2HCW on his antenna farm which includes 75-meter rotary full-sized 40-meter three-element beam plus stacked arrays. Albany ARA featured K2ZEL on digital electronics devices and a new Swan 250-C and Clegg 22er in the station. Past pres. WA2TEQ talked to the Communications Club of New Rochelle on phone co. use of time shared carrier techniques. The Westchester Club Annual Dinner held on Dec. 12. Nice to have seen so many section appointees at HARC Convention in Tarrytown. Looking forward to more at Hudson sponsored National Convention in '74 celebrating 50 years of the Division. New calls are WN2QXZ, WN2DSY and WN2INI at Harmonic Hill; ex-W2SUC now W2AO: WN2HRK at Albany; Look for RM WA2FBI as NCS on ESS Net each Tue. To all appointees: Expect your 1973 renewal soon after you read this. Please mail monthly reports to SCM to arrive before 7th of month even if you send traffic through nets; latter sometimes comes through too late for inclusion in column. Will be looking for many of you during annual SET soon. Closing note to all - Happy 1973, keep the reports coming. Traffic: W2CNE 227, W2GPM 124, K2UYK 76, W2URP 29, WA2PJL 26, WB2VJB 26, W2SZ 16, WA2FBI 15, WA2WGS 15, K2SIN 11, WA2FMD 7, WB2AEO 6, WA2LIK 2.

NEW YORK CITY AND LONG ISLAND - SCM, Fred I. Brunjes, K2DCI - SEC: K2HTX. RM/PAM: WA2UWA. RM: WB2LZN. VHF PAM: WB2RQF. The following are major AREC nets; Join one!

Bronx	28.64 MHz	50.35 MHz	146.17 MHz
Kings	28.64 MHz	50.35 MHz	146.26 MHz
Richmond			146.88 fm
New York	29.50 MHz	50.48 MHz	145.62 MHz
Queens	29.50 MHz	50.20 MHz	145.62 MHz
Nassau	28.72 MHz		146.10 MHz
Suffolk (West)	28.73 MHz	50.46 MHz	145.59 MHz
			147.21 fm
			146.88 fm

Suffolk (East)

Note: Nets usually open 2000 local, Mon. It is with deep regret that I open the New Year with a Silent Key - W2F1, long time EC and Nassau County RACES RO passed away Nov. 12, 1972. He had contributed greatly to the successful emergency communications of Nassau Co., and will be dearly missed by all who knew him! WB2BYV reports the Smithtown AREC/RACES Goblin Patrol was a great success. WN2THV/8 is now a student at Case Western Reserve Univ. in Cleveland, Ohio. For those RTTY enthusiasts; WA2PMW and the Tu-Boro Radio Club are looking for exchange of contacts (and artwork). Operations are on 145.62 MHz at 1900 EST daily. W2JTP has constructed a 2-meter kw amplifier based on K2RIW's "Stripline Techniques" article in QST. Troops on Staten Island report much activity in Fax (facsimile) practically every night on 145.26 MHz. If interested in this latest adventure, break in and ask for information. WB2BYV has recently upgraded to Advance Class license. WN2CON has recently acquired a Heath HD-10 Keyer (guess it beats the of 'QLF). Recent appointments: WA2CXY, WA2CLB and WB2CHY as ORS; WA2CXY and WB2CHY as OPS; WA2CRK as EC Huntington Township. Congratulations to all! Our traffic nets need support! I know we have many cw operators in our area that are looking for the opportunity to do their part in satisfying the Public Service requirement of their FCC license; and this is an area where that can be accomplished. Of over 3500 ARRL members in the NLI section, there is a total of 35 amateurs who participate in our traffic nets, and provide the bulk of Public Service messages into and out of this section. Stations that have the capability of 2 meters along with 80 meters are particularly needed for routing traffic to the various towns and villages in the NLI area. If you can spare some of your valuable time to help out, check into any one of the section traffic nets (listed every other issue of this column), your presence would be much appreciated by all of us. Traffic: WB2LZN 258, WA2CLB 130, W2EC 120, WB2OYV 47, WB2BYV 37, WB2CHY 28, WA2PLI 22, WN2CON 16, K2JFE 13, W2DBQ 10, WA2LJS 9, WA2GLP 8, W2PF 8, WA2MDX 4.

NORTHERN NEW JERSEY - SCM, Louis J. Amoroso, W2ZZ SEC: K2KDO. RMs: WA2UOO and WA2BAN. PAMs: K2KDO and WA2FVH.

Net	kHz	Time (PM)	Days	Sess.	QNT	T/c.	Mgr.
NJN	3695	7:00	Dy	31	551	187	WA2UOO
NJN	3695	10:00	Dy	31	230	63	WA2UOO
NJSN	3740	8:15	Dy				WA2RYD
NJEPN	3950	6:00	Dy	31	584	234	WA2FVH
PVTEN	145710	7:30	Dy				K2KDO

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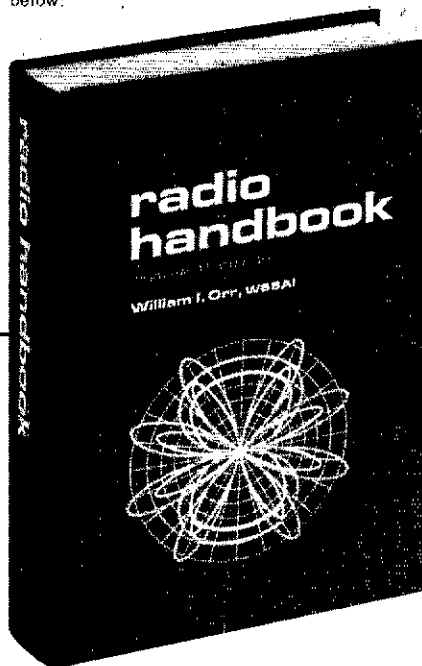
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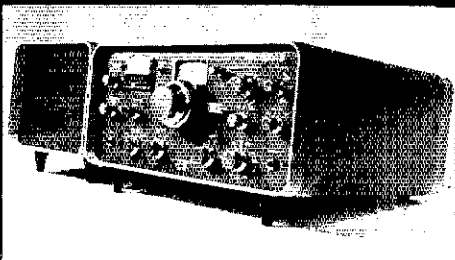
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New appointment: WA2RYD as ORS. Please note the new Mgr. and time for the Slow Net. We welcome all who wish to learn something about traffic handling to check into the above nets. All nets will be active during this year's SFT. We hope all NIN stations can find time for this exercise. The spring floods are a good enough reason for everyone to join in. This year's NIN meeting was held at QTH of W2CVW and was one of the most productive. A big thank you to him for the hospitality and fine food. W2ZEP was elected the new Net Mgr. for 1973. We wish him the best of luck. The job is not easy so let's all try to help out. The Phone Net meeting and dinner was also a big success thanks to WA2FVH. The two NIM candidates were introduced and everyone enjoyed their comments. WB2HGV has 81 countries worked with his SB-102 and HB-500-watt linear. WA2UDT again QRL with college. K2EOP reports he is converting his BC-221. WB2JWM was WN9GEM/2. WA2QJU having problems with his apartment antenna. WB2CST enjoyed the Oct. CD party. W2AJ is recovering nicely after heart surgery. WB2MOL passed the Radiotelephone 2nd. W2ABE chasing 40-meter DX. W2WHB reports he has 40 states worked with his 5-watt Tentec. WB2NOM is also WA3TOM. WN2AYE passed the General and is waiting to use his SB-102. WN2DWB, WN2HXS, W2GWA, K2VVI, WA2EZG, WA2-MXT, WB2CLJ, WB2ITX and WB2JFX were just a few of the many who participated with the CD units on Cabbage Night. The use of the 1m rigs during sessions this year were a big improvement over last year's gear and impressed many of the local CD brass. FB to all who helped. WA2SUT passed the Advanced, Extra and First Class Radiotelephone all in one day. WA2CFN is the newest member of the K2DEL group. WA2RIN is moving to W1-Land (Mass.). WA2ACJ moved to W6-Land. WA2CRF moving to Maywood. WN2DEP is now on 80 and 40 with his new antenna. The ARRL Hudson Division Convention was a big success and was attended by many from NNJ. We enjoyed seeing our former SFC, WA2ASM/8 who came in for the show. Happy New Year to all Traffic: WB2CST 316, WA2EUO 228, WB2DDO 140, WA2RYD 120, WA2UOO/2 94, W2ZEP 89, WA2SRO 81, WB2IKL/2 65, WA2EPI 60, WA2MJG 48, WB2CFT 42, WB2JWM 35, WA2CAK 34, WA2NPP 29, WA2FVH 26, W2CU 25, WA2CCF 19, K2OQJ 15, WB2COV 14, W2ZZ 14, WB2DGY 10, WB2KNS 6, K2EFT 60, W2WOJ 3, WA2QJU 2, W2ABL 1, WN2AYE 1.

MIDWEST DIVISION

IOWA - SCM, Al Culbert, K0YVU - SEC: K0LVB, W0MOQ, K0DDA and WA0ATY have been making successful contacts through Oscar 6 from their eastern Iowa QTH's. WB0AAM advises me that the new Des Moines area repeater, WA0LEW which is on 22/82 is an open, carrier access repeater. WB0EFG at Usage has a new receiver. Congratulations to K0VOM for achieving the score on the Sept. FMT which placed him on the Honor Roll; WA0EFN and WA0DYZ also had very low error readings. Ex-WA0OTF, now WA2TZO recently visited friends in the Mason City area. WA0RMK is back from his hitch with the Marine Corps.

Iowa 75 Fone 18307 3970 kHz QNI 1418 QTC 87
Iowa 75 Fone 00020 3970 kHz QNI 1096 QTC 43
TLCN (cw) 0030Z 3560 kHz QNI 168 QTC 60

Traffic: (Oct.) W0LCK 306, WA0AUX 135, K0DDA 124, K0AZJ 103, W0MOQ 50, W0DBG 27, WA0TAQ 23, WA0VZ 21, K0YVU 15, W0BAAM 14, W0IQ 9, K0LKH 4, W0FFNA 2. (Sept.) WA0NJS 8, WA0ODB 8, W0FFNA 6.

KANSAS - SCM, Robert M. Summers, K0HXF - SEC: W0BGX. PAMS: K0JMF, W0BCL. RM: K0MRI. VHF PAM: WA0TRO. Very sorry to report Silent Keys K0MRG, W0GU, ex-W0OZN and WA0JTM. Our sincere sympathy to their families. On the sick list is K0LPE, ex-SEC. W0PB monitoring several orbits of Oscar 6 reports calls heard on 10-meter down-link to AMSAT. The Hiawatha ARC provided communications (2-meter fm) for the Hiawatha Halloween Festival. K0KU reports 16 overseas or international type phone patches in Oct. W0CGOL appointed Novice correspondent for 1973 to YL Harmonics. W0RBO says the Ft. Hays State College RC meets 1st and 3rd Wed. of each month 7 P.M. and welcomes visitors. The grapevine reports W0NEE has recently made pappa notions of sorts - he brewed a new rig - pair 6146s. QKS SS now meeting a daily sked, 3735 kHz at 0200Z. Monthly report: QTC 50 in 18 sessions, 92 QNI. W0BQVR acting mgr. put out the first bulletin of QKS SS. Drop in on the net and get to know your future traffic handlers. W0CHJ reports mighty fine mobiling around, listen for his HW-12A. Other net reports for Oct.: K5BN 0030Z 3920 M-Sat. QNI 940, QTC 74, KPN 0645 A.M. CST M-W-F and 0800 A.M. CST Sun. QNI 274, QTC 22, KWXN 0001Z daily 3920 QNI 450, QTC 147. KEC 1900Z Sun. 2278 kHz QNI 32, QTC 0. The Mid-States Mobile Monitor Service 3920 kHz daily 0100Z-0500Z plus or minus, QNI 2503 serving 153 mobiles. 128 phone calls or patches and 134 QTC in 94 hours of operation. ARRC activity is up to 639 members and 38 local emergency nets; totals include 50 net sessions 621 QNI, 8

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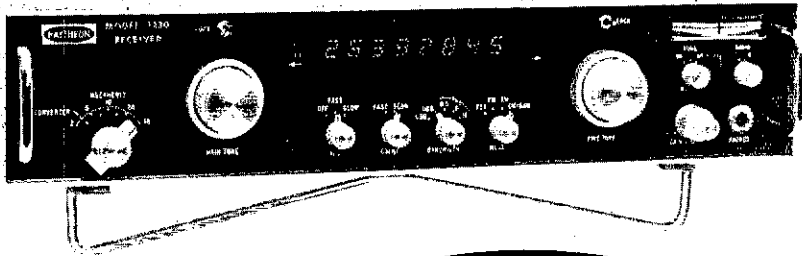
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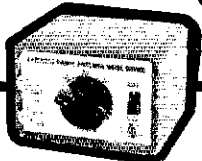
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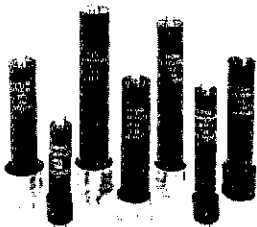


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HVK1144/575	1.5	15.0	18.0	125	60.00	
HVK1145/576	0.5	25.0	30.0	50	27.25	
HVK1126/673	1.5	15.0	18.0	125	60.00	
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HVK1139/866	0.5	10.0	12.0	50	13.00	
HVK1110/872	1.25	10.0	12.0	60	13.10	
HVK1138/872	1.25	10.0	17.0	60	17.80	
HVK1117/869	2.5	20.0	28.0	175	96.00	
HVK1121/8008	1.25	10.0	12.0	60	13.10	
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QTC. K00KCI reported 800 plus QSOs from the van at the opening of Mid Continent International Airport. W00BVC looking for skeds in the upcoming VHF QSO Party. He has a new converter and 25C watts all primed. QKS for Oct. QNI 448, QTC 184. Net meets daily 3610 kHz 0100Z and 0400Z. Traffic: W0HI 224, K0MRI 196, W0BGX 83, W0INH 81, K0BXF 80, K0JMF 79, W0MA 74, W0EAF 63, W0CHI 60, W0PB 49, W0UXI 38, W0BBI 36, W0GCI 36, W0GVR 36, K0ZHO 29, W0FSL 26, K0KU 26, W0N0QL 25, W0HTR 25, W0RBO 24, W0RYK 22, W0CZR 21, K0GII 20, W0DOX 15, K0FFC 11, W0NYG 11, W0FCV 10, W0LLC 10, W0VIR 9, K0LPE 6, W0NEE 5, W0BEV 4, W0HHT 3, W0OWH 2.

MISSOURI - SCM, Robert J. Peavler, W0BV - SEC: W0ENW. New appointments: W0JKF as ORS, W0YZZ as OPS, Class IV OO. Appointments renewed: K0BIX as LC, W0ITU, K0LCB as OVSs, W0TAA as PAM.

Net	Freq.	Time(Days)	Sess.	QNI	QTC	Mgr.
HBN	7280	1800 M-F	21	46.3	26	W0UPA
MNN	7040	1900 Dy	31	86	41	W0GBJ
MON	3885	0100 Dy	31	160	130	K0AEM
MO2	3585	0345 Dy	28	100	53	K0AEM
MoPON	3963	2300 M-S	26	721	72	W0TAA
MOSSB	3963	2400 M-S	26	953	66	K0HNE
MSN	3703	2200 Su	5	20	8	K0BIX
WEN	28.6	0130 M	5	27	5	K0BIX
PHD	50.45	0130 T	5	71	9	W0KUH

K0BIX reports that MSN will operate seven days a week beginning Dec. 1. Sessions will be conducted at 5 pm MWF at 7:30 P.M. and TTS at 5:15 P.M. and at 10 wpm on Sun. at 4:00 P.M.; all Novices and other beginning traffic handlers are invited. In the first year of operation, MSN held 84 sessions with QNI 341 and QTC 161; 35 different stations participated. W0WYJ received a Public Service Award for his work in the South Dak. flood disaster. The Lebanon High School is starting a club and needs a receiver (not necessarily operational but capable of being made so), keys, Novice crystals, and books and magazines for a library; all who can contribute please get in touch with Bill Wheeler, K0DFW, 272 Donna Lee St., Lebanon, Mo. 65536, or W0BV. Congratulations to K0DFW, who passed Advanced Class exam. Traffic: K0ONK 1556, W0BV 181, K0AEM 154, W0GJ 93, K0BIX 87, W0UUD 72, W0CXN 64, K0ENH 44, W0FQM 36, W0NUE 9, W0KUH 7.

NEBRASKA - SCM, V.A. Cashion, K0OAL - Asst. SCM: Velma Sayer, W0GHZ. SEC: K0ODE. Appointments: W0YVZ and W0GEQ as ECs; W0MW and W0GEQ as OPSs. Endorsements: W0DJO as OVS; W0HOQ and W0DJO as OPSs.

Net	Freq.	GMT(Days)	QNI	QTC	Mgr.
NSN I	3982	0030 Dy	1021	20	W0LOY
Neb. 160	1995	0130 Dy	36	3	W0CJB
NEB	3890	0215 Dy	121	22	W0TOD
NMN	3982	1230 Dy	1192	35	W0JUE
WNN	3950	1300 M-S	529	40	W0NIK
AREC	3982	1330 Su	226	1	W0IRZ
CHN	3980	1730 Dy	1240	21	W0GHZ
DEN	3980	2030 M-F	295	4	W0AUX
NSN II	3982	2330 Dy	1222	17	W0LOY

The 2-meter repeater at Norfolk no longer in operation. K10NEH made approximately 3000 contacts during State Fair. Box Butte Co. 2-meter AREC Net Oct. QNI 20, QTC 1. Lancaster Co. 2-meter AREC Net Apr-Sept. QNI 202, QTC 20. Douglas Co. 2-meter AREC Net meets Mon. at 8:00 P.M. Keith Co. AREC 2-meter repeater nearly completed 146.16-146-76. Note that 160-Meter Net resumed operation. Congrats to W0NBHT now W0BHT. Blue Valley ARC had public display and demonstrated ham equipment in Seward Oct. 29 to promote Nehr. Amateur Radio Days. W0KPA completed his SB-102 and is headed south for Winter - listen for him on 20 meters. W0LRK wintering in Casa Grande, Ariz. Sincere sympathy to K0HIY on loss of loved one. Traffic: W0TOD 189, W0LOD 96, W0SCP 74, W0QEX 73, W0IXD 44, W0PCC 35, W0CJB 33, W0HOP 26, K0OAL 14, K0DOW 12, W0MW 11, W0BOK 10, W0NIK 9, W0GEQ 8, W0LJO 8, W0SGA 8, W0DMY 7, W0FQB 7, W0GHZ 7, W0HTA 6, W0VYX 6, K0MUF 5, W0YGI 5, W0CAU 4, W0EEI 4, W0JH 4, W0LWS 4, K0ODE 4, W0QOX 4, W0GAK 3, W0YFR 3, W0YVZ 3, W0CWD 2, K0ECH 2, W0JKN 2, W0DJO 1, K0FRU 1, W0IRZ 1, W0JUF 1, W0OTQ/0 1, K0WPF 1.

NEW ENGLAND DIVISION

CONNECTICUT - SCM, John McNassor, W1GVT - SEC: W1HHR. RM: K1EIR. PAM: K1YGS. VHF PAM: K1SXF.

Net	Freq.	Time/Days	Sess.	QNI	QTC
CN	3640	1906 Dy	62	661	423
		2200			

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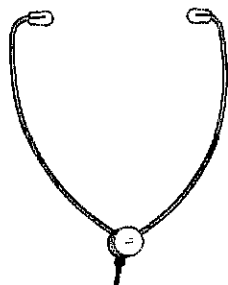
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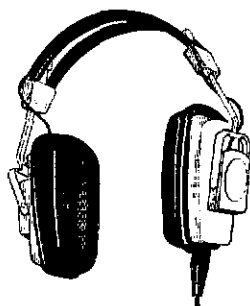
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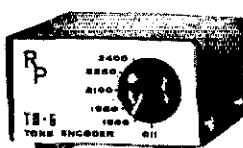
High QNI: CN - WIKV, WA1GFH, WICTI, K1EIR and W1MPW. CPN - W1BFY, W1GVT, W1MPW, WA1NLD, W1NQO and K1SXF. SEC W1HHR reminds ECs to read "Public Service Diary" in each QST to learn what others are doing - your comments on an Emergency Advisory Committee (Nov. pg. 83) welcome. Director W1QV held LO meeting at ARRL with all NE Divisions represented. Excellent participation in many topics of interest provided a better understanding of our problems and included suggestions for their solution. Auction season promoted by Meriden ARC and Tri-City ARC. Insurance City RC (28/88) originated a very good "Flea Market." Murphy's Marauders in high gear for '73 - contact K1GUD to join. QCWA final meeting for '72 held in Newington - more Conn. members wanted, contact W1GVT. ARPS-LO Bulletin to all appointees loaded with information, be sure to read and comment. K1PNB invites check-ins to NE Novice Net on 3720 at 6:30 P.M. Oscar 6 is in Orbit, who besides K1HTV is making the machine? Congratulations to: WA1FCM for Oct. BPL and K1EPW for 20 wpm certificate! Many new FCC Rules are now in effect - you don't have to like them but you MUST abide by them - please read and reread QST to keep up to date! Thanks to all for another wonderful year, 73, 88 and Happy New Year to All! Traffic: WA1FCM 279, W1EFW 264, W1EH 245, WA1GFH 211, W1MPW 112, WA1NLD 89, W1CTI 83, WA1GNN 78, W1KV 59, K1SXF 56, K1YGS 50, WA1NYU 49, W1GVT 43, WA1NES 26, WA1KID 25, K1EPW 18, WA1OPB 16, W1AW 15, W1DGL 15, W1RML 14, WA1NBS 13, WA1MTZ 12, W1QV 10, W1DQJ 7, W1HHR 7, W1CUH 5, W1BDI 4.

EASTERN MASSACHUSETTS - SCM, Frank L. Baker, W1ALP - SEC W1AOG received reports from ECs WA1DXI, W1BAB, K1DZG, K1ZUP, W1LE, WA1QAI is a new EC and RO for Rockland. W1AAT, WA1ETY, W1IKR are Silent Keys. W1AEC held an auction also a talk on transistors by K1CDM. W1AQC is going to SMU. W1ALK is home after a long trip all over the USA. W1ARCD is new in Braintree. WA1MYA and WA1OML have started at Eastern Mass. Phone Net on 3985 at 1800, 6 days a week and are looking for traffic. W1HOM put up a Ringo antenna for WA1EY for his 2-meter fm rig. K1DRB has the call KX6MN on Kwajalein. 1200 Radio Club has 2nd station call WA1RAK. WA1KJ has 2nd call WA1RAW. Ex-W9YZH retired from Raytheon. T-9 Club met at W1TJP's QTH. W4KT back to Ga. for the winter. W1HWM on many bands. W1BHD says "Skunk Hollow" repeater has gone to 31/91. W1UIR writes from ME, says he will be on 75. W1LE checking in on ECARS, also W1KBN running patches, and sbb cw, RTTY, 2-meter fm soon, writes WA1EUV. Vice-pres., South Shore Club held a meeting. WA1PJ on 80, 40 cw WA1KGS repeater. W1BGW on 2-meter fm, Nice publicity about W1ZLG getting some serum to a sick girl in Argentina. W1PEX, W1OJM made BPL. WA1OML has a rig for 2 and 6. WA1DJC is temp. mgr. of Clearing House Net on 3925 at 1100. K1OJO in Fla. WA1FNM received Public Service Award from ARRL. Sharon ARC publishes "Sara Monthly." WA1OTE has new rig. W1AQU now retired. W1AJK has Extra. WA1HF worked WB9KAX on 6. New officers of MITRS, W1MX, WA2BWW, pres.; WB0BST, treas.; WA8OCG, station mgr.; WA1MKE, secy.; WA1JZC, act. coord. New officers of Chelmsford ARC: W1NQAA, pres.; WA1OMU, vice-pres.; WA1EMN, treas.; W1DOM trustee; W1NQAB, secy.. K1ASB, officer-at-large. Theory and code classes will again be held. W1OJM moved to Hyannis. WA1PAZ has HW-101, SX-140. Endorsements: W1s BVV, MOJ, NZZ, K1s TRL, HRV, WA1DXI as ECs; W1DFS as OO; W1DOM, WA1NRY as OPSs; K4GGI/1 as OVS; W1AOG, W1AQV as OBS; W1AOG, K1JLF/1 as ORS; W1TZ as OO/OBS; K1PNB as RM/EC; W1AOG as SEC. New appointments: K1s YBS, UMP, W1KGU as OBS; WA1MXV as ORS/OPS also WA1MYA, WA1OTE as ORS. WA1QEI moved to Las Vegas. WA1MPZ moved to Fla. W1ZY on 160, W1DBH on 75. W1AAI busy at work but gets on some. W1QXX, K1OJO, W1AYG, W1JOT on 432. W1BW is receiving. Middlesex ARC had a Non-Hams Night. W1TZ on 6 some. Norwood ARC have classes for Novice and General licensees. Many groups out for Halloween duty. WA1NNL is asst. RM for EMN. Capeway RC met at W1RGH's QTH Framingham RC had a 6-meter transmitter hunt. Quannapowitt RA had an auction. Our section well represented at W1QV LO meeting at ARRL; all but one New Eng. SCM was present, along with many SECs, RMs, PAMs, etc. W1AAC sends regards to all from Fla.

Net	Freq.	Time/Days	QNI	QTC	MFR.
EM2MN	145.8	2000 M-F	118	88	WA1OWC
NEEPN	3945	0830 Su	99	9	K1EPI
6MCPN (Sept.)	150.85	1930 M-F	17		K1OK
EMN	3660	1900/2200 Dy	498	283	WA1MSB

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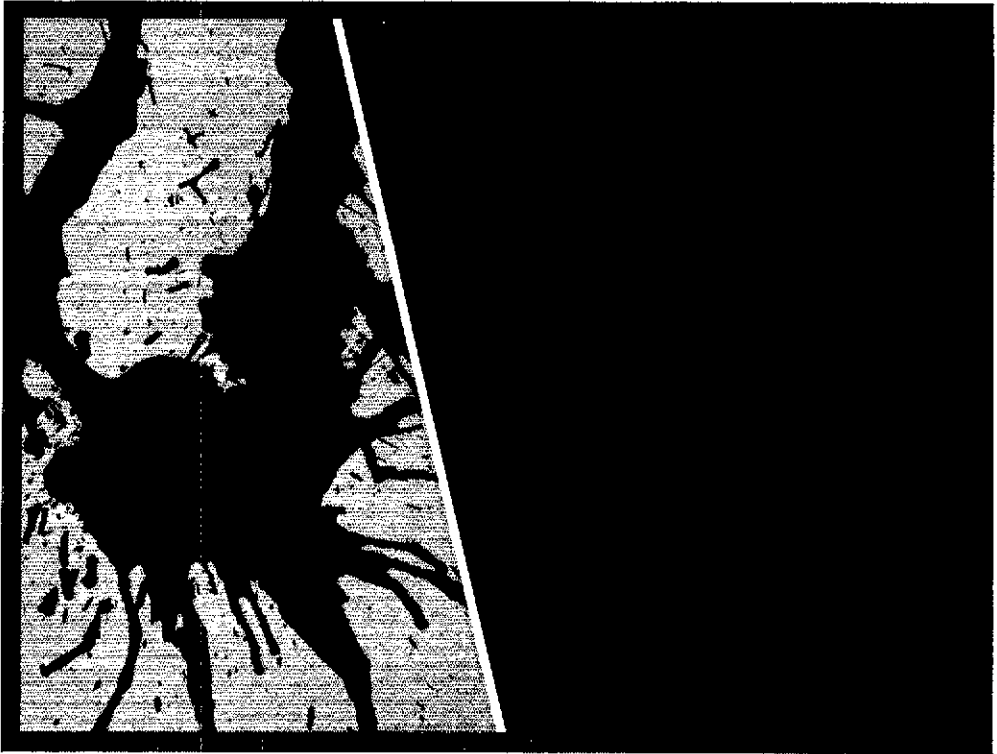
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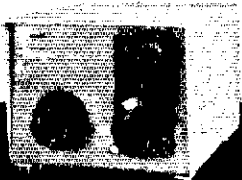
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Traffic: (Oct.) WIOJM 650, W1PEX 437, WA1MSK 217, WA1OWQ 110, WICE 81, WIEMG 68, WA1OML 63, WA1OTE 60, WAIMYK 43, K1PRB 41, WA1FE 29, WIUX 27, WAIMXV 26, WA1DJC 25, K1EPL 8, WA1MSB 8, WA1FNM 6, K1LCO 6, WA1NRT 6, WINJL 4, WA1PAZ 4, WIPL 2. (Sept.) WIOJM 287, WA1MSK 152, WICE 54, WA1OML 42, K1PRB 40, WA1OTE 34.

MAINE — SCM, Peter E. Sterling, K1TEV — SEC: K1CLF. PAM: WA1PEN. RM: W1BJG, W1SFS, W1EM and W1CTR were guests of W1AE enjoying a fine day on the island. WA1ETT Kittery, had an antenna raising and now is on working the different repeaters. The Maine Slow Speed Net has been reactivated by WA1QHU, ex-K1MZB. The net open to everyone, is on at 2215 GMT on 3726. We are looking for more people who would be willing to be NCS for one night out of the week. For more details contact WA1QHU or K1GUP. WA1CXY Auburn, was recently elected pres. of the Yankee Radio Club, Inc. W1GCB aided W1CTR greatly in getting Dan's receiver back into operation. New hams in Maine are WN1OZL, WN1OZP, WA1RAN, WA1RDH, WN1RDB, WN1RCK. Congratulations fellows! K1IVJ is slowly recovering from surgery. The Northeast Area of Barnyard reports 26 sessions, 725 check-ins, 0 traffic for Oct. K4RO/1 and W1MPP moved to Fla. for the winter months. W1AE aided W1SDA by supplying Cliff with a tube which is hard to get nowadays. I am sorry to report the passing of W1AQW, he will be sadly missed. I was glad to hear so many stations from Maine participating in the ME QSO Party. Traffic: WA1QHU 83, WA1JHT 19, WAINMW 5, K1TEV 4.

NEW HAMPSHIRE — SCM, Robert C. Mitchell, W1SWX. SEC: K1RSC. RM: W1UBG. Welcome to new hams WN1OZR, WN1RBE, WN1RBG, WA1RBM, WN1RBY, WA1RCF, WA1RCG, WN1RCU, WN1RDA and WN1RDP. Let's make this New Year a good one by supporting your favorite nets. W2BRV, 40 years on L.I. now is W1GME, Jackson with an FTDX-570 high gain vertical combo. W1JSD reports 10 meters still hot. K1ACL now mobile with 2-meter fm. Retired WIUT (ex-W7PN) and XYL are active from North Sutton on 20 and 15 cw. Neighbor W1OHA also enjoying much ham radio. K1GBI is a new NHVT Net member. W1BYS finds the repeater net very enjoyable. K1RSC's NHEPN reports 66 check-ins and 40 traffic. W1EVN is a big help with traffic between NHVT and the GSPN. WN1NHF working in N.Y. W1DXB has 275 countries confirmed. KG6JBS (WA1JTM) looking for NH friends on all bands. Happy New Year to all. Traffic: W1UBG 97, K1ACL 18, K1POV 16, W1EVN 7, W1SWX 4, W1BYS 3, W1MHX 2, WN1NHF 1.

RHODE ISLAND — SCM, John E. Johnson, K1AAV — Net report from R1SPN: 31 sessions, 395 QNI, 51 traffic. The Fidelity ARC, K1NQG, has a program for upgrading licenses from Novice to General as its primary objective for the year according to pres. WA1GGL. WN1NSM the vice-pres. and WN1QKD, treas., plan a trip with the club in a local broadcasting station. WA3EEC/I is active on 2-meter fm in his spare time while attending Brown Univ. WN1POJ is Net Mgr. for EASN but hopes to get his General license soon and wants to start a Rhode Island cw net. All interested drop a line to the SCM. The PRA, W1OP, plans an old timer's night in Jan. with a display and talk on old equipment. In Mar. the club will hold its annual auction. Traffic: W1YNE 66, WN1POJ 63, K1QFD 9, WA3EEC/I 1.

VERMONT — SCM, James H. Viele, W1BRG — SEC: W1VSA.

Net	Freq.	Time(Z)/Days	QNI	QTC	Mbr.
VTSB	3909	2300 M-S	516	157	W1ZCU
		1230 Su			
VTPO	3909	2700 Su	99	32	K1BQB
Carrier	3932	1400 M-S			
NHVT	3685	2400 Dy			

Welcome new amateurs WN1RCJ and WN1RCZ. W1YZZ and W1TJ have left for Fla. until Apr. Novice training net on 3720 M-W-F at 11:30(Z). Any interest in an RM for Novices? W1BRG and W1VSA attended League Officials meeting at Headquarters. WA1QOP is at new FB radio location on a hill in Plainfield. Traffic: K1BQB178, WA1QOP 52.

WESTERN MASSACHUSETTS — SCM, Percy C. Noble, W1BVR — SEC: WA1DNB. CW RM: W1DVW. UHF VHF PAM: W1KZS. WA1DNB reports a total AREC membership of 105 with 3 AREC nets with liaison to NTS. WMEN held 5 sessions with QNI of 39 and traffic 6. W1DVW reports WMN held 31 sessions with QNI of 165 and traffic 113. Top 5 in attendance: W1BVR, W1DVW, W1ZPB, WA1LNF, W1STR. W1KZS reports NOBARC AREC assisted N. Adams police during Fall Foliage Parade. Five net sessions were held with approximately QNI of 12 each session (thru Repeater K1FFK). WA1KFZ (10/70) now has 100-ft. tower and duplexer. A new WM phone net has now been started with WA1HTL acting mgr. — 4:30 P.M. on 3930. OO WA1LR sent out 29 cw notices. W1ZPB is active on WMN, RTTY and SSB DX. We are sorry to lose OT



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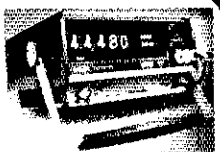
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W1EOB to W2-Land. Your SCM, SEC WA1DNB, RM W1DVV, ECs W1CSF and WA1LPJ, along with W1JH and WA1LNF attended the Director-called LO meeting at ARRL on Nov. 4. CMARA reports W1LZK and W1NIQKE are new members. HCRA reports with regret the passing of W1MBT. Seventeen members of the club are in AREC. MARC reports W1IPZ is recovering from an operation. Mt. Tara says EC WA1LPJ was the club speaker. NOBARC says KFZ, Spruce Hill is back on the air. The club reminds members to remember many people have receivers which can tune in repeaters. K1DEU is in the hospital. VARA says SEC WA1DNB and EC W1CSF gave a talk on Emergency Communications. WM AREC RA reports WA1PLS is the new secy. A great deal of new building has been done on the Mt. Lincoln repeater location. WA1DNB has appointed W1AEL as EC for Franklin Co. Traffic: W1BVR 95, W1DVV 76, WA1LNF 54, W1ZPB 51, WA1LPJ 16, WA1MJE 14, W1TM 12, WA1OUZ 10, W1STR 6, W1N1QHR 3, WA1FBE 1.

NORTHWESTERN DIVISION

IDAHO - SCM, Donald A. Crisp, W7ZNN - The Idaho P.O. Net is again meeting after a summer vacation. The net meets at 0130 GMT on 3930 kHz Mon., Wed., Fri. (local time). WA7PFL is teaching a code and theory class at Koonska. W7HZL was within 11 cycles per million in the frequency test. W7IUO has a new cw exciter. VE3DUN/W7 is teaching a code and theory class at Coeur d'Alene. K7NHV reports good response from a questionnaire sent to area amateurs regarding the formation of an Idaho/Montana CW net. K7MNZ, K7NHA, K7NHV and other Aberdeen amateurs managed to come in second in the 7th call area in the club 2-meter activity the FD contest. W7JFA was recently elected mgr. of the FARM Net. FARM Net report for Oct.: 31 sessions, 887 QNI, 175 visitor QNI, traffic handled. Traffic: W7GHT 236, WA7BDD 59, W7ZNN 11.

MONTANA - SCM, Harry A. Roylance, W7RZY - Asst. SCM: Bertha A. Roylance, K7CHA. SEC: W7TYN. PAM: WA7IZR. Gary and Macy finally shook the 6 calls and are now WA7UPI and WA7UJP. Butte Amateur Radio Club will have their annual officer installation party on Jan. 20. All are welcome for one nice party. Members of the Butte club are building the pip-squeek transmitters and receivers. Active repeaters in Mont. are Bridger Ridge 28-88, Butte 34-94, Helena 16-76, Missoula 34-94 and Mount Royal 34-94. Mont. Traffic net had 1000 check-ins, 44 pieces of formal traffic and 22 sessions. WA7IZR is moving the ham shack upstairs. W7DXO went south for the winter. W7CT has a new HR-212 2-meter rig. New RaACES frequency for Mont. is 3999.5. This doesn't leave much room for error. We have a lot of openings for appointments and if interested drop the SCM a note. Traffic: WA7JQS 109, W7LBK 77, WA7OBH 9, WA7MKP 7, WA7IZR 6.

OREGON - SCM, Dale T. Justice, K7WWR - SEC: W7HLF. RM: K7GGQ. PAM: K7RAZ. Section net reports; WA7GTJ reports for Sept. AREC net sessions 25, traffic 2, contacts 51, check-ins 311, maximum number of counties 13; Oct. sessions 27, check-ins 488, traffic 8, contacts 54, maximum number of counties 18. WA7KIU reports for the Sept. OSN sessions 27, check-ins 105, traffic 81. WA7NWV reports for the Oct. BSN sessions 61, check-ins 1022, traffic 101, contacts 184. New appointee WA7QAU as ORS. New Novice in Hillsboro WN7UMM, XYL K7WWR. New Life Member is WA7UBI, FARS secy.

Net	Freq.	Time(Z)	Days	MGR.
BSN	3908	0130	Dy	WA7NWV
OSN	3585	0245	Dy	WA7KIU
AREC	3908	0300	Dy	WA7GTJ
OEN	3980	0200	Dy	W7VTF
Nuclear	50.25	1730	Su	K7EPZ
AREC	145.35	0330	T-S	WA7EUQ

W7JWN heading south for the winter. New appointment W7UIU as OBS. The central Oregon Club has a new theory class. Traffic: (Oct.) K7NTS 152, K7OUF 88, WA7NWV 55, WA7MOK 25, W7IWN 20, K7QFG 20, K7WWR 14, W7ZB 14, W7DAN 12, W7HLF 11, W7LT 11, W7MLJ 8, WA7KRH 6. (Sept.) K7OUF 132, WA7IPS 53, W7IWN 30, W7LT 25, WA7QAU 24, W7DAN 18, K7GGQ 17, WA7MOK 17, K7WWR 10, WA7KRH 5. (Aug.) WA7QAU 30, WA7KRH 3.

WASHINGTON - SCM, Arthur Henning, W7PI - SEC: W7UWT. PAMS: W7GVC, W7MCW. VHF PAMS: K7BBO, K7LRD. RM: K7OZA. New appointments: W7AKT as OO, W7ZIW as ORS. Regret to report K7IAL a Silent Key.

Net	Freq.	Time(Z)	QNI	QTC	Sess.	MGR.
WSN	3590	0245	352	195	31	K7OZA
NSN	3700	0300	362	113	31	WA7OCV
NWSSB	3945	0230	1067	60	31	W7SVV

K7OZA appointed RM succeeding W7GYF who resigned. Don will maintain activity in NTS and has our thanks for an FB job. Olympia

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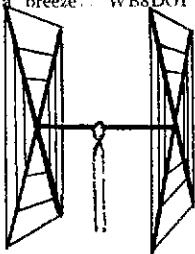
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— these two element beams have a full wavelength driven element and a reflector (the gain is equal to that of a three element beam and the directivity appears to us to be exceptional! ALL METAL (except the insulators) — absolutely no bamboo. Complete 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!



10/15/20 CUBICAL QUAD SPECIFICATIONS

Elements: A full wavelength driven element and reflector for each band.
Frequencies: 14-14.4 Mc.; 21-21.45 Mc., 28-29.7 Mc.

Dimensions: About 16' square

Power Rating: 5 KW.

Operation Mode: All.

SWR: 1.05:1 at resonance.

Boom: 10' x 1 1/4" OD, 18 gauge steel, double plated, gold color.

Beam Mount: Square aluminum alloy plate, with four steel U-bolt assemblies. Will support 100 lbs.; universal polarization.

Radiating elements: Aluminum wire, tempered and plated, .064" diameter.

X Frameworks: Two 12' x 1" OD aluminum 'hi-strength' alloy tubing, with telescoping 7/8" OD tubing and dowel insulator. Plated hose clamps on telescoping sections.

Radiator Terminals: Cinch-Jones two-terminal fittings.

Feedline: (not furnished) Single 52 ohm coaxial cable.

Now check these startling prices — note that they are much lower than even the bamboo-type:

- 10-15-20 CUBICAL QUAD. \$41.00
- 10-15 CUBICAL QUAD. 36.00
- 15-20 CUBICAL QUAD. 38.00
- TWENTY METER CUBICAL QUAD 31.00
- FIFTEEN METER CUBICAL QUAD 30.00
- TEN METER CUBICAL QUAD. . . . 29.00 (all use single coax feedline)

BEAMS

"Just a note to let you know that as a Novice, your 3-E1. 15 Beam got me RI Section Winner and New England Division Leader in Novice Round-up. See June QST, p. 57 for picture of ant. (below). Tnx for a fine working piece of gear. 73s, Jay, WA1JFG"

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; 7/8" 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 E1 20 \$25 | 4 E1 10 \$24 |
| 3 E1 20 31* | 7 E1 10 38* |
| 4 E1 20 38* | 4 E1 6 24 |
| 2 E1 15 21 | 8 E1 6 34* |
| 3 E1 15 25 | 12 E1 2 31* |
| 4 E1 15 31* | *20-ft. boom |
| 5 E1 15 34* | |

ALL-BAND VERTICALS

"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, K1MVV, K8HGY, K3UTL, W8OJC, WA2LVE, YS1MAM, WA8ATS, K2PGS, W2QJP, W4JWJ, K2PSK, WA8CGA, WB2KWY, W2IWJ, VE3KT. Moral: It's the antenna that counts!

FLASH! Switched to 15 c.w. and worked KZ5IKN, KZ5OWN, HC1LC, PY5ASN, FG7XT, XE2I, KP4AQL, SM5BGK, G2A0B, YV5CLK, OZ4AH, and over a thousand other stations!

- V40 vertical for 40, 20, 15, 10, 6 meters \$18.95
- V80 vertical for 80, 75, 40, 20, 15, 10, 6 meters \$20.95
- V160 vertical for 160, 80, 75, 40, 20, 15, 10, 6 meters . . \$22.95

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GOTHAM, 1805 Purdy Ave, Miami Beach, Fla. 33139

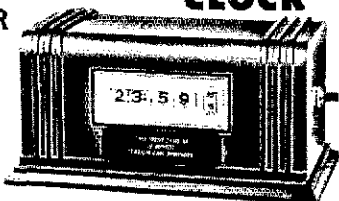
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CALL REMINDER

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23⁵⁰



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RT-70/GRC RECEIVER - TRANS.

47 to 58.4 MHz, FM continuous tuning; also 2 pre-set chan., Voice, power output 500 MW, 18 Tubes; power req.: 90 VDC @ 80 MA, 6.3 @ 960 MA, 6.3 @ 160 MA. (See accessories below) Size: 5 x 13 x 8"; Wt.: 17 lbs. Price—Used **\$22.95**

AM-65/GRC AF AMPLIFIER—three chan. audio freq. amplifier for interphone & radio monitoring of various types GRC Rec.-Trans.; 7 Tubes; power req.: 135 VDC 35 MA & 6, 12, or 24 VDC. (See accessories below) Size 4 1/2 x 13 x 7 3/4"; Wt.: 15.5 lbs. Price—Used **\$14.95**

PP-282/GRC POWER SUPPLY—24 Volt. used with RT-70 & AM-65. Plugs inside AM-65, supplies voltages for both units. Size: 4 1/2 x 6 x 3"; Wt.: 6 lbs. Price—Used **\$5.95**

COMBINATION DEAL—RT-70, AM-65, and PP-282—All three items for just **\$35.00**

TECH MANUALS: For RT-70, w/schematics . . . \$7.50. For AM-65, w/schematic . . . \$5.00; Schematics Only . . . \$1.00 Ea. H-33/PT HANDSET—Used . . . \$5.95—Unused . . . \$7.95

All Prices are F.O.B., Lima, Ohio—Dept. QST

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Case: 2x4"; shaft 1/4"x3"
Model TC2: Skirt 2 1/4"; Knob 1 1/4"
Model TC3: Skirt 3"; Knob 2 3/4"

Model	Price
TC2	\$7.95
TC3	\$7.95
TC4	\$11.00
TC5	\$11.00

R. H. BAUMAN SALES

P.O. Box 122, Itasca, Ill. 60143

area Ham Breakfast Club meets 1st Sat. each month 8:00 A.M. at Chuck Wagon in Lacey — all welcome says WA7FKM. W7FHZ is frequency coordinator for Wash. for the VHF Repeater frequencies. W7FIC is NCS for Spokane Dial Twisters phone net meeting each Sun. on 3915 at 5:00 P.M. Oscar 6 is affording great VHF DX for this area and is real fun says K7BBO. Mt. Baker ARC with 25 members and 10 mobiles worked Halloween operation with Wash. State Patrol. Newly elected mgr. of WSN is K7OZA. Notice Code practice net run by WA7IKZ is on 3735 kHz each Mon. at 7:30 P.M. New operator in Olympia is W7JFR, ex-W6YKF and QRL working on antenna problems and active in WSN and PON nets. W7CBU wants participation by Lewis Co. hams in developing AREC program for Lewis Co. Everyone reserve week end of Jan. 27 and 28 for SFT exercise — join in with an AREC group and learn emergency preparedness techniques. Contact W7UWT SEC for details about AREC. For license upgrading the NW Tech net meets each Sun. at 3 P.M. on 3970 kHz with W7BO as NCS. New NWSSB net mgr. is W7SVV. WA7JCB is able editor of TOTEM TABLOID, bulletin of fast growing Western Wash. DX Club. Traffic: W7PI 423, W7KC 238, W7AXT 102, W7BO 95, WA7OCV 89, W7GYF 74, W7JEY 66, W7BUN 64, W7APS 50, K7OZA 50, W7MCW 46, K7OXL 35, W7FOE 33, W7PWP 27, WA7KNW 26, W7JFR 12, WA7QZ 11, WA7HCL 6, W7IEU 5, WA7LOO 4, W7AIB 3, K7BBO 3, K7NZV 3.

PACIFIC DIVISION

HAWAII — SCM, Lee R. Wical, KH6BZF — SEC: KH6BZF. RM: KH6AD. PAM: KH6GJN. VHF PAM: KH6GRU. SRC: KH6FOX. QST Mgr.: KH6DQ. ECs: KH6S GPO, BAS, HIG and BZF.

Net	MHz	Time (GMT)	Days
Confusion (patches)	21.400	0030	ALL
WCARS	7.255	ALL	
Friendly	7.290	2030	M-F
Pacific Interisland/ Micronesia	14.305	0800	ALL
S.E. Asia	14.320	1230	ALL

At the recent Pacific Division Convention held in San Mateo's Royal Coach Motor Hotel, which was a great success, W4BW, Chief Amateur Division FCC was the keynote speaker. A most outstanding and expressive speech covering five major points. The strongest point being that we should plan to protect our amateur frequencies and privileges thereof. The open forum presented an interesting Q and A session with ARRL prexy W2TUK, W6ZRI, W3PS, W1UED and K1PLP, ex-KH6EGL to name a few in the hot seats. W6ELW did the Wouff Hong ceremony that would make the KKK envious! On the local scene KH6EOO announced code practice on 14.070 at 0600Z Tue. and Thurs. Late report was the Kure Is. DXpedition was heard standing by for that VE9 station—QRZ VE9! KH6HPT was selected for Chief — you Navy types. KH6BZF eyeballed with W6EDX. Received a note from someone on a Kangaroo Safari but it was unsigned. Could it be from (LID) Lime One Delta? It mentioned PR one MO? KH6JAR went to JA-Land for an FT-101. When he got back to KC6-Land he got the flu bug. First time in 20 years plus with Philon he's put in for sick leave. Had a pleasant visit with WR6AUH publisher of World Radio in San Francisco. Aloha and Season's Greetings. Traffic: KH6BZF 6, W6DAD/KH6 4, KH6BWT 4, KH6GRU 2, KG6JAR 1.

NEVADA — SCM, Leonard M. Norman, W7PBV — W1UED. W7PBV, K7YVN and K7ZAU were received by Governor Mike O'Callahan who congratulated W7PBV on his re-election as SCM. W1UED was the principal speaker at a meeting called by NARA, attended by 37 members. W7TGG and KYL were observed exercising their golf clubs. W7DNX, W7IAD and WA7HVK have an excellent code and theory class with 13 students. WA7OZG reported hearing wedding bells. W7ABX, W7DNX and WA7HVA active on 160 meters looking for DX. W7PRM actively looking for rocks. W7TKV a cycling enthusiast. WA7ESM looking for old sewing machines and vacuum cleaners. WA7MOC got skunked while hunting? WA7EGH heard on KSRN. WA7NIN fixed his antenna and now may be heard on 2-meter fm. WA7FSM and WA7KVV were recognized by the North Las Vegas City Council for their public service working handling traffic in the Rapid City flood disaster. The SAROC Convention committee set for the biggest turnout of exhibitors and delegates. W7LX is active in the PON nets. Traffic: W7LX 58.

SACRAMENTO VALLEY — SCM, John F. Minke, III, W6KYA — The North Hills RC and the John I. Saban Pioneer RC had as their guest speaker for Oct. W1UED, Sr. Assist. Secv. of ARRL. The latter club reports that 26 per cent of their membership is Extra Class, 33 per cent Advanced. New Novice WN6SNY is now Advanced Class WA6SNY. What's your excuse for not getting your



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- Selectivity—Adjacent channel (40 KHz) down 50 db.
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Advanced, or Extra? For you 6-meter fans, KH6BZF, SCM of Hawaii, is interested in hearing from those who would like to see a beacon installed there. K6SG reports being back on 80/75 after a long absence. The El Dorado ARC is giving General and Advanced Class theory classes every Thur. Contact WB6WBP or W6KDJ for details. Traffic: K6YZU 23, K6KWN 6.

SAN FRANCISCO - SCM, Thomas A. Gallagher, W6NUT - Activity reports received from W6BWV, WA6BYZ, W6FAX, W6RNL, W6RQ, W6SLX and W6WLV. This holiday season is a good time to get your feet wet in a net. Try it, you may like it! CCDN 0300ZM 3545.5, NCN 0300ZD 3630, NCEN 1800ZS 3920, W6SLX is active in the Calif., Colo. and Wyo. WX nets. Ed reports that the Humbolt ARC has been going strong since 1947. W6WLV again is active in the NCN and was heard in the Oct. CW CD Party along with W6BIP who made a big splash with 650 QSOs. The SF RC provided 5 mobile units and 8 operators, W6URA, WB6LRQ, K6HWL, WA6DJI, W6FAX, WA6AXV, WN6JBI and WB6IQN for the 20 mile Cancer Society Bike-a-thon. The RACES Twin Peaks 6-meter repeater was used. What is your club doing to promote amateur radio? The Tel. Co. Club's Newsletter observes that the FCC layed great emphasis on the Amateur Service as "...a pool of U.S. citizens skilled in cw operations as a resource..." (Quoted from the Repeater docket Report and Order). Those of you troubled with hi-fi interference complaints should obtain copies of FCC bulletin 25 which puts the problem in perspective. See you in the Jan. CD Parties. A Peaceful and Happy New Year to all. Traffic: (Oct.) WA6BYZ 146, W6RNL 18, W6WLV 11, W6BWV 6. (Sept.) W6FAX 8. (Aug.) WA6BYZ 222.

SAN JOAQUIN VALLEY - SCM, Ralph Saroyan, W6JPU - SEC: WB6RZI, WB6TDR, WB6RZI, WA6HIN, WB6EJR and W6JPU attended the Pacific Division Convention in San Mateo on Oct. 14, 1972. WAGXP and K6RPH attended the SW Division Convention on Oct. 21, 1972. WA6BUH transmitting through Oscar Satellite. W6PSQ chasing DX for DXCC. W6GRV has 301 countries. WN6SKE teaching boy scouts the code with the assistance of WA6OSM. WA6UAA back from the service. WA6AAJ now located in Fresno. WA6DEA has an SB-144. K6OFR again is active in Navy MARS. WA6BUH active keeping repeaters on the air. W6YEP attended the Mexican Road Races and helped in communication. The Fresno ARC's annual Hamfest will be held May 5, 1973 at the Sheraton Motor Inn. WA6SCE back handling traffic on NCN and

RN6. WA6CPP moving to Calaveras Co. W6YKS was active in Oct. CW CD contest. WA6CPP has a 60-ft. tower. WA6CPP activated Tuolumne, Mariposa, Merced Stanislaus and San Joaquin Co., making 100 contacts in the Calif. contest. May I take this last line to wish each and every one of a very Happy New Year. Traffic: WA6SCE 52, WA6JDB 28.

SANTA CLARA VALLEY - SCM, James A. Hauser, WA6LFA SEC: WA6RXB, RMs: W6BVB, W6RFF. W6BVB reports NCN had 573 check-ins in Sept. and handled 283 pieces of traffic. WA6HAD made BPL with 100 originations. Congrats! W6NW is very active on the traffic nets. W6KZJ working on a new rig, says his signal will be louder. W6IQU active on NCN. W6AUC, W6DEF and W6YBV again made the Honor Roll this month. Information on Oscar 6 is being passed on the Santa Clara Valley Net at 8 P.M. Tue. on 146 MHz for those interested. Bulletin Schedules: W6ZRJ each Thur. evening as follows: CW 15 and 20 wpm, 7:30 local 3590 and 7:29 kHz; SSB, 8:30 P local 3815 kHz; RTTY 850 Hz shift 9:00 P local 3615 kHz.

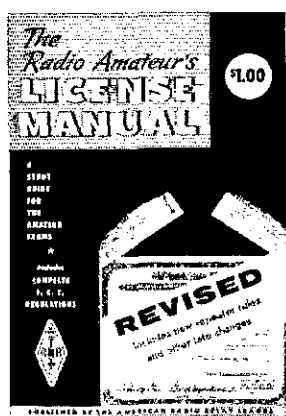
Net	Affil.	Freq.	Local Time(Days)
NCN	NTS	3630	7:00/8:30 P.M. D
SPECS	AREC	146	7:45 P.M. M
SCV	AREC	146	8:00 P.M. T

Traffic: (Oct.) W6NW 160, W6YBV 159, W6AUC 142, W6BVB 127, WA6HAD 116, W6RFF 93, W6KZJ 81, W6DEF 49, W6IQU 42, WA6DKF 4. (Sept.) WA6DKF 6.

ROANOKE DIVISION

NORTH CAROLINA - SCM, Chuck Brydges, W4WXZ - SEC: W4EVN. PAM: WB4JMG. RMs: WB4ETF, WB4VBM. This starts a New Year and my sincere gratitude for your reports during the past year. I look forward to working with you all for a better amateur radio. WB4BGI lost antennas and is off. K4EZH traveled for a month and is again ONI. WB4MLI got off to a fast start working states via Oscar. WB4UBA moved to Winston and has passed Commercial 2nd Class. UBS is ex-Marine Corps and operated from Okinawa. WN4UOO worked some priority QTC to Thailand for Uncle Sam. WA4KWC is chasing DX on high bands as is W4WXZ who finally submitted DXCC. Annual Buncombe Co. ARC Picnic attracted about 35 to the mountains at Asheville. Newly-elected for Brightleaf ARC is WB4HGT, pres.: W9NTV/4, vice-pres.: WA4HPY.

UP TO DATE

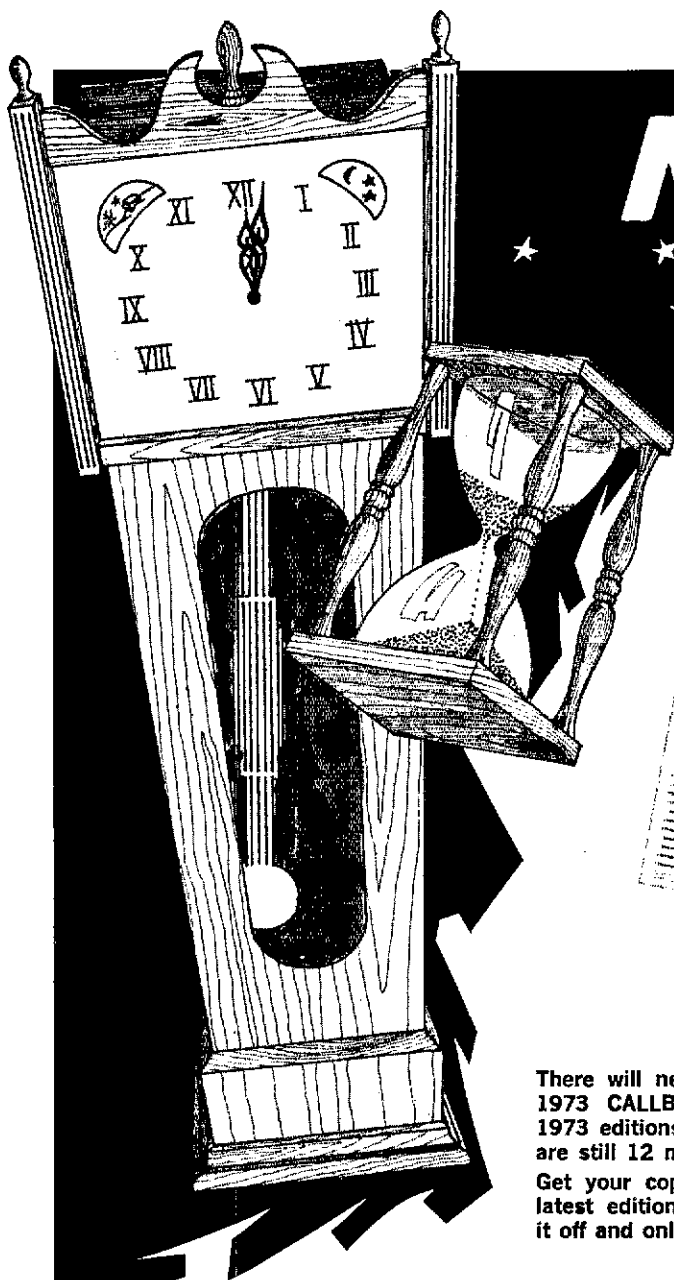


ARE YOU?

The Radio Amateur's License Manual was recently revised to include the latest changes in regulations from the F.C.C. All amateurs are affected by the changes in logging requirements and changes in band segments. Of course, you'll find the new repeater rules and sample exams. Have you kept up to date? Be sure by reading the License Manual.

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secy.-treas. K4MSG was busy getting set up for Oscar and repairing test equip. K4RJ was helping CAP with exercise and also working into Oscar. K4JO altering feed on yagis for 432 and continues work on KW for same band. W4OFO is putting it all together as EC with a fine report indicating his operating plan.

Net	Freq.	Time
NCNN	3725	0100Z
CNE	3573	2400Z
CNTL	3573	0300Z
CNCTN	W4EXU Salisbury Rptr	0300Z
IFKN	3923	2330Z
Tarheel E.mg.	3923	2430Z
NCSSBN	3938	2430Z

Traffic: (Oct.) W4EVN 137, WB4BGL 92, K4MC 71, W4WXZ 56, WB4MLI 47, WB4TNC 41, WB4VBM 37, K4VBG 22, WB4UBA 17, WN4UOO 15, WN4&YMW 15, WA2NMT/4 8, W4OFO 7, WB4CES 6, WB4JMG 6, W4TYE 5, K4EZH 4, WA4KWC 1. (Sept.) K4EZH 2.

VIRGINIA - SCM, Robert J. Slagle, K4GR - Asst. SCM: A.E. Martin, Jr., W4THV. SEC: WA4PBG. Asst. SECs: WA4JFF, WB4CVVY. PAM: WA4FGC. RMs: W4HIR, W4SOO, W4SHJ, KØPIV/4. WB4PNY sent 88s with her report this month! New daughter curtailing activities of K4VIG. W4SOO and KØPIV/4 bumped into each other in Germany! Our Director, W4KFC attended six fests and had first satellite QSO. V5BN 56 sessions, 892 ONI, 196 OTC. New repeater of NVFMA for 22/82 taking most of K4LHB's time. Congratulations to Ft. Belvoir ARC League affiliation. W4KX admits laziness. W4NOA found good DX on all bands. K4IAF new call of WA2BEX/4. W4MXP moving from Arlington. K4KDJ again active at VPI. W4QDY promises to be back on shortly. WB4PWP has rig problems. WN4BKQ had first DX contact. W8VDA/4 made a remote VFO out of ARC-5 transmitter. WA4HQW very busy with his automatic contest station. W5VZO/4 activity down. W4MK in Oct. CD Party. W4DM also CDed plus DX phone contest. OO K2HBA/4 will soon be MARS interface station for Va. WB4SSE has invisible antenna at U. Va. W4THV now 2-meter fm mobile. W4TJF teaching hamdom to son of WB4KBJ. WB4WIS in strong NCSing. WB4WLK moved to Va. Beach. Counties: WA4WQG 3047, W4JUI 2721 and WA4UNS 1235. W5ZH sent me Zerox of my W5OU card for a contact with him in 1931! W8VDA/4 with no traffic!

VSMN	3947 kHz	0715/1630 M-F
V5BN	3935 kHz	1800/2200 Dy
VSN	3680 kHz	1830 Dy

VN	3680 kHz	1900 Dy
VPN	3947 kHz	1930 Dy
VRN	3625 kHz	2000 Dy
VPON	3905 kHz	2215 T

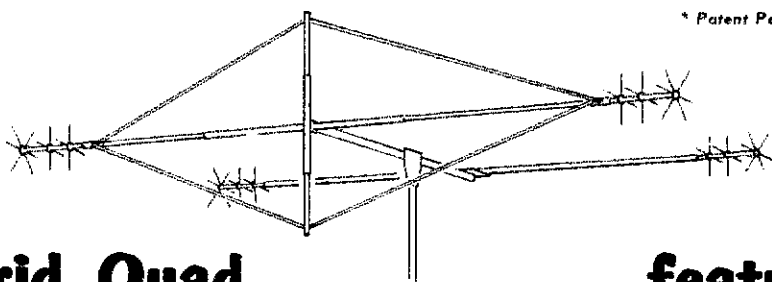
Traffic: (Oct.) W4UQ 283, K4KNP 181, W4SQO 106, WB4SGV 83, K4GR 75, K4IAF 75, WB4KIT 74, WA4FGC/4 73, WB4RDV 62, WA4SMR 48, WB4PNY 45, K4KDJ 40, K4KA 29, W4TE 29, WA4PBG 22, WB4RZW 22, W4YZC 22, W5VZO/4 21, WA4JFF 20, WB4KBJ 20, W4KFC 19, WB4WIS 18, W4THV 16, WA4UNS 14, WA4HQW 12, W4FOV 10, K4JM 10, W4MK 8, K4VIG 6, K4CGY 5, WA4WQG 5, W4KX 3. (Sept.) K4PQL 62, KØPIV/4 47, K4KA 40, W4NOA 30, K4IAF 28, W4LQO 4.

WEST VIRGINIA - SCM, Donald B. Morris, W8JM - SEC WA8NDY. RM: W8BBBG. PAMs: W8DIW, W8IYD, K8CHW, Phone Net Mgr.: W8BBMV, Tri-State ARC of Huntington officers are WA8HVM. pres.; WA8CGR, vice-pres.; WN8NCL, secy.; W8BAQU, treas.; W8SFEQ, QSL mgr. WA8AFB, WN8NSZ and WA8KCJ active in club's code and theory classes. Following amateurs active in Huntington's 20 mile, March of Dimes Walk-athon: W8BARY, W8BNRJ, WA8KCJ, W8DUV, W8DUW, K8SXO, WA8HSZ, K8MHR, WA8HVM, WA8NJB, WA8TSS, W8SFOV, WA8CCR, WA8ODA, W8SFIJ, W8RDOD, W8BIDA, W8BBMV made PSHR and reports WVN Phone Net with 324 stations, passed 78 messages. W8WVM, WA8NDY, WA8WCK, WA8OKG, W8SHT, WA8YCD, W8BBMV, W8BBMW, W8BDFX and WN8LGF active in Upshur Co. CD Drill. W8BKK now is W8PV and new OBS. W8HZA received 50-year plaque at OCWA dinner in Washington. I regret to report the passing of WA8ACF, Huntington, W8ØVI/K1FMU of Parkersburg, now W8KUQ. QCWA Spring meeting set for Huntington with W8IT and W8AFB as co-chmn. '8RN-ARPC meeting held in Huntington with WA8POS, WA8HVM and WA8KCJ handling arrangements. Traffic: W8JWX 64, W8BBMV 39, WA8NDY 28, WA8WCK 22, K8QEW 13, W8JM 10, W8SEK 8, WA8OKG 7, WA8KCI 5, WN8MKL 5, W8DUV 3, WA8YCD 3, W8AEC 2, W8BDQX 2, K8ZDY 2, K8BCF 1, WA8CHS 1, W8CKX 1, W8BCPU 1, W8GDP 1, W8GWR 1, WA8OHG 1, K8ZDY 1.

ROCKY MOUNTAIN DIVISION

COLORADO - SCM, Clyde O. Penney, WAØHLQ - SEC: WAØQOY. RM: WØLRN. PAMs: KØCNV, WØLRW, WAØWYP. W8ØFDK has recently returned home from several days stay in the

Hotter than a firecracker!



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- MORE BANDWIDTH
- TURNING RADIUS - 74 INCHES
- LIGHTWEIGHT - 15 LBS.
- WIND SURVIVAL - 75 M.P.H.
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hospital. We are glad to have her back and hope she will soon be back on the air. W0DCY has been performing venman service all summer by maintaining a log of all visitors on the local 146.34/94 FM repeater. He reports there were 53 visitors on the repeater from June 22 to July 15; 135 visitors from July 16 to Aug. 15; 80 visitors from Aug. 16 through Sept. 15. Net traffic for Oct.: Columbine QNI 1132, QTC 47, informals 202, 26 sessions. SSN QNI 356, QTC 128, informals 37, 31 sessions, 816 minutes. CCN QNI 305, QTC 122, 31 sessions. Hi-Noon QNI 1208, QTC 44, informals 152, 1016 minutes. CTN QNI 254, QTC 40, informals 65, 597 minutes. Net traffic for Sept.: (late) SSN QNI 245, QTC 110, informals 39, 30 sessions, 688 minutes. CEPN QNI 151, 4 sessions. Traffic: (Oct.) W0WYX 364, W0LO 202, WB0AXW 163, K00TH 109, W0LRN 97, W0LLA 83, W2TPV/0 80, K0JSP 77, WB0HCK 62, W0IW 62, WA0SIG 59, W0MZL 54, W0LRW 45, WA0WYP 42, K0TIV 26, WA0ZPP 25, WB0BSS 23, WB0CCB 23, K0SPR 22, W0ONK 16, W0LAE 14, W0GAG 12, WA0NFO 12, W0SIN 11, W0BY 7, WA0YED 6, WB0DRG 3, WA0HLO 1. (Sept.) W0SIN 21, W0KFH 14, K0CNV 2, K0PHF 1.

NEW MEXICO - SCM, James R. Price, W5NUI The Roadrunner Net 3940 kHz 0100Z had 22 sessions with QNI 156, QTC 51, QSI 10. Some difficulty has been experienced with long skip interference however, let's consider the advantages of training under QRM. WASUNB after some three years absence is back with a Swan 500 and an inverted V antenna. WSIGU received a 50-year award during the Q-CWA meeting at the Albuquerque Hamvention. K5IKL has completely rebuilt the ham shack and is enjoying a first class station. W5TLK attended the Southwest Division Convention in Santa Maria, Cal. The dutch treat breakfast in Albuquerque the first Sat. of each month is very popular. Contact the Albuquerque fellows for specifics of location. Is your emergency generator operational? Traffic: W5MYM 100, W5TLK 86, K5DAB 75, K5MAT 57, W5DAD 40, W5RE 35, W5NON 17, W5PDY 14, W5SOH 12, W5BWW 6, W5YO 3, W5SMY 1.

UTAH - SCM, Carroll F. Soper, K7SOT - SEC: W7WKE. RM: W7OCK. The application for license of the Cedar City repeater has been made and should soon be in operation. W7UGV new amateur in Salina. W7HRC moved to new location and should soon be back on the air. WA7MEL has completed all counties in Utah. WA7LJU elected pres. of the Utah Amateur Radio Club for 1973. Traffic: W7EM 132, W7OCK 76, W7IOU 30, WA7MBL 13, K7CLO 9, W7HRC 1.

WYOMING - SCM, Wayne M. Moore, W7CQL - SEC: K7NQX. PAMs: W7TZK, K7YUG. OBSs: K7NQX, W7SDA, WA7FHA, K7YUG. Nets: Pony Express Sun. at 0800 on 3920; YO daily at 1830 on 3608; Jackalope Mon. through Sat. at 1215 on 7260 (alt.3.920); Wx Net Mon. through Sat. at 0630 on 3920; PO Net 1900 Mon. through Fri. on 3950. W7BKH and XYL have a new baby boy. WA7MKU is the new pres. of the Univ. of Wyo. Club. W7ENF is now back in Wyo. The first part of Nov. some of the hams in Casper and Cheyenne furnished communications for the CAP for their state drill when their radio system broke down. W7VDZ now has his 6-meter stacked beam up along with a very good low band antenna. W7BXS was honored as the first life member of the Casper Club. Traffic: K7NOX 246, K7VVA 100, W7SDA 39, W7HNI 37, W7BHH 32, WA7HAB 17, K7ITH 14, WA7NHP 11, K7TAL 4.

SOUTHEASTERN DIVISION

ALABAMA - SCM, James A. Brashear, Jr., WB4EKJ - SEC: W4DGH. RM: W4HFU. The return to standard time has helped net and traffic activity to pick up, so reports WB4KDI and WB4SVH. WB4JMH set up and operated a station at a NASA picnic recently and originated about 30 messages. Those helping with QSP were WB4SVH, WB4KSL and W4HFU. A belated congrats to K4MG for his section scores (high on cw and phone) in the 38th ARRL International DX Competition. W4USM is completing facilities for 160-meter operation using a DX-100B. New members of the North Ala. DX Club are WB4RIU, K4UVJ, K4PMO and W4RGM. The Birmingham ARC recently had a slide presentation by K4FKZ of one of his trips to the Ycatan area. WB4ZAG has his SB-102 operating on 80 and 40 and expects to be going on 20, 15 and 10 soon. WB4WUS reports that he, WB4ZAG, WB4WWT and W4AYK recently participated in the CD, CAP, RACES exercise and operated as WB4ZAG/4 with traffic going to K4EGK in Montgomery from CD operating center in Birmingham. K4HJM reports he is a member of the Breakfast Club, No. 944, on 3973. The Calhoun County Radio Association is a new ARRL affiliate and boasts of 25 members - in addition to a gaudy number of on-lookers. Some members are interested in 2-meter fm and are hard at work atop Blue Mountain (Anniston) attempting to deploy a repeater before bad weather overcomes them. W4UAR and WA4AEP are interested in 6-meter fax work. K4FRY and WB4TJO are busy gathering parts to get something started on 432 MHz. A hearty welcome to DK1DF



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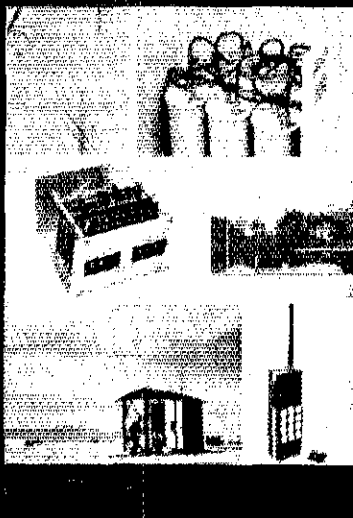
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who recently became a member of Huntsville ARC. WB4JMH has big trouble. Does anyone have any ideas on how to generate interest and increase participation on our cw nets? The AENB meets at 9100Z daily on 3,575 and has scheduled representatives that QNI the Fifth Region Net. The AEND (Novice Training Net) meets daily at 2330Z on 3,725 and welcomes any and all QNL. For the second successive year, the Huntsville ARC provided communications for a group of Arabian horse enthusiasts in a 50 mile endurance ride in Bankhead Forrest. They also provided communications recently for a group at a Motorcycle contest. Sorry to hear W4WLG resigned as PAM. Anyone interested in assuming this position? Traffic: WB4EKJ 124, WB4SVH 103, WB4JMH 87, WB4KDI 53, WB4KSL 43, K4AOZ 38, WB4WUS 3, WN4ZQF 3, K4HJM 2, WB4ZAG 2.

EASTERN FLORIDA - SCM. Regis K. Kramer, W41E - SEC: W41YT, Asst. SEC: W4SMK, RMs: K4FAC CW, WA4WVW RTTY, PAMS: W4SIDR 40, W4OGX 75. Reminder: Jan. 21 and 22 is the Miami Hamboree. A number of meetings are planned for Communication Dept. activities. Agenda will include NTS with respect to Region Reps in Fla., our NEW sections, traffic nets, liaison, etc. WINJM is attending the Hamboree and we are looking forward to his attendance at the QFN Breakfast Meeting, Sun. 8 A.M., Howard Johnson's, 11th St. & Biscayne Blvd. WB4OMG resigned as RM for Eastern Fla. K4FAC from "Southern" Fla. has been appointed our new RM. WB4HJW has taken over as QFN Editor and Publisher. This is SET month. We need your support to keep our sections up front and in emergency readiness. Appointments: WB4GHD as ORS; WB4WYX, ORS. OPS. W4ID, collector of amateur radio publications is looking for 2 old ones from the early 30s. One called, The Dope Bucket and the other, The Sivannee Review - if you have any leads, ARL 7 to W4ID in Eau Gallie. W4YOX is mixing in a little traffic work with his cw, hunting. WA4ESS held an AREC dnll for Okeechobee Co. WN4AJL enjoyed the SS. WN4YJL, a paraplegic, is studying hard for his conditional. W4IA hopes to be back with Gators soon. W4OZF patrols for DX on 10 and has sites set for some 160-meter work. WA4SGF, WB4SCA and WA4VZF conduct a Novice Class for NOFARS. WB4WTL likes 7FTN. W4DO has 90-ft. worth of Irtax 1M-370 with a TH6-DXX at 75'. W4MML works hard at his AEC job in Western Palm Beach Co. K4NE attended Wash., D.C. National QCWA dinner and is interested in forming Fla. Chapter of the UOTC. Approximately 300 amateurs enjoyed the statewide QCWA dinner at Orlando Nov. 18 with K7UGA as guest speaker. WA4PDM conveys a hearty thanks to AFMARS for helping

with Youth Training Program at Miami Springs Jr. High. GN is looking for Novice QNI on 7115 at 0830E daily. WA4BGW present OFN Mgr. has computerized net statistics. Welcome to WIGM, FCC retiree from Boston. The W4ROA's expecting a Jr. Op. New officers: Dade Co. ARPS include WB4QNR, pres.; K4FAC, vice-pres.; WB4HKP, secy-treas. and WA2HHO/4 as C/S. Please send in your traffic and PSHR reports. Traffic: (Oct.) WA4LJH 592, K4SCL 447, WA2AFJ/4 322, K4FAC 282, WB4OMG 211, W4LJK 159, WB4WYX 151, W4SIDR 137, WRBZY/4 130, WB4GHD 128, WB4PNW 126, WB4JSK 97, W4ILE 86, WA4SCK 80, WB4WHK 80, WB4HJW 68, K4BLM 67, W4NLR 67, K0ECCG/4 66, W4IAD 62, WB4OAA 58, WB4SOA 53, K4GJ 51, WB4HKP 50, W4BM 47, W4DVO 41, W4GJU 39, W44HDH 39, W44FJA 35, WA4BCW 34, WB4ADL 32, W4IYT 30, WB4AID 27, W4DOS 26, W4EHZ 24, WA4RUE 24, W4YOX 24, W4DFP 23, WB4PHT 23, WB4WTL 23, W4LSR 22, WB4FLE 21, K4GDV 21, WA4PDM 21, K4QNT 21, W4LDM 20, K4NE 20, WA4ESS 18, WB4NJI 17, W4NTE 17, W4YYP 16, W4MML 15, K4EZE 14, W4BCZ 13, K4EYN 12, W44EYU 12, K4SJJH 12, WN4AJL 11, W4DDW 9, WB4BBH 9, W4TJM 9, W4EHW/4 8, WB4FJY 8, W4DTV 7, WB4WIO 7, K4DVV 6, W4FTF 6, W4LK 6, WB4SKJ 6, W4SMK 6, W4WZR 6, K4EBE 5, WK4EJW 5, W44EY 5, WB4GMB 5, K4MV 5, W44VZF 5, WB4QID 4, W4ZAK 3, W4DO 2. (Sept.) WB4FTW 26, K4EBE 6, W4SMK 6, W4TJM 5, W4MML 3.

GEORGIA - SCM, A.J. Garrison, WA4WOU - Asst. SCM: John T. Laney, III, K4BAI. SEC: WA4VWV. RMs: K4BAI, WB4SPB PAMS: K4HQH, W4LRR.

Net	Freq.	Time (Z)	QNT	QTC	MFR.
GSN	3595	0000/0300/1150	834	241	K4BAI
Ga.SSB	3975	0100	940	60	K4VNV
GTN	3718	2300	-	-	WB4SPE

All 6-meter operators are invited to join WA4AGD and gang on Tue and Fri. nights at 0230Z on 50.2 MHz on The North Georgia 6-Meter Variety Net. Presently they have about 15 members checking in from 10 different cities. Our condolences to the families of WA4VSS, W4JKP, W4JES and K4KMX who recently joined the Silent Key ranks. Congratulations are in order for WB4RUA for making Public Service Honor Roll for third consecutive month. He also has had the highest reported traffic total for the Georgia section for 7 consecutive months. Let us take this opportunity again to urge all stations to send us their station activity report the first of each

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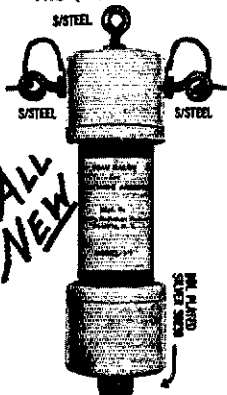
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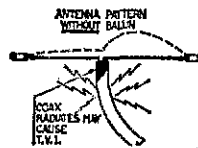
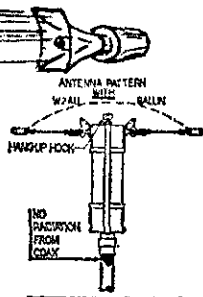
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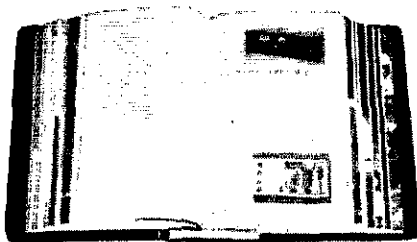
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month. Traffic: WB4RUA 128, K4BAI 78, W4EEP 66, W4AMB 58, W4RNL 57, WA4WQU 50, W4CZN 45, WA4RAV 40, W4UVP 28, K4OSL 24, WB4WXX 24, W4REI 10, W4DOC 9, W4FDN 4, WB4KVE 2.

WEST INDIES - SCM, Pedro J. Piza, Jr., KP4AST - SEC: KP4CB. KP4s QM, AWM and QC are working hard to get the PRARC repeater on the air. KP4s GN, MO and BLX are active on 2-meter fm from their mobile units. KP4DJE bought a gladding and is heard quite often talking with KP4QM. KP4JK has a 2-meter rig in Guanica and waiting for the repeater to establish contact with the rest of the gang. KP4PHW has the health line completed and working DX on 15 meters. KP4AIG is very active on 14 MHz. KP4DAC, KP4CLB are doing undermarte photography. KV4FZ worked during CQWVWX on 160 meters with a 5/8 wave vertical. FELIZ Y PROSPERO AÑO 1973.

WESTERN FLORIDA - SCM, Frank M. Butler, Jr., W4RKH - SEC: W4IKB. RM: K4LAN. RTTY: W4WEB. PAM: WA4IZM. VHF: WB4KGW. New net time for WFPN is 2330 GMT; still on 3957 kHz. Stations in the Northern Fla. section are invited to check in. Pensacola: WN4BVO and WN4BJD are new hams. WSRE-TV, Ch. 23 educational station, featured local hams in action, plus a showing of "Ham's Wide World." Sorry to see WB9AIU/4 leave the area this month. WA4NAP/mmm handles traffic from the USS LEXINGTON. K4LAN and K0BAD/4 renewed ORS appointments. W4UC/4 and WA4ECY/4 demonstrated amateur radio at the Interstate Fair. WB4KGW, WB4BSZ, WB4DHL, WB4ZPC and WA4JNA are among a growing group on 220 MHz. Fort Walton: New officers of the NW Fla. FM Assn. are W4LRC, W4MMW, W3ZVT/4, WB4PGQ and W4ZGS. The repeater license was finally returned by the FCC and WB4KLT should be on shortly. WN4CBT, younger brother of WB4ZKK, received his Novice ticket. YV3SJ is taking pilot training at Hurlburt. WA4NMG was a Silent Key this month. Defuniak Springs: K4VWE has a new six-element tri-bander. Panama City: W4GGU/4 was top W4 and 2nd in nation in FD, class 2-A. Chipley: W2QWC/4 is first ham to move into the Sunny Hills development, near here. Marianna: WA4BXJ, XYL of WB4YBO, received her Tech. ticket. W4HPF is a Silent Key. Tallahassee: WA4EQD died this month; he was a former NCS and active member of WFPN. Crawfordville: WN4ZQC earned a QFTN certificate; he just passed the General and Advanced tests! Traffic: K0BAD/4 332, K4BSS/4 44, WN4ZQC 17, WB9AIU/4 16, W4RKH 14, WB4NHH 11, WA4NAP 10.

SOUTHWESTERN DIVISION

ARIZONA - SCM, Gary M. Hamman, W7CAF - The annual SET is Jan. 27, 28. ATEN will have two extra sessions on each day to help handle the extra traffic. ECs K7JWB and K7NTG are planning exercises for Maricopa and Pima Counties, respectively. Maricopa Co. will be having simulated flood conditions and will conduct its exercise from noon to 1600 on each day. Stations outside Maricopa Co. are welcome to participate and should contact W7CAF for details. The annual Winter Hamfest, sponsored by ARCA, will be Feb. 4 at Squaw Peak Park in Phoenix. The Maricopa Co. AREC VHF group provided communications for the Phoenix Veteran's Day Parade. Participating were K7EMA, W7JDW, K7NIL, WA7NMI, K7VOR. RACES provided backup communications for a civil air patrol exercise on Nov. 11. Participating were W7CAF, K7CET, WA7GGB, K7JWB, W7UXX, K7VXS and K7WUG. New appointments: WB0HZE/7 as OPS; K7MTZ as ORS and OO; WB6LLD/7 as 220 MHz PAM. Contact W7CAF if you are interested in an appointment. K7UGA presented W7GX and WA7EIG with 50 year QCWA awards. Stations earning Section Net Awards were K7EMM, WA7HIT, WA7LXC, WA7JCK, WA7KOE, K7RLT, WA7NHQ, WA7QVN, K7GLA. ATEN: 31 sessions, 637 QNI, 78 QTC, 800 minutes. (Sept. 30 sessions, 529 QNI, 72 QTC, 649 minutes) Traffic: (Oct.) WA7QVN 49, W7PG 25, K7RLT 24, W7CAF 21, WA7JCK 14, WA7IXC 10, K7EMM 6, WA7KOE 5, W7LLO 4, K7GLA 3, WN7TWI 3, W7JXX 2. (Sept.) K7NHL 45, K7NTG 42, W7CAF 34, W7PG 25, WA7QVN 25, K7UYW 18, K7RLT 17, WA7JCK 8, W7DOS 7, K7EMM 7, WA7IXC 7, K7GLA 4, WA7MCK 4, K7ZMA 4, WA7KOE 3.

LOS ANGELES - SCM, Eugene H. Violino, W6INH - Ast. SCM: Leigh S. Jones, WB6OLD. Jerry Hall of ARRL has been making the rounds of local radio clubs giving tech talks. The St. Maria Convention was the best one around this area for many years. Congrats to WA6DEI, W6JTA and rest of the gang. WB6BOY says anyone interested in code and theory classes should call 837-5211. Santa Clarita Club planning on big Christmas Dinner. WB6ROY doing good job editing club paper. WB6HZZ of the Ramona Club is transmitter hunt chmn. W6MLL in Washington, D.C. attending QCWA meeting. The So. Calif. VHF Club reports planning the Spook patrol this year. They also are providing communications for the Barstow to Las Vegas motorcycle races. WA6ASR has been selecting choice films re resistors for the club, and also are



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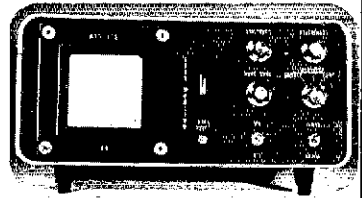
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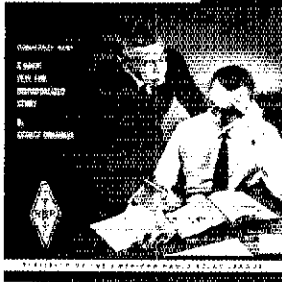
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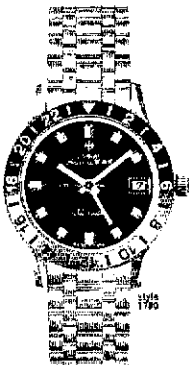
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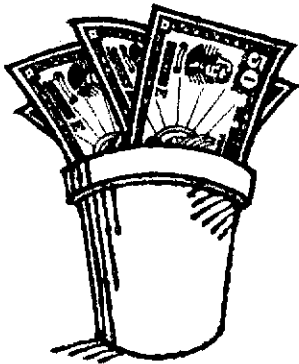
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planning their famous DXpedition on 1200 MHz from Mt. Modjesko to cover most of the LA basin. The Antelope Valley club has theoretical classes at A.V.H.S. conducted by WB6PRT. TRW club members furnished communications for the annual Baja 1000 mile road race. W6NHX and W6KQI were in charge of this operation. WA6DZ reports not getting QST regularly. The following groups had breakfast at the St. Maria Convention, So Cal DX Club and QCWANTS group Western Public Service. All groups were well attended. The Western Public Service System electing new officers. Congratulations for a job well done to WB6MDN, W6OAW, WB6GHS and WB6KOL — these fellows gave their time for the convenience of others. K6CNV having a ball working the Novice bands and has W.S. WB6KOL says 72 paid breakfasts at St. Maria with a special prayer by K6VFE. W6AM is contemplating selling his lots on the hill. Any takers? Hi. WB6BBO is moving out of state leaving vacancies on RN6 and MARS skeds. We need takers fast. We are all going to miss Lou in the NTS groups. K6ASK reports that SOCON net has changed its frequency to 146.04 primary mode will be fm sigs will be repeated 146.64. K6CDW lost his antenna in the big wind, planning to rebuild new antenna system. WN6TQA a new member in our ranks is active with Drake 2-B and Knight T-50. Traffic: (Oct.) W6INH 335, WB6BBO 304, WB6KJI 92, W6QAE 86, W6LYY 49, WB6ZVC 37, W6USY 36, W6OOZ 22, K6UYK 22, WA6ZKI 18, WA6LDN 17, WA6AAV 13, W6JPH 13, K6ASK 8, K6CL 7, W6HUI 6, W6IVC 5, W6BGG 4, K6KA 4, K6UQ 4, WB6KXC 3. (Sept.) W6OQI 21, WB6YIZ 15, W6IVC 8, W6HUI 3, W6JPH 3.

ORANGE SCM, William L. Weise, W6CPB — Asst. SCM. Richard W. Birbeck, K6CID. SEC: WA6TVA. PAM: K6YCI. RMs: WB6AKR, W6BNX. New officers for NARS are WA6BPM, pres.; W6SYC, vice-pres.; WA6LVS, secy.; WB6YMI, treas. Congrats to new Novice WN6THH. San Bernardino FM repeater, WA6ALV, with 146.25 in and 146.85 out located near Crestline has over 130 amateurs utilizing its service. It also provides excellent coverage during AREC drills. WA6TAG returned from several months touring Europe in new VW camper. Worked mobile from 8 countries. K6YNB enjoyed working 2-meter DX via Oscar VI. New AREC members in Orange Co. are WA6UTU, WN6OHI, WN6KUY, WN6REB. ARRL Convention in Santa Maria in Oct. was the highlight of the year. Your SCM had opportunity to meet with many league appointees in the section and plan for future programs. The Tech. sessions, speakers and all-you-can-eat barbecue were great. Congratulations to the gang who sponsored the convention. PSHR: WA6TVA 46. Traffic: WB6YVK 183, W6ISC 77, WA6TVA 20, K6GGS 19, WA6YWS 19, W6WRJ 12, WB6QNU 6, W6TF 4, W6CPB 3, W6QBD 3.

SAN DIEGO — SCM, Paul C. Thompson, W6SRS — Asst. SCM. Art Smith, W6INI. The AREC membership drive is drawing to close. Thanks to all who have worked to make it a success. Remember the get-together to be held to award each of you for your efforts. The amateur radio display at the Home Show was another success. A real opportunity to show what ham radio can do. Many hams from the section attended the Santa Maria Convention. W6SLF captured 2nd place in Mobile Contest. WA6KJK led North Shores on an HR Adventure to South America. Palomar RC held their Christmas Party. IVARA saw presentation on SSTV. SOBAR investigated IC manufacture. SDDX inducted the first YL — W6GIC. SDFM has completed frequency change 04-64. WA6HQH now on SCN. How about some of you older folks getting into the act. A fine opportunity will be here shortly with Daytime NTS. Your participation will make the difference. Contact your SCM or RM (W6BGH, W6LRU) for additional information. AREC nets now operate on 3905 kHz Sun. 0900, Mon. 1900 local; 29.375 MHz Sun. 1000 Mon. 2000 local 28.585 MHz; 50.250 MHz Sun. 1000, Tue. 2000 local 50.4 MHz; 145.5 MHz Sun. 0900, Tue. 1900 local. PSHR: W6LRU 49, W6HGF 44, WB6VKV 34. See Dec. QST for information on Daytime NTS activity. Any help for MTN/SCN liaison stations contact W6LYY or your SCM. Traffic: W6BGF 253, WA6AMK 119, W6VNO 113, WB6VKV 100, W6LRU 80, W6DEI 41, W6SRS 7, WA6HLA 1, W6TAI 1, W6MAR 1.

SANTA BARBARA — SCM, D. Paul Gagnon, WA6DEI — The best SW Division convention ever is now history. Over 1000 people registered. The Estero and Satellite clubs did a great job. The committee chmn. were K6YHK, W6DKQ, WB6ECM, WA6GOF, WB6JXL, WA6KRA, W6PA and W6DOY along with K6ELO and WB6YH; W6QMV, WB6WVY and WB6UDV, WB6HJW, WA6IDC, W6JTA, W6EKO, W6PRN, WB6GRW, WA6DHS. Next time you work them thank them for a fine job. New VCARC officers are W6CQR, pres.; WB6NNQ, vice-pres.; WN6NPN, secy.; WA6PII, treas. W6OAL is operating thru Oscar. WA6ESM is installing model 15 RTTY at Thatcher School Radio Club station in Ojai. WA6CVV has completed a unique 4-1000 linear with scrounged

parts. K6BCE now has a three-element full space 40-meter beam on a 240-ft. tower. WA6WVC worked XW8EH for his 100th country and has received his DXCC award. The Canejo Valley club holds code practice on 7090 at 9 P.M. each week night. W6MJU took his XYL to Swan open house and she walked away with the ladies prize. The SET is the end of Jan. Contact your EC immediately to receive your assignment. I have a list of EC's if you don't know who yours is. It takes very little work and is fun. It also justifies your use of the amateur bands as you are preparing yourself for public service. See you on 3935. PSHR: WA6DEL Traffic: WA6DEL 177, WB6PGK 109, W6JTA 52, K6OPH 7, WA6PFF 6, W6MLJ 1.

WEST GULF DIVISION

NORTHERN TEXAS - SCM L.E. Harrison, W5LR - Asst. SCM: Frank A. Sewell, W51ZU. SEC: K5QKM. Asst. SEC: WA5KHE. RM: WSQU. If your endorsement has expired please let K5QKM and SCM know and we'll bring them up-to-date. Oh yes, I understand many of our clubs of many years standing are having trouble keeping accredited. Write me if you have problems. Those interested in Committee Work read page 9, Articles of Assn. Comm. Dept. now has two committees closely related to operational work, i.e. contests and DX and one on emergency preparedness in the study stage. Temple ARC meeting Oct. 5 attended by 19 members. OVS forms sent to WA5VJB. DARC Dallas special meeting Oct. 27, guests were W2TUK and W5EYB. W5JAX read 6 OBSs three times each. WN5FOY now WB5FOY, congrats Jim. Remember folks an Official Observer is in no sense a policeman or informer. His mission is a friendly one to assist in correcting difficulties before they come to attention of authorities. Irving ARC plus 36 members and W5CKF implemented the Spook-Patrol. WA5SUY, 3961 Net Mgr. sends his regards to all NoTex. W5EYB and W5GM reelected for another term. Congrats. W5HP has longwire (280ft. and 50-ft.) on air with 150 watts. Tex. VHF FM Society News a most interesting and helpful publication. The YLs held their annual TYLRUN gathering at LaQuinta Motor Hotel. Caprock AR Society meets 1st and 3rd Thur. each month Red Cross Bldg. Corner Broadway and 8th St. Code classes are under consideration. For results of "eyebank" hearing please refer to OBS No. 395 and Dec. QST. Kilocycle Club of Fort Worth reports WB5FGM made successful trip to Dallas and now full-fledged Tech. WA5VJB, Grand Prairie VHF reports nice 6-meter opening to Central Fla. Oct. 16. WB5EFE made PSHR listing. Former RM NoTex W5QJZ active in Contests and DX. Another VHF reports his OM lost right hand in accident. Traffic: WSQU 198, W5TI 112, WB5EEE 80, W5LR 14, K5QKM 5.

OKLAHOMA - SCM Cecil C. Cash, W5PML - Asst. SCM: Joseph M. Schlosser, WASIMO. SEC: WA5FSN. RM: W5RB. PAMs: W5MFX, WB5CW, K5DLE and WASZR. The Texhoma Hamarama for 1972 now is history with 650 in attendance. It was the biggest by far and probably by most considered to be the best or at least one of the best. It was wound down just before noon by the usual auction of many goodies sponsored by the QCWA. The next big event coming up is the Lawton-Fort Sill's 26th Founders Day Banquet to be held at the Montiao Bay Convention Center and Quality Motel on Feb. 11, 1973. Sorry about the illness in the family of K5OCQ but Bill is now back in full swing on OLZ. We were deeply grieved to hear of the passing of the wife of WA5JXS. We are losing a good EC and OPS to North Tex in K5WPP. Glad to have WB5BFX from North Tex. at OCC in Ok. City, and happy to have him on OLZ.

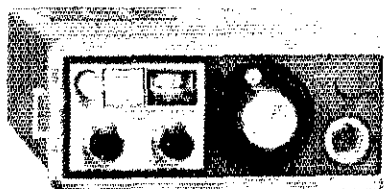
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OPON	3900	1700 M-F	22	500	134	
SIN	3850	1730 M-S	26	404	28	
OTWKN	3900	1745 M-S	26	484	13	
OLZ	3682.5	1900 Dy	31	137	76	

Traffic: K5TEY 470, W5RB 60, K5OTM 32, WASZOO 26, W5MFX 24, W5EKL 21, W5FW 17, W5SUG 17, W5SAZS 13, WA5FSN 13, W5PML 12, WA5CUJ 11, WB5CW 9, K5WPP 8, WA5OUV 7, WB5FK 5, K5OCX 2.

SOUTHERN TEXAS - SCM, E. Lee Ulrey, K5HZR - PAM: W5KLV. RM: W5ABQ. Congratulations to new OBS W5BHW; ORS W5AZBK; OBS/OPS W5HDS and OO K5MEN. Renewed OO/ORS for W5RBB. Received OO reports from K5HHA, K5MEN, W5AMIN, W5NGW and W5RBB. OVS WA5UCP reports received Oscar on several passes. W5AMN, W5ABQ, K5ROZ and W7WAH/5 made PSHR. Thanks to RM W5ABQ and PAM W5KLV for collecting station activity reports while this operator was off the air moving to new QTH. OBS K5HUA back on the air after long stay in hospital.

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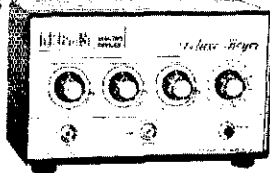
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CANADIAN DIVISION

ALBERTA - SCM, Don Sutherland, VE6FK - Aast. SCM: Mrs. Domez Booth, VE6YL. SEC: VE6XC. ECs: VE6FM, VE6AGZ, VE6WJ, VE6ATY, VE6AXH. Congrats to VE6YL on her well earned nomination to that exclusive group A1 Ops. Congrats also to VE6AY and VE6AXH on their appointment as FC for Lethbridge and Medicine Hat respectively. EC VE6FM held a fine AREC meeting in Calgary with a splendid visiting contingent from Vulcan. VE6ASL is again pres. of ARLA. Welcome to VE6MF on his return to Calgary. VE7ATO is now VE6BAO in Swan Hills. PAM VE6ALQ reports increasing QNI and traffic on the APSN. It was nice to have the company of VE6TY in the CD parties. VE6BAT finds he must use the late sessions of RN7 or no copy. Congrats to VE6AIK and VE6ANE on their engagement. VE6ADX is again active as NCS APSN on Sun. VE6SA is secy.-treas. of ARLA. Traffic: VE6FK 50, VE6FS 27, VE6VF 20, VE6AKO 4.

BRITISH COLUMBIA - SCM, H.E. Savage, VE7FB - RM: VE7QQ and VE7ASY Net Mgr. BC Emergency Net 3650 kHz are organizing cw code session Mon., Wed. and Fri. on 3755 kHz at 0300 GMT for 15 minutes. This is after the phone net closes for those that wish to bring up their speed. Chilliwack ARC's 1973 officers: VE7BEX, pres.; VE7BCP, vice-pres.; VE7BUS, secy. Vancouver ARC's 1973 officers: VE7AGX, pres.; VE7BIU, vice-pres.; VE7APL, secy. Congrats to Victoria Short Wave Club being first in its class in Canada for FD. VE7BOA visited VE7JN in VK-Land. BC FM Assn. held another interesting meeting; membership over 200. Have now rented repeater stations to many Interior clubs; you may now travel most of BC and have communications. WA6IQP/VE7ANE Silent Keys. Traffic: VE7BLO 92, VE7LL 64, VE7QO 41, VE7ADI 23, VE7TT 4, VE7AXI 2.

MANITOBA - SCM, Steve Fink, VE4FY - A new SEC and Winnipeg EC are urgently required. VE4WC and VE4HR have both asked to be relieved and as SET approaches your suggestions, and better yet, your services would be most appreciated. VE4s BG, HE,

HI, HR, IH and PU assisted West Kildonan Police Halloween night. VE4KE has a new four-element quad up and was active in the CQDX contest. OO VE4SW started a club and class at Gordon Bell High in Wpg. VE4CR took a short trip to W0-Land in early Nov. WARC has QUA back in circulation after an absence of three years. VE4TP now is VE7ATP; VE4GQ now VE7YH and VE4AZ now VE2DO. VE4OY a new operator at VE4GY club. VE4EA did an FJ job with the Fall MTN Bulletin. We could use an OO or two, as well as an SEC and some ECs, so let's hear from you. MTN: 26 sessions 89 QNI, 33 QTC. MEPN: 31 sessions, 875 QNI, 15 QTC. Traffic: VE4EA 68, VE4RO 64, VE4BM 16, VE4PG 16, VE4FO 14, VE4JA 10, VE4EF 5, VE4KE 4, VE4XN 4, VE4EJ 3, VE4NE 3, VE4QJ 3, VE4LN 2, VE4RV 2, VE4LA 1.

MARITIME SCM, W.D. Jones, VE1AMR - RMs: VE1RO VO1CA. PAMs: VO1FX, VE1YO. During Boy Scout Jamboree On-The-Air our section was well represented. Among those operating were Dartmouth Club, VE1HF with VE1PT, VE1AUE and VE1WZ doing the honors. About 100 cubs and scouts participated. VE1LC was operated by VE1s TS, SI, GU, ARV, WK, IN and AHP. The St. John boys also had about 100 cubs and scouts on hand. VE1OW Moncton, VE1WN Greenwood, VE1YL Cape Breton and VE1ATP Charlottetown were all active with the Scouts during the Jamboree. On Oct. 28 the Dartmouth Club held another successful auction. The NSVHF Assn. are publishing a new VHF Directory for our section. The UCARC (St. John N.B.) run a nightly net on 3755 kHz at 9 P.M. local time, good chance to get your "Worked St. John Award." Hope everyone is ready for the 18th annual VE1 contest (VE1s only) a great chance to sharpen up our cw operating on Sun. Jan. 21 to be followed the next Sun. Jan. 28 by the phone section. 12 hours of pure enjoyment 8 A.M. to 8 P.M. local time. VO1GW after 25 years of cw operating has received his phone ticket. APN reports QNI 80, QTC 61 in 30 sessions. Traffic: VE1AMR 74, VE1ARB 67, VE1AMB 12.

ONTARIO - SCM, Holland H. Shepherd, VE3DV - Once again I had the pleasure of attending the 5th annual convention of the RSO held on Nov. 3, 4 (668 paid registrants) at the Conestoga College, Kitchener under the auspices of the K-WARC. The K-WARC under chmn., VE3DWH and VE3AIM put together an outstanding event, everyone is to be congratulated. Your SCM attended the RSO delegates meeting as a representative for Ottawa. I also took part in the RSO, CARF and ARLI forums. For those

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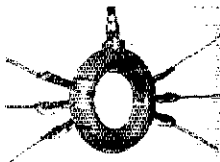
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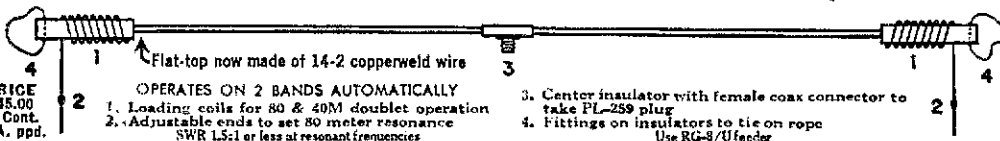
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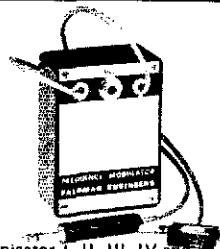
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(Please see the other side of this page for an application for membership in ARRL and 12 issues of QST)

THE AMERICAN RADIO RELAY LEAGUE, INC., NEWINGTON, CONN. 06111

QS-1-73


unable to attend let me report there was some discussion on the US band expansion but after the pres. of CARF spoke of an Oct. 25 meeting with Mr. Scott of DOC which was attended by VE3AHU, VE3CJ, VE3CDC, VE2MS and VE3DV there was little anyone could do except to wait. It was at this meeting DOC proposed sending out a questionnaire on possible Canadian action to all licensed Canadian amateurs and to ask for their opinions. The Canadian Division Dir. and pres. of CARF readily agreed to this action after receiving assurances from Mr. Scott that they would be allowed to make suggestions for amendments on the draft questionnaire. So look for that questionnaire sometime in late Dec. or early in the new year. I might add that I heartily endorse this very cooperative view of the DOC and I trust that every amateur will take advantage and let his voice be heard. Congratulations to the new pres. of the RSO VE3AR, and his new executive for 1973. Traffic: (Oct.) VE3SB 319, VE3GFN 217, VE3AWE 198, VE3FXI 194, VE3DV 160, VE3EHF 158, VE3FQZ 114, VE3DPO 109, VE3GT 89, VE3ASZ 60, VE3DBG 37, VE3GJG 30, VE3ATR 29, VE3BPC 27, VE3CYR 25, VE3EWD 24, VE3FRG 18, VE3DU 15, VE3FGV 11, VE3EHL 7, VE3EBC 6, VE3DH 6, VE3DVE 5, VE3VD 5. (Sept.) VE3SB 126, VE3DPO 102, VE3FXI 96, VE3DV 92, VE3GFN 91, VE3FQZ 89, VE3AWE 53, VE3AIA 46, VE3EHF 44, VE3GT 40, VE3EWD 26, VE3ASZ 25, VE3ATR 21, VE3FRG 18, VE3GJG 15, VE3BPC 14, VE3DU 13, VE3GBR 13, VE3FGV 6, VE3DVE 5. (Aug.) VE3AIA 44, VE3FGV 29.

QUEBEC -- SCM, Joe Unsworth, VE2ALE -- SEC: VE2BDM, VE2BJZ on 2 and 80 meters. VE2EB steady on VE2AQC for Shawinigan and VE2DBN's QTH Cap Sante. VE2BP active on 75 and 40 meters. Former VE2PV now VE2MN active on 80 meters. VE2AGQ operated from VE0MAB for a few months. VE2BLT looks for DX. Three Rivers active ARC classes for new hams. VE2DLG reports OQN and CQN weaker on 80 than 40. Repeater WIKOO now workable in the Montreal area. VE2GA and VE2BOK made print up all calls in QR net for past year over one K stations. VE2GA again mobile on two meters. Great interest locally for AMSAT Oscar 6. VE2AKM to chair committee for nomination VE2RM elections. VE2LS operates P/3 Ottawa during the week. VE2WX new on two meters. VE2UN again QIC active and made RPL. About two dozen VE2RM counters will be completed this fall. VE2AVP works on small boards for RTTY operation. VE2BU back to QTH after repairs in Nov. VE2APT new Sky hook at QTH.

VE2BEN on 450 MHz. Too bad many operators tune units on different bands not using dummy loads and QRM other QSOs. VE2BBK tuning 450 MHz unit. VE2AXY active on hf and vhf thanks to VE2TD. K3AY visited VE2JO. All AREC EC's requested to assist the SEC and make up and return their reports and be active in 1973 SET; look at past standing for AREC Quebec section. PSHR: VE2APT 28. Traffic: VE2UN 117, VE2DR 71, VE2QJ 44, VE2EC 40, VE2BP 36, VE2APT 23, VE2LV 19, VE2AJD 18, VE2ALE 15, VE2DLG 14, VE2UY 4.

SASKATCHEWAN -- SCM, William H. Parker, VE5CU -- AREC very active, attached to Saskatchewan EMO (formerly CD) as back up communications team. More members are needed, see your local EC. VE5LG and XYL in Hawaii. NIS doing great job. CW ops see VE5GI and join the SATN net. Regular ARRL Saskatchewan Net (phone) every evening at 0100 GMT 3785. AREC net every Sun. morning 1530Z 3780 and 1800Z 7175. Special thanks to VE5IL for past work as EC Moose Jaw and welcome to new EC VE5AQ. New class of hams started in Saskatoon Oct. 7. CNB hams all on the air and actively looking to make your acquaintance. Don't forget SET exercise in Jan. Look in Dec. QST for details and let your EC know you are available to participate. Traffic: VE5GL 30, VE5HP 11, VE5SC 11, VE5BW 5, VE5LN 2, VE5CU 9.

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QS-1-73

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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.

QJWA Quarter Century Wireless Association is an international non-profit organization founded 1947. Any Amateur Radio Operator licensed 25 or more years is eligible for membership. Members receive a membership call book and quarterly news. Write for information. Q.C.W.A. Inc., Box 394, Mamaroneck NY 10643.

PROFESSIONAL CW operators, retired or active, commercial, military, gov't, police, etc. invited to join Society of Wireless Pioneers - W7GAQ/6 Box 530, Santa Rosa CA 95402.

EDITING a club paper? Need public relations help? You should belong to Amateur Radio News Service. For information contact Rose Ellen Hills, WA2FGS, Secretary, 17 Craig Pl., Pennsville NJ 08070

FREE sample copy Long Island DX Assn. bulletin. Latest DX news. Business size s.a.s.e. to W22MBF, Box 532, West Hempstead NY 11552

AN INVITATION NYC area hams and SWLs are invited to attend NY Radio Club meetings - 2nd Monday of every month, Williams Club, 24 E. 39th St., near Madison Ave., at 8 PM - New members welcome. Interesting programs.

ROCHESTER NY is the place to go for the largest Hamfest, Flea meet and flea market in the northeast, May 12th. Write WNY Hamfest, Box 1389, Rochester NY 14603

22ND ANNUAL Dayton Hamvention will be held on April 28, 1973, at Wampler's Dayton Hara Arena. Technical sessions, exhibits, hidden transmitter hunt, flea market, and special program for the XYL. For info write Dayton Hamvention, Dept. Q, Box 44, Dayton OH 45401.

SOUTHEASTERN Division A.R.R.L. Convention and Tropical HamBoree. Miami Florida January 20 and 21. Always the biggest and best in the Southeast. Giant in-door flea market. Manufacturer and distributor exhibits of the latest new equipment. Meet your QSL Manager. Attend net, DX and QJWA meetings. Get the latest from the A.R.R.L. Board meeting (within 24 hours) direct from the Division director and other League officials. Special Saturday afternoon program for the YL/XYL group. Early registration \$1. \$2 at the door. Further info and special low hotel rates, write Dade Radio Club, PO Box 73, Biscayne Annex, Miami FL 33133.

WELCOME to Disney World! Visit Florida for the big one - the Orlando Hamfest and FM convention - June 2, 3 - something for all! Air conditioned 25,000 sq ft exhibition areas, great motels, restaurants, Cape Kennedy, all major attractions - Atlantic, Gulf Beaches - very easy drive - plan now! Enjoy yourself - details later.

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QSLs 200 two color \$5.20. 8c stamp for samples. Rubber stamps with your call and address \$1.50 ppd. Mark Peterson, WB6NKO, 2534 El Tomas Way, Carricocha, CA 95608.

CASH paid for your unused tubes and good ham and commercial equipment. Send list to Barry, W2LNI, Barry Electronics, 512 Broadway, NY NY 10012.

WANTED: All types of tubes. Top prices paid for Varian & Kimac. Jaro Electronics Corp. P.O. Box 414, Orlando, Fla. 32802. For fast action call Toll Free: 800-327-7799. Ask for Bob Hoffman.

WANTED: An opportunity to quote your ham needs. 33 years a ham gear dealer. Collins, Drake, Galaxy, Tempo, Kenwood, Ten-Tec, Hy-Gain, and all others. Also \$25,000 inventory used gear. Request list. Chuck, W8UCG, Electronic Distributors, Inc. 1960 Peck St., Muskegon MI 49441. Tel: 616-726-3198

HAM ticket - Amateur radio license course for Novice, General, Advanced, Extra Class. Write for information. Clayton Radio Co. 220 Mira Mar Av. Long Beach CA 90803.

SPIDERS for boomless quads. Hellarc welded aluminum. All's Antennas, 1339 So. Washington St., Kennewick WA 99336

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TOWER climbing safety belt/lanyard \$21.50. Prop pitch rotor \$65. T/S 175 frequency meters \$45. 2M handtalki \$50. Coax rf switches multiposition \$16-\$48. Free list. Link, 1000 Monroe Tpk. Monroe CT 06468.

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SELLING out. Send address for list. Cline WATPMR Box 216, Logan UT 84321.

HEWLETT Packard electronic counter 5245L main frame with 5262A time interval plug-in \$1600. Box 217 Hinsdale IL 60521. (312) 654-0513.

FOR SALE. Transceiver brand new Eico 753 sst/a-m/cw 80, 40, 20 meters 200 watt, transistorized VFO with ac supply and 12 volt dc supply \$250. Harry McCall, Sparta NC 28675. Work 372-8459. Home 372-8655.

NOVICE Crystals - new frags. 24-hr shipment. Free flyer. Nat Stimette Electronics, Tavares FL 32778.

SWAP Clegg Thor 6 with ac supply in good condition for Heath HW22A and ac supply. Frank McLanett, 11557 Evanston N, Seattle WA 98133.

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WANTED UTC CG311 transformer, CG1C, CG109 chokes. F. Budavary, 285 Summit, St. Paul MN 55102.

COLLINS crystal pack - first \$140 or what have you. Want basket case 585 series revr. J. Koehler, 2 Sullivan St., Saskatoon, Sask. S7H-3G8 Canada.

COLLINS mechanical filters 455 KHz 2.4 kHz bandwidth \$11 postpaid. V. Mozarowski VE3AIA, 1 Belgrave Dr., Islington ON Canada.

YAESU FT101 owners - present and prospective. Join the nonprofit international Fox-Tango Club. Send stamped, self-addressed envelope for information and sample newsletter. Milt Lowens, WA2AOQ, 3977-F Sedgwick Ave. Bronx NY 10463.

TRIFYPE model 19 for sale. Sync motors, geared for 60 wpm. clean, in good condx \$150. Also model 14 receive-only typing reper, governed motor, 60 wpm, exc. condx. \$50. Will ship. Jerry Hall, K1PLP, 181 Brimfield Rd. Wethersfield CT 06109.

WANTED, QST magazine 1916-1922. Paul Kluwe, Edmore MI 48225.

AWARDS Hunters - Five band awards log book for DXCC, 5BDXCC, 5BWAS. Easy to read and easy to use. Send \$2 to Five Band Publications, Box 264, Lyndhurst NJ 07071.

WX satellite picture rig complete. Yours for only \$275 complete. Larry Payne, K6UNT, Wainwright AK 99782.

2-METER fm Inoue IC-20. Brand new, 12CH, 6xtaled, w/mike mount, 10W, \$269.50. Bob Brunkow, 206-747-8421, 15112 S.E. 44th, Bellevue WA 98006.

KWM2, yours is not perfect but it can be easily. Write. W4BNF Box 105, Kearney NE 68847.

FOR SALE: Simpson 260 meter, 20,000 OM, \$25; BC 221 A.J 125 to 20,000 KC, \$60; Hammarlund HQ-180C, \$250; Waters-Hybrid Coupler Model 3001, \$40; TC-34-A keyer with tapes, \$20; GE Model MM2, \$50; Heathkit HW-17A, \$50. All prices FOB. William Kimball, 61 Hartford Ave., Hopedale MA 01747.

GONSET II, 2-meter transceiver, \$55; Gonset III, \$75; Clegg 22er, \$125; Poly Comm IV, \$165; Norelco video tape recorder, \$310. Wanted: Gonset IV in scrap condition or meter for unit. W4GKF, Stan Nazimek, Jr., 506 Mt. Prospect Ave., Clifton NJ 07012.

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RCA WT501A transistor analyzer-tester, mint, \$45; BC AR229, \$5; BC AS230, \$5. Bostwick, WN4SGS, 2015 Va. Ave., McLean VA 22101.

COLLINS 755-3, \$375; Drake R4-B, \$325. Jim, K6GLC, 1216-B Strand, Manhattan Beach CA 90266. Phone (213) 545-3164.

HEATHKIT HW-16, HR-10B used less than 10 hours, \$150. W4EKK, 9761 SW158 St., Miami FL 33157.

COLLINS 75A1, \$128; Knight T-150, \$30. Doug Pace, 18520 Prairie No. 6, Northridge CA 91324.

OLD tubes for sale. 0J, 26, 4I, 71, 24, 27. WASHK7 Coopersburg PA 18036.

FOR SALE: Collins EWS-1 transmitter and 75A-4 receiver, all mechanical filters. In excellent working condition. With instruction manuals. Price: \$500 cash, FOB Sumter. W.J. Tee 730 Wren St., Sumter SC. Telephone (803) 775-6232.

NEWS tabloid for radio collectors and historians, 50 cents. The Horn Speaker, Box 12, Kieberg TX 75145.

WANTED EZ Way 40' tower, ground post. J. Warren, 50 Ronnie, Indian Harbour Beach FL 32937.

HRO 'Sixty' receiver coils with dial scales wanted. Excellent condition only. P. Barrett, W4IQFB, 112 Sunny Cove Dr. Warwick RI 02886. Tel. 737-3729.

SELL Eico Model 315 signal generator, manuals, \$25 plus ship W9CAS, 6525 West Brooklyn Pl., Milw. WI 53216.

SELLING my station. Drake 2B/2BQ mult., \$175; HT-4 sideband transmitter plus HA-16 VOX, \$150; P&H linear amp, LA400C, \$45. Must sell, all gear in excellent condition. Phon (312) 662-3913. Write Lowell Wertz, C-1005, Trinity College Deerfield IL 60015.

SELL Drake TR3 AC3, \$395; Kepko reg. power supply to 500 200 mA, \$30, many other transmitter components. Write WA1ING, Saunderstown RI 02874.

NCX-5 with ac supply/speaker, manual, service notes, \$27 including shipping 48 states. W4BESM, Thacher School, Ojai CA 93023.

SALE: Hallcrafters SR-2000, power supply, \$750. W4EO: Gallant, 4411 No. Federal Hwy., Pompano Beach FL 33064.

NOVICES: DX-60B, excellent. HQ-110, reconditioned. HG-10, VFO, \$170, w/ship. Gary Dolan, WN9INQ, 1212 So. 15th Lincoln NE 68502.

CONTACT us for new or reconditioned Collins, Kenwood, Tempo-One, Drake, Galax, Hy-Gain, Mosley, Henry linear towers, antennas, rotators, other equipment. We try to meet an deal and to give you the best service, best price, best terms, to you. Write for price lists. Try us, Henry Radio, Butler MO 64730.

WANTED: Type F condensers, also other misc. Atwater-Kent breadboard parts. Joe Horvath, 522 Third St., San Rafael CA 94901.

SELL Drake 2-B and 2-AQ in excellent condition; Heath DX-60B needs minor repairs, both \$195. N.T. Bailey, 107 N. Wilton Rd., Richmond VA 23226.

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WANTED: Heathkit SB-640. Vince Essex, W9KB, 111 Amsterdam Ave., Madison WI 53716.

SELL: HW-16, SB-600 spkr., 7 xtals, excellent condition, \$95 or best offer. Jeff Smith, Box 146, Mapleview RI 02839.

PART time business, manufacture and sell coax connectors to fellow Hams, small metal lathe and spare time required. Price right, will trade, want KWM-2, write for particulars. Wayne Smith, 128 Powers Rd., Bedford OH 44146.

TTY equip. 15-19 printers, 14 TDs, tape perf., power supplies, tables, tape reader, audio converter. QSTs 1946 thru 1970. Make offer. W6NQE, (707) 822-5500.

SELLING out: HT-32 trmtr, with low pass filter and semi-auto key; NC-303 revr., all for \$250, you pay shipping. X-W7GBZ, F. Fowler, 2580 26th Ave., W. Seattle WA 98199.

SALE Heathkit HW-101 xcvr, HP-23A power supply, HO-1 patch, E-0 mike, filter, Balun R-8, 30 ft. mast, 4B7C vertical excellent condition and less than 1 year old, \$400 or bid separately. Hugh Crossman, WB6TQZ, 1034 Emerald St., Apt 312, Torrance CA 90503.

WANTED sensibly priced, clean Collins 753 and 3253. KX6IC 418 Washington, Union City TN 38261.

JOHNSON match box with vswr mtj. 750 W pep. \$60 WA2NDO, 210 Appian Ave., Middlesex NJ 08846.

FOR SALE or trade: Friden Flexowriter, fine condition standard keyboard, electric typewriter, punches tape, reads tape original cost, \$4700; National HRD-5TA-1 with power supply A-B-C-D coils in perfect condition, these are hard to find; National SW-3 with power supply 80-40-20-meter coils, like new condition, a collector's item. Need late Collins or Drake gear. A inquiries answered. Donald L. Farrell, W2GA, 207 Seneca St. Chittenango NY 13037.

C.W. ops. Collins 600 H2 low pass filters (3) 2000 ohm in and out. Also tone channel filters (2) 90 Hz wide at 6 dB, 500 Hz at 60 dB. Just plug between revr and phones, \$10 each plus \$3 shipping. Dave, WA2VYU, 31 Rifton St., Elmont NY 11003 (516) LO1-2390.

DRAKE system R4A, T4X, MS-4 speaker, AC-4 power supply excellent condition, \$415 complete, W4J8Q, 9018 Charles Augustine Dr., Alexandria VA 22308. Phone (703) 780-3970.

SELL Hallcrafters SX 100 receiver, excellent, \$80. R.W. Luedke, K9MOR, 602 S. William, Mt. Prospect IL 60056.

HW-16 excellent condition, \$75. Greg Short, WA5IAK, #60 Hereford, Odessa TX 79760.

HT-32 vox. PTT break in cw. Sell or trade. John Allen, Bowling Green MO 63334. (314) 324-2410.

WANTED junked HT32 for parts. WB2GDK, William Downs, 2 Stevens Dr., Attica NY 14011.

DRAKE 2-NT, Knight VFO, \$110; 2-C, 2-CQ, \$200. All excellent condition, 1 day shipping. WN4UCC, No. 96 Hallmark Estates, Athens GA 30601.

DRAKE 2C with calibrator, noise blander and Q-multiplier speaker, \$175; Drake 2NT, \$85; and Eico 722 VFO, \$20; all for \$260. All in super mint condition with manuals and cables. John Fagan, 721 W. Border St., Arlington TX 76010.

SELL QST, CQ, 73 issues back to 1950. W2FIV, 102 Cobblestone Cr., Moorestown NJ 08057.

REALISTIC offers wanted for QST 1926 thru 1972, RADIO 1938 thru 1940, CQ 1947 thru 1954. Collins 75A4 cw, ssb and am filters, vernier knob, speaker, manual, No. 4402. Beautiful. Terms if no order, \$325. W4ZLN, 3 Puddingstone Ct., Morristown NJ 07960. (201) 267-2921.

HOOSIER Electronics - Your ham headquarters in the heart of the Midwest where only the finest amateur equipment is sold. Individual personal service by experienced and active hams. Factory-authorized dealers for Drake, Regency, Standard, Ten-Tec, Hy-Gain, CushCraft, Mosley, Ham-M, plus many more. Orders for in-stock merchandise shipped the same day. Write today for our low quote and try our personal, friendly Hoosier service. Hoosier Electronics, R.R. 25, Box 403, Terre Haute IN 47802.

WANTED old radios and tubes, best prices. Ullom, Box 547, Blythe CA 92225.

SELL Heath DX60B xmt with 15 crystals, HR10B rcvr with calibrator, \$140 or best offer. Will swap for Drake AC-4 and MS-4. WA1PCB (617) 427-3976 35 Thornton St., Boston MA 02119.

GALAXY V MK II, ac supply, remote VFO, 300 Hz filter, splr console, \$300 FOB. W6OGC, 4837-1/2 Kansas, San Diego CA 92116.

10KW power plant on steel skids, self contained fuel tank, special heavy duty starter and batteries, jeep engine, very complete instrument panel with frequency meter, volts, amps, running time, convenience outlets, 182 hours since new, average use once normally bring \$1250, this clean one is only \$750; GE-PI base station, new high gain antenna, 2-TPL mobiles with new 3DB antenna, 150-170 MC, 2-complete clean low band Motorola 751GGV mobiles, MASTR electronic siren, PA unit, w/speaker, this gear will definitely be sold for best offer. W3DSV, Box 87, Webster WI 54983.

MANUAL or schematic needed for Bendix Model 1P71CA mobile 2 meter fm transceiver. Robert Kennedy, K9DXB, Merom IN 47851.

SWAN 500C, ac and dc supplies, VOX, beautiful condition. Joel, WA2KZD, 156 Groton Pl., W. Hempstead NY (516) 485-5103.

FOR SALE Collins 75A-2 receiver, best offer. Richard Bailey, 68A Church St., Gonic NH 03867. (603) 332-7855.

WANTED 10M, 20M, 7VH and 10M, 15M, and 20M JVL coils, or 3 TVH plug bars. K8HEN, 55 Moore Dr., Franklin OH 45005.

FOR SALE SX-101A rcvr, excellent condition, \$140. K4EKS, Box 20, Rt. 7, Somerset KY 42501.

SELL Eico 753 rcvr, 751 ac supply; Hallicrafters SX-140 rcvr; Heath HF-1 VFO. All good condition. Will ship. 1926 Grebe complete instrument panel with frequency meter, volts, amps, running time, convenience outlets, 182 hours since new, average use once normally bring \$1250, this clean one is only \$750; GE-PI base station, new high gain antenna, 2-TPL mobiles with new 3DB antenna, 150-170 MC, 2-complete clean low band Motorola 751GGV mobiles, MASTR electronic siren, PA unit, w/speaker, this gear will definitely be sold for best offer. W3DSV, Box 87, Webster WI 54983.

SELL Collins 70H-3 VFO, \$25; 250 kHz mech. filters one each USB/LSB, \$20; Johnson 150D71 and 100D70, \$5 and \$4 each; Heath Scanalyzer \$95; 221AK freq. meter in battery compartment, \$25; TTY Perf and TD, etc. Add shipping. W2ATQ.

WANTED operating manual for HQ 170A VHF. Joe Gurr, W6AEW, 29 Hawthorne Ave., Los Alos CA 94022.

COLLINS 32S-1 with ac supply, \$325; Collins 30L-1 amplifier, \$320. Both for \$625. Dave Arnold, 501 Harton Circle, Virginia Beach VA 23452.

SB101 and HP23 for sale. Excellent condition, \$350 for both. Eugene Chester, K9FOQ, 6821 W. 11th St., Indianapolis IN 46224.

SELL T-150 transmitter, excellent condition T/R relay built in, \$45. Dick Broomfield, 256 William St., West Haven CT 06516.

WANTED Vernier knob for 75A4. Pay good price. VOIFN, 48 Laurier, St. John's Newfoundland, Canada.

CENTRAL Electronics 100V excellent condition, \$350. Thomas Lifland, 272 Cedarhurst Ave., Cedarhurst NY 11516. Tel. (516) 569-1687.

SELL Drake 2B, \$160; DX-60B, \$59. Bryan Bergeron, 328 Glennwood Ave., Morgan City LA 70380.

SELL Hallicrafters HT37 xmt, ssb, cw, excellent condition, \$150. WA2ZDV, 4046 Eve Dr., Seaford NY 11783.

SELL Swan TV-2B two meters cw and ssb transceiver, 14 MHz input, excellent condition, \$200; Cliff Dweller 40 and 80 meter dipole with 3 motors, \$75. Tom Carter, WIBHZ, 19 Webb Cir., Monroe CT 06468.

OLD timers - YL committed to learning theory and servicing of tube era urgently needs working 1945-1960 vintage test equipment, manuals, etc. Also want preselector rcvr ssb adapter, etc. Please check attic and advise lowest price. Ms. M. Eppley, 4634 Field, Wheatridge CO 80033.

SELL Galaxy V transceiver, recently completely factory overhauled, AC-35 P/S, speaker console, VOX-35B VOX, cal-35 100 kc cal., all in very good condition, with all manuals included. Make offer, sorry, can't ship. Call after 3:30 PM, EST. Inland Button, WA2LMD, 63 Dale Dr., Chatham NJ 07928. (201) 377-7779.

COLLINS KWM-2 with 516F2, \$625; 516F1, \$75; 30L1, \$325. All excellent. Teletype KSR-28, USM 24C scope, magre offer. Need 75A2. Gil DeBard, 3384 Heights Dr., Reno NV 89503.

COLLINS linear 30S-1, excellent. Best over \$600. W9JQD, 54712 Merrifield, Mishawaka IN 46544. (219) 255-7930.

RANGER II factory wired w/pt, excellent, \$135. Dan Meyer, 308 West Wisconsin, Chippewa Falls WI 54729.

WANTED antique tubes, UV202, etc. Have RCA 18. W3BNO, 2706 Cubhill Rd., Balto MD 21234.

SELL Swan 250C and 117XC supply; Clegg 22er. Brian Shptoski, WA3JGU, 178 Newport St., Nanticoke PA 18634.

CRYSTALS airmailed: MARS, SSB, Nets - Notice: Get on new-old frequencies. Quick-cheap, minimum five, active FT-243, 40M-15M, 99 cts. each; 80M, \$1.59. Mix okay. Four or less, \$1.25; 80M, \$1.75. General purpose: FT-243, custom finished etch stabilized, .01% 32pt., 3500-8600 kilocycles, \$1.90 each, (minimum five, \$1.75). Crystals that nest, minimum ten, \$1.45; 1700-3499, 8601-13,000, fundamentals, 10,000-30,000 kilocycles overtones, \$2.95. Add 50 cts. each for .005%, 75 cts. each for HC-6u metal miniatures above 2000. Write for order-listings. Airmailed 15 cts./crystal, 1st-10 cts. Crystals since 1933, C-W Woods, W9LPS, C-W Crystals, Marshfield MO 65706.

WE buy electron tubes, diodes, transistors, integrated circuits, semiconductors. Astral Electronics, 150 Miller St., Elizabeth NJ 07207. (201) 354-2420.

WANT to buy Galaxy V Mark III Deluxe console DAC 35. W2ALY4, 1167 No. Tamiami Trail, No. Ft. Myers FL 33903.

FOR SALE The Wireless Age magazine, 1914 (Jan., Mar., Nov.), 1915 (Oct., Dec.), 1916 (Jan., Feb., May, Oct., Nov., Dec.) and 1917 (Jan., Feb.). Best offer. W1CUT, 18 Mohawk Dr., Unionville CT 06085.

DX-60B, \$68; HR-10B (with cal.), \$70. Both in excellent condition. You ship, Bill Tyson, 1001 No. C. St., Hamburg AR 71646.

SBE-34, microphone, codapter, SB2-LA linear, 200' coax, all \$350. WB2UNI, P.O. Box 42, Somerset NJ 08873.

DISCOUNTS on all Shure microphones. Model 444 list price \$29.95, only \$23.87 postpaid, guaranteed. Check out COB. Other models available. Advance Sound Company, 188 Warner Rd., Huntington NY 11743. (516) 368-7620.

SELL Hickok 6000A tube and transistor core for \$90 (present price \$230); RCA solid-state WV500 series voltohmmyst with WG-301A.R.F. probe, \$50 (present WV series, \$128+); Cams 159-20 photo meter, \$35; Jones Micro Match and transmission line couplers, \$25. Metropolitan N.Y. City hams preferred. W2IW, Ed O'Brien, 86-10 34 Ave., Jackson Heights NY 11372.

COLLINS 32s3 transmitter with power supply, \$650; 75s3 receiver, \$450; control box and phone patch \$125; \$100; 30L1 antenna, \$40; 200' coax, \$25; Jones Micro Match and transmission line couplers, \$25. Metropolitan N.Y. City hams preferred. W2IW, Ed O'Brien, 86-10 34 Ave., Jackson Heights NY 11372.

HOME BREWERS: Parts, cheap, list SASE, W6YKQ, 228 El Prado, San Rafael CA 94903. Tel. 479-9498.

HOSPITALITY would be appreciated from Richmond-Petersburg, Virginia hams during school attendance at Ft. Lee, 6 Jan. to 16 Feb. Past three years as DL4VA, 3AQFN, FUG, WA4WMLX, HB0XJG, HB0XKW. Write Hugh Vandegriff, A1MSM, Class 73-3, USALMC, Ft. Lee.

DRAKE 2NT, excellent condition, guaranteed, free shipping, \$110; xtal box (Drake W-4 cabinet) incl. 3 good quality 15M xtals (like VFO), \$25. Both \$130. Mario A. Petrone, 434 So. Euclid Ave., (3E), Oak Park IL 60302.

SELL Heath IM-11 VTVM, \$18 ppd.; IT-12 sig. tracer, \$15 ppd.; HW-12A, \$85 ppd.; HW-32A, \$85 ppd.; Need Aem. Mfg. band key, W4YOX, 413 So. Ocean Blvd., Pompano Beach FL 33062.

WANT to buy Hallicrafters Models S-37 and SX-88. Please state condition and price. All letters answered. Call (213) 285-5165. Bill Wysocki, 5052-1/2 Sereno Dr., Temple City CA 91780.

SWAN 500C (factory modified to CX) and Swan 117C. Excellent condition, \$375 postpaid. Sten Gould, 460 Forest Ave., Paramus NJ 07652. Tel. 262-8632.

SELL HQ110C, good condition, \$95, you ship; Ten-Tec PM2, \$35. W1DRN/2, Whitehall Apts. C1-3, Mt. Holly NJ 08060.

SELL Collins 32S-1, \$300; 75S-3 with filters, \$400; 75S-1, \$250. W1UOP, Roger Paulson, P.O. Box 4, Needham MA 02192.

QSTs 1926-1971. Write for list. Merrill Britton, W1NCD, 35 Winsor Dr., Barrington RI 02806.

FOR SALE HW101 with crystal filter, E.U. 630 mike, SB650 freq. counter, power supply, HM102 SWR-watt meter, headphones. All Heath, all mint, all manuals, Transmatch, 200 ft. RE59, key, College must go \$800. For all or best offer. Art Morton, 1340 Laffer Ave., Akron OH 44305.

SELLING: Heath SB-301, SB-401, and Hammarlund HX-50A, HQ-170. All perfect. Will trade a 16' Galston boat, 35 hp Johnson, and trailer for ham gear. Trying to win DX test, so prefer tubes, beams or linears. Offers to: WB81AY, 1740 Shiloh Springs Rd., Trotwood OH 45426. (513) 837-5901.

HEATH HW101 factory aligned with cw filter and HP23A, \$295; Hunter Bandit 2000A linear, \$200. Philip Schwabler, W9GCG, 4536 N. 50 St., Milwaukee WI 53218.

SELL: DuMont 208-B scope, \$50; 10 meter xmt, \$29-B final, \$25. Pick up at W2TFL, 99 Mtside Terr., Clifton NJ.

SYLVANIA television cameras \$75 and up. Ideal for amateurs, sonic monitors, scan and scan rate, and video tape recorder. Write: Reed Electronics, 154 Main St., Middletown CT 06457.

"DON and Bob" buys. Gladding 25, \$212.50; with ac, \$255; SBE144, \$209; SBE450 MHz transceiver (399.95L), \$339; SBE SBY system, monitor, camera (999.90L), \$849; Mosley CL43, \$124; CL36, \$149; MCQ35 quad, \$91; SA02, \$143; Radiant TH6DX, \$139; 204BA, \$129; Ham-M, \$99; TR44, \$69.95; Belden 8448 Rotor cable, 10 cts./ft.; AR22R, \$31.95; CDE parts: Mallory 2.5A/1000V epoxy diode, 29 cts., Cetrion 572B, \$13.95, Leader 810 GDM, \$49.95; quote Clegg FM27A, Kmac, Triex, Ten-Tec, Drake, Kenwood, Tempo Dealer, Write quotes, list prices, FOB Houston, subject to change without notice. Master Charge, BAC. Warranty guaranteed. Madigan Electronics, 1508 McKinney, Houston TX 77002. (713) 224-2668.

SIGNAL/Jone-Alpha-77: CX7 factory modified to CX7A, \$1395; CX7A less than 3 months old, \$1795, new \$2395; Alpha-77 new, \$1995, demonstrator, \$1795; use Alpha-77 vapor and air, either, \$1195. Tone trades. Payne Radio, 525, Springfield TN. Days (615) 384-5573, nites (615) 384-5642.

HEATHKITS professionally wired, tested. Send for quote. Parrish, 306 W. Amherst, Melbourne FL 32901.

FOR SALE: 6N2 Thundربول. Will take in trade Genset 903A amplifier. J. Gyan, 53 Lethrop St., Beverly MA 01915. (617) 922-3850.

WANTED to buy Heathkit Analog Computer. Working condition. E.J. Schlesinger, 5108 Melvin Ave., Tarzana CA 91356. (213) 244-4376.

HALLICRAFTERS S-38E revr. \$25; Handbook 75W xmtcr, \$30. FOB. W1YU, 2045 Yale Station, New Haven CT 06520.

DX-pedition KX1L approved? VP2M QTH; beautiful house in tropical setting, overlooking Caribbean and mountains. Large swimming pool, 3 bedrooms, 3 baths, maid service. K. Hollatz, VERPHO, Box 1077, Elmira Ontario.

SELL: Waters Model 359 compresor, \$15; Irmer M+3 mike, \$15; Heath PPT mobile mike, \$5. All new condition with instructions. Douglass, 6 Damon, Belen NM 87002.

SX-110, \$55; Eloc 722 80-10M VFO, \$25; DX-20, \$20. All excellent. K8HJL.

WANTED: Eddystone dial. Frank Yatko, G.E. Company, APO Seattle WA 98736

SELL: Heath HW-16 cw transceiver, excellent condition, \$80. W9FFW, 321 Olympic Hgts., Dubuque IA 52001.

FOR SALE: KW match box, eter, \$125; 2C, 2CQ, \$195; SB-401, xtal pack, \$250; 7553-C, 0.5, 1.5, 2.1, (ground emblem), \$350; 2001 (needs work), \$575; 15-100 HP, 23-A, spkr, mike, SWR, \$275; 75A, 1000 Hz, 5 filter, \$445; Warty; Rohn No. 45, Collins SC-101/88Y, L-501 (KWS-1), KWS1 (over No. 1500), KWS-1 (for parts) TEK-545, James Craig, 29 Sherburne Ave., Portsmouth NH 03801. (603) 436-9062.

HEATH SB-300 with all filters and xtals for 15 and 27 MHz, \$215; SB-400 with xtal pack, \$275. Both mint condition. WR2RG, 374 W. Lawrence St., Albany NY 12208.

SELL: UCS300, \$25; UCS400, \$30; good used 4-1000A's, \$30; USM32 oscilloscope, \$45; varaca, 110V input/20V at 20A output, \$15; complete industrial radio system: base station/repeater, 10 personal communicators, 10 Halo base antennas, hard line, etc., 25-55 MHz AM. All solid state, 15% of cost. Trammell, 1507 White Oak Ct., Martinsville VA 24112.

JOHNSON KW matchbox without coupler, \$35; Telrex 20M316, \$70; 10/15 fiberglass 2EL quad 150" RG80, \$40; Hy-Gain FBX-71, 18" trap mod, 75" control cable, \$60; compressor CEI mod ACP-1, \$10. "AP", WSUUI, Ardmore OK 73401.

QST Jan. 1957 thru Dec. 1971. P.F. Reporter 1962 thru 1967. Like new. Make offer. R.E. Balfner, W2BAA, 22-12 128 St., College Point NY 11356.

HALLICRAFTERS SX-122 receiver, unused, mint condition, \$125. Ed Valae, Page Dr., Mentor OH 44060.

SELL Hallcrafters SX10A receiver and matching speaker. Like new. \$165. J.L. Amari, WA2QHL, 10-30 River Rd., Fairlawn NJ 07410. (201) 796-1892

FOR SALE: VHF 152, 10M, 6M, 2M, tunable converter. Excellent condition, with book, \$35 postpaid anywhere U.S. Technical Material Corp. XRF-1 RTTY and facsimile heterodyne frequency shift keyer. Calibrated front panel dial sets shift from 0 to 1000 cycles. VFO in precision oven. Speeds to 1000 words per minute. Using one in my station, have two. Complete data brochure free for SASE. Excellent condition. Complete with twelve dollar book, \$89.95. Postpaid anywhere U.S. W5OR, 1721 N. Tierney Rd., Fort Worth TX 76112.

HEATHKIT SB301-SB401 SB600 speaker, all cables and manuals, \$425. George Blair, K9VGE, 5039 N. 61st St., Milwaukee WI 53218.

SELLING entire station to pay for Number 3 child arrival: SB-401, SB-200, SB-610, SB-600, HDP-11A, HD-15, WNA1, 143VZ, QRP-20. Best meters cheap, \$700 takes. WASCOD, J. Clark, 14392 Purdy St., Westminster CA 92683. Tel. (714) 894-6344.

SELLING Hallcrafters SR-150, ac speaker/supply, all crystals, exceptionally nice, \$295; Johnson 275W SWR matchbox, \$65; EC-221 frequency, ac, \$48; 200V transceiver ac supply, \$45; 75A-1 3.1 kHz. QRP-20. Panel meters cheap, send for list. More, W7DI, 6633 E. Palo Verde Lane, Scottsdale AZ 85253.

6 METER sellout, Clegg Venus SSB-AM transceiver, \$195; Interceptor receiver with matching Zeus transmitter, \$395; International Crystal's twins SBX9 mc, SSB exciter with SBA-50 mixer/linear, \$165; MCQ35 receiver 6 meters HQ180, \$125; YK-2 transmitter \$69. Utica 650 with VFO, \$65; Polycrom 6, \$68; Apollo linear, \$195; Hallcrafters HA6-P26, \$120; CF20A, \$55; KWMI, \$250; FLDX400, \$275; HXL1, \$260. F.E. Coble, 251 Collier Ave., Nashville TN 37211. Phone (615) 833-2724.

SWAN 270B, 2 hours use, \$400. W5KDM.

ONE unused tape distributor, \$90; 1 IVC 800 video tape recorder, \$1200; 2 Satchel Carlson color monitors, \$500 ea.; 1 Polcom 8 meter rig, \$90; 1 8" transistor conarc monitor, \$150; 1 KM 15 Teflon "saw", \$275. Write or call Hicketts, WA2GID, 1733 Broadway NY 10019. (212) 245-2497.

FOR SALE excellent Hallcrafters SX-122 receiver, with speaker and manual, 540-34 MHz, ssb-am-cw, best offer over \$200, shipped prepaid. Also Heath GR-54 receiver, \$50. Write M.J. Hayostek, WN9ESY, Box 401, Lake Park IA 51347.

TRISTAO CZ454FS tower with MU-33 electric drive unit 3 years old, very good condition, \$275; Ham-M rotator, \$50. WA6DET, 27031 Grayslake Rd., Palos Verdes CA 90274. Tel. (213) 377-6266.

GOING QRT every thing must go. Collins 2533, 755-3A, KWM-2, Drake R-4A, T-4X, Henry 2K, TH-3, plus many accessories, reasonable. WA2NDU, (201) 568-4064.

WANTED Drake TR-2V. State age, condition, crystal frequencies and lowest price. WA2VOP, Alden Bender, 1678 Northgate, Merrick NY 11566.

COLLINS 516F-1 12 VDC power supply and 351D-2 mobile mount, \$115; Gladding 25 Hz transceiver with ac supply and 24/76, 94/94, 19/79, 28/88 crystals, \$220. K1MRM, 44 Briarwood Rd., West Hartford CT 06107.

"HOSS Trader Ed Moory" says he will not be undersold on Cash deals. Shop around for your best price and then call or write the "Hoss" before you buy. A steal at this price. New Galaxy GT-550A transceiver, factory sealed carton, reg. \$595, cash price, \$389. New Rohn 50 ft. foldover tower, prepaid, \$259; new Mosley CT-33 and demo Ham-M rotator, \$215. Factory authorized dealer for New Drake Collins, Hallcrafters and others, write for quote. New Drake TR-4 transceiver, \$495. Used equipment; L-4-B linear, \$525; R-4-B, \$349; T-4-XB, \$375; Ham-M, \$85. Moory Electronics Co., P.O. Box 506, DeWitt AR 72042. Tel. (501) 946-2820.

IN4007 diodes, with suppression networks, 10 for \$2.50, 100 for \$22.50. East Coast Electronics, 123 St. Boniface Rd., Cheektowaga NY 14225.

NEED a new rig? In stock for immediate delivery. Clegg RM-27A, Regency HR2A, HR-212, HR-6, AR-2, SR-2-144, SB-450, SB-30, Standard SC-146A, SC-8265, GTC-20, complete Ten-Tec line, Gladding 25, plus Cushcraft, Newtronics, Hy-Gain, and Mini-Products antennas and accessories. Phone or write today for fast personalized service. Johnson Electronic Sales, Box 332, Griffin GA 30223. (404) 228-3831.

SELL: Galaxy 5 mark two, 5 band 400 watt transceiver w/VOX and 1000A, cond. \$250; 4-1000A linear, excellent engineer construction, compact, 5 mt, rated 3800 volts at 500 mA, continuous loads at 2000 watts. First \$350 takes. Extra 4-1000A, \$40. M. Farcy, WA3NNR, 241 Selkirk Rd., Williamsport PA 17701.

SELL: Collins 20 meter beam 20 ft. boom, \$60; filter choke for 30S-1, R. Hy, 600 mA, 4000 wvts. 480-A metering device. 7000C-6 tuning units. Heath HW-30 tuner, \$25; SCR-522 3 meter xmt and ac supply, 4CX1000A and socket, 4X-150A, 812A, others. Amprobe Jr, \$50; Heath capacitor checker IT-11, \$20; Newtronics NB-40 noise blanker antenna; Hallcrafters E-46 speaker. Oil filled capacitors 8 muF, 2500VDC, others. Bob, W6DTZ, 4420 Prospect, Downers Grove IL 60515.

SWAP Gertsch freq meter FM3, cost new, \$800. Cond. perfect in looks and performance. 20-R40 MHz .001 accuracy, need linear that can deliver KW easily on cw and ssb 80-10 MHz. Ben, WA4BR, 4243 Loveless Dr., Ellenwood GA 30049. (404) 241-3888.

MUST sell HW-100 needs work, \$100; HP-23A, excellent, \$25; Heath antenna (new), \$5; AR-22 with indicator and 100 H. cable, \$15. Jim, 80 White Springs Rd., Geneva NY 14456.

EXPANDING family means smaller ham shack, must sell SX-101 Mk. III, \$125; GS8100 exciter, \$100; GS8101 linear, \$150; BC-348Q, \$35. All excellent condition. Will swap or buy evr. W9KFR, 5901 Leonard, Downers Grove IL 60515. (312) 852-9236.

HT-37 mint condition, \$140, also good SX117, \$170, will demonstrate, both for \$290. Will trade part or all with cash for good 5-band vcr. Dave Anderson, 1051 Johnson Dr., Aurora IL 60538. (312) 897-3868.

FOR SALE: Swan 345 ac supply and dc supply, \$250; Hy-Gain DB 6 2 beam, \$25; ElectroVoice 664 mike, \$25 each, or best offer. Zenith Oceanic radio, \$30. WICKA, 60 Northwestern Dr., Bristol CT 06010.

FOR SALE: Squires-Sanders SS-1R, \$450; Heathkit SB-401, \$255; Hallcrafters H101A, \$100. All in good working condition. Forking A.R.C. Johns Hopkins University, Box 2120, Baltimore MD 21218. Tel. (301) 243-6691.

14AVQ antenna, \$22.50; CDR rotor control unit, \$35; Heath vacuum V-7A meter, \$9.50; Heath audio generator AG-9A, \$25; RME RCVR preselector, \$15. W6UCJ, (213) 342-5654.

FREQUENCY meter TS 174JU 20 to 250 MHz, with ac power supply, original crystal and book, good condition, \$100. KH9YU, 3657 Tantalus Dr., Honolulu HI 96822.

FOR SALE: Hammarlund Super-Pro, 1.25 to 40 MHz coverage, \$50. Prefer pick up deal. Ed Newman, 19 Robin Hood Ct., Nesconset NY 11767.

ALLIED A-2516 receiver, 1 year old, perfect condition, with speaker, \$95. Will send CUD. WA2RDH, Robert Zecrenner, 17 Fawn Lane, Westbury NY 11590.

SELL: ART-12 2-18 MHz, 200W A1A3 with P.S. No shipping. \$40. Chas. Wallace, W1IIB, 3 Elaine St., Hampton NH 03843.

WANTED Collins Thirty S-One. Call (609) 392-2111 Ext. 600 or (609) 695-6430. Jim Zimskind, K2QJL.

UNIVAC core stacks, 4K by 36 bit, \$100; assorted DTL ICs, 10 cts. W5TYC, 507 Sudbury Rd., Litchfield MD 21090.

MINT Collins KWS-1, \$400, or trade for 51J-4. Tom Gunther, 716 So. Eighth St., Alhambra CA 91801.

SELL: Drake TR-4 MS-4 AC-4 RV-4, excellent mint condition, \$570. Kalinkowitz, 54 Boerum St., Brooklyn NY 11206.

NCX-3 with dc supply, works perfect, \$235, add postage. Bob Sunderman, WA0VSI, Box 232, Hiawatha KS 66434.

COLLINS 62S-1 VHF converter, excellent condition, \$490. Jack Power, W2AXU, 102 Upper Ferry, Trenton NJ 08628.

WANTED Drake TRs or TR4 with power supply. WA6K1BK, Kurt W. Zander, 2907 N. Baker St., Bakersfield CA 93305.

HW12A and HP13, \$130. W4BZL, 1505 Murray Lane, Chapel Hill NC 27514.

SELL: Drake 2C, 2CQ, Eico 720, package, \$270. Patrick L. Pope, WB0GWT, Rural Route 3, Sutton NE 68979.

WANTED: Heath SB-110A SB-500. W1JW, Dresser, 12 Edgewood, Trumbull CT 06611.

SELLING KWM2, 516F2, speaker, MP1, 30L1, TA33, my own mobile tray, all cables, mike. Package deal only. Demonstrated at my QTH, \$1100. HW32A, ACPS, sprk. TA33, package, \$175. W2MHL, (201) 261-8449.

COLLINS 30L-1 Kilowatt linear amplifier for sale. 811s have been replaced with four 572Bs by owner. Unit is in excellent electrical and physical condition. \$350. Can be seen by appointment, Contact R. Myers, 225 Main St., Newington CT 06111. Tel. (203) 666-1541 or (203) 879-0561.

DXERS — Dig them out of the mud. New low noise dual gate MOSFET preamplifier. Nominal 20 dB gain, 10-30 MHz. Complete in cabinet, \$29.95. Dynacom, 1183 Wall Rd., Webster NY 14580.

SELL: HT 44 and A.C., \$230. David Levine, 8 Brayton Rd., Scarsdale NY 10583.

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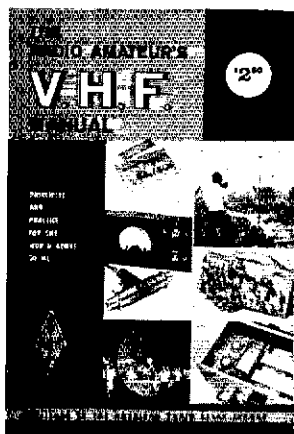
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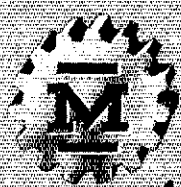
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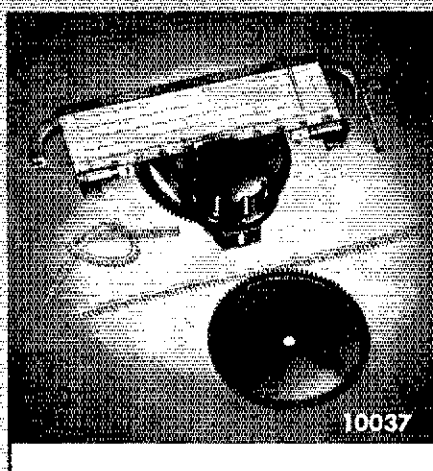
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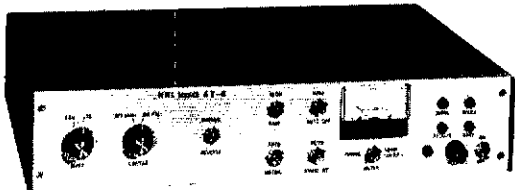
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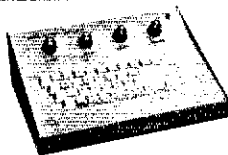
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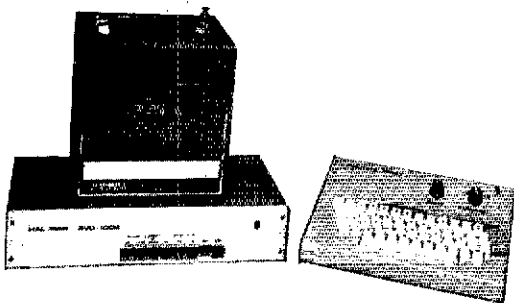
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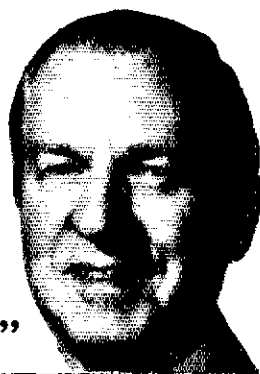
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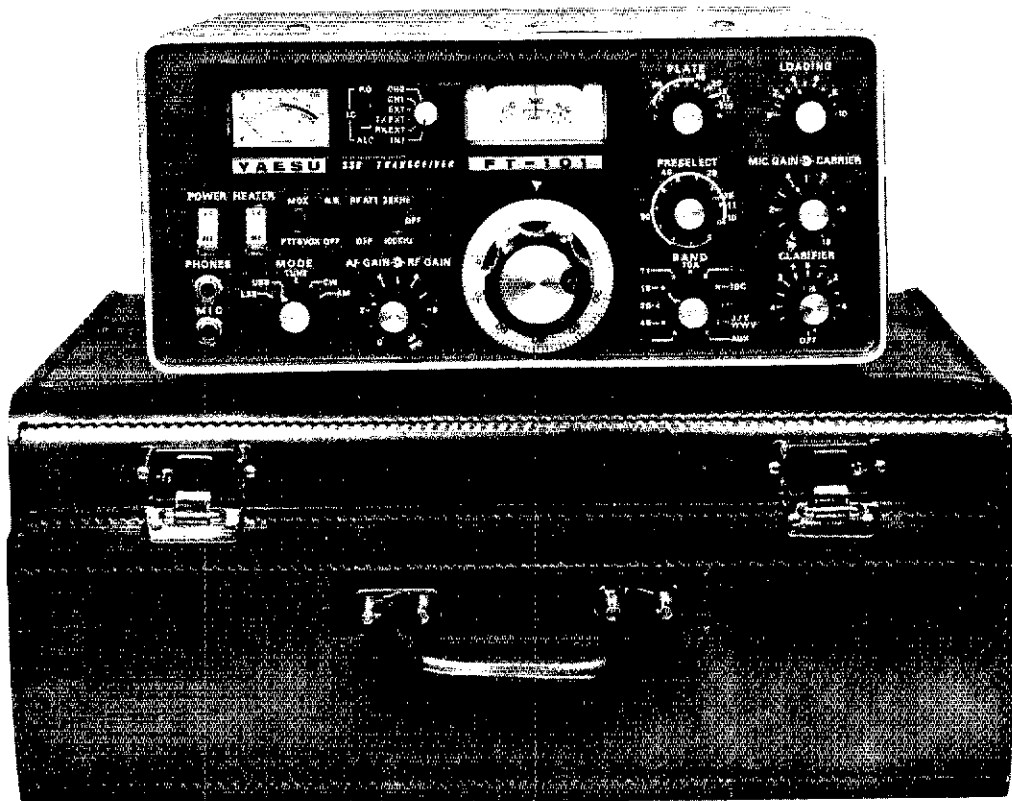
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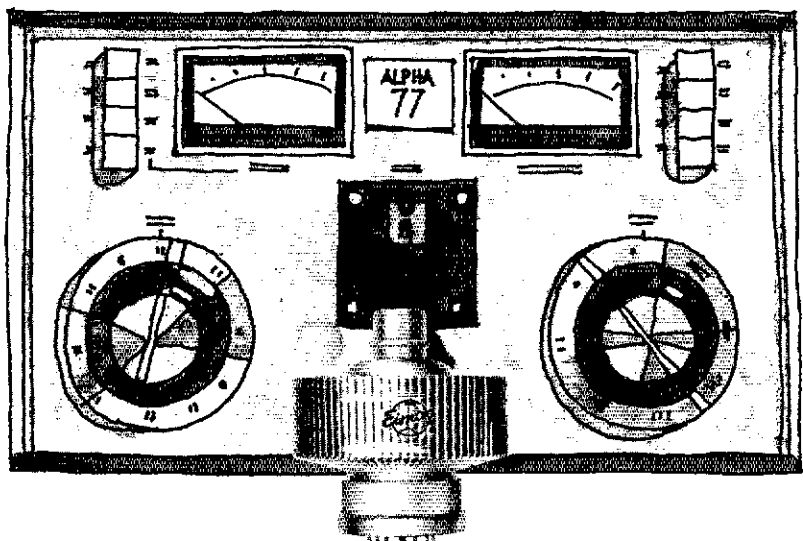
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